

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4366					How about sea level rise? [Shouraseni Roy, United States of America]	Noted.
3605					These references cannot be left out: Dell M, Jones B, Olken B. What Do We Learn from the Weather? The New Climate-Economy Literature. Journal of Economic Literature. 2014. [Valentina Bosetti, Italy]	Noted. References to be considered.
1302					General comment on the whole chapter: Chapter 1 sets up a conceptual framework for the SR with a strong focus on issues of equity and justice, but this emphasis is not carried through into Chapter 3 where there seems to be a particularly strong focus on changes in the natural systems without an equivalent consideration of the meaning of these changes for achieving a more sustainable, just and equitable world. As a result this chapter is unbalanced with insufficient attention being given to assessing the social implications of changes in natural systems and the multidimensional social impacts of climate change. Establishing this balance is critical, as this chapter must be accessible to policy makers and practitioners who need to understand not only the scale of the problem, but what this might mean for the communities they are accountable to. [Debra Roberts, South Africa]	Noted. Chapter 3 focuses on the impacts that are likely at 1.5°C on human and natural systems. The evidence is carefully assessed and policy prescription avoided.
3606					Estimating economic damage from climate change in the United States Hsiang, Kopp, Jina, Rising, Delgado, Mohan, Rasmussen, Muir-Wood, Wilson, Oppenheimer, Larsen, Houser, Science (2017) [Valentina Bosetti, Italy]	Noted. Reference included.
3607					Social and economic impacts of climate T.A. Carleton & S.M. Hsiang, Science (2016) [Valentina Bosetti, Italy]	Noted. Reference included.
3608					The chapter completely ignores the issue of the monetary and non monetary assessment of the value to humanity of keeping temperature below 2°C [Valentina Bosetti, Italy]	Noted. Reference included.
3609					No reference is made to SSPs but for water and health impacts, what are the implications of future socio-economic scenarios on the impacts from climate change? [Valentina Bosetti, Italy]	This is the focus of other chapters in the report.
20781					Number of the figures must be revised with that written in the text. [Amal Hussein, Egypt]	Editorial - copyedit to be completed prior to publication
20782					Some figures are clear as example Figures 3.18, 3.20, ...so on [Amal Hussein, Egypt]	Editorial - copyedit to be completed prior to publication
2620					impacts have been reported on a purely natural science basis, with limited reference to socio-economic factors and how those would affect the intensity of impacts/resilience? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	These elements are covered in chapter 4 and five.
17212					The executive summary should mention, in a quantitative way, relevant feedbacks in global warming such as the release of methane to the atmosphere by the melting of permafrost, both in 1.5 and 2 degrees scenarios. [Carlos Garci Soto, Spain]	We explore this issue and whether or not it qualifies for executive summary. Note that statements included in the executive summary have to relate to the question of impacts in human and natural systems at 1.5°C and 2°C. Not all the issues mentioned are actually suitably qualified to be included.
17213					The executive summary could also include information about the relationship (or not) between the intensification of hurricanes and typhoons with climate change, given the recent extreme events and the increased societal concern. [Carlos Garci Soto, Spain]	We explore this issue and whether or not it qualifies for executive summary. Note that statements included in the executive summary have to relate to the question of impacts in human and natural systems at 1.5°C and 2°C. Not all the issues mentioned are actually suitably qualified to be included.
20558					I mainly focus on chapter 3 and 4 as I believe my expertise is more relevant here. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Ok.
6223					The chapter gives a comprehensive detailed account of the observed and projected impacts of 1.5C and 2.0C warming on various natural and human systems. The authors have taken great pains in collecting the relevant data. The differences in some of the natural systems between 1.5 and 2.0C are hair thin. Some of the changes are still unanswered (e.g. in Table 3.1) and some of the papers are various stages of publication. Hopefully the answers will be found and the papers will be published by the time SOD or subsequent drafts. [Muhammad Mohsin IQBAL, Pakistan]	Noted.
6224					Some of the Tables (e.g. Table 3-2 to 3-6) are not reader-friendly in the present form. Their printed versions can hardly be read without using a magnifying lense. [Muhammad Mohsin IQBAL, Pakistan]	Editorial - copyedit to be completed prior to publication
20567					In general again: given the impacts on climate change and its impacts on SIDS it would be good if this report could stir future actions by the international political and general community. What will happen with the affected populations if the sea levels are so high that these obliterate the country? I agree that it is better not to contemplate the worst case scenario, but if it happens will there be a concerted action? In the worst case scenario: there will be a bigger number of refugees, where will this people be relocated? Or will we passively see them perishing? Or being used by human traffickers? It would be important for the future to have plans in place and agreed by all on how to deal with these situations. Considering the most nefarious consequences might keep nations focused on what needs to be done given the human and economic costs associated with the worst case scenarios. These plans could be drawn in consultation with the populations and then put to the UN. It is crucial to be prepared. It might never happen, but if this happens there will be a legal framework that acknowledges that we are all inhabitants of the same planet, and that borders are a relatively recent concept in its history. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	We thank the reviewer for their comments. We would look at the particular ideas that have been presented - Noting that the IPCC assessment process cannot be policy prescriptive - and we must stick with the dry facts and assess their implications.
1403					There is potential for novel effects from SRM, but by suppressing climate system feedbacks, the bulk of the effects of SRM are direct offsets of the effects of carbon dioxide. (See MacMartin et al., 2015, "On solar geoengineering and climate uncertainty" or the recent review by Irvine et al., 2016.) [Ben Kravitz, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1404					I think this chapter is where being pigeonholed by the "pathways" framing set up in Chapter 1 is doing the report a disservice. You rightly say that you can't talk about the climate effects of 1.5°C without talking about the path to getting there. But because the pathways don't include SRM, you can't talk about the effects of SRM, which I think is missing a huge portion of the conversation. [Ben Kravitz, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1405					This chapter suffers from the lack of integration of SRM. It reads sort of like, "Well, we had better say something about SRM, so here's a small section." This is dissatisfying. [Ben Kravitz, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10879					chapter 1 talks about 1.5 or 2C world, while chapter 3 uses other names (see comment 8), shouldn't all chapters call it in a same way? [Carolina Vera, Argentina]	Agreed. We have taken this on board.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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7554					I work on urban climatology and although if I did a wider reading I focused my review on the paragraphs concerning urban areas (Section 3.3.2.1, pg 22; Section 3.3.2.2, pg 27 and Section 3.5.2, pg 88). [Julia Hidalgo, France]	Noted.
3729					Annex 3.1, Figure S3.4: Are not the upper and lower figures mixed up? It appears so from reading the figure legends and looking at what is plotted in the two figures. [Fredrik Charpentier Ljungqvist, Sweden]	Noted.
3730					Annex 3.1, Figure S3.5: These figures need to be provided, as Figure SPM.8b in IPCC AR5 Summary for Policymakers, with hatching indicating regions where the multi-model mean is small compared to natural internal variability (i.e., less than one standard deviation of natural internal variability in 20-year means) and with stippling indicating regions where the multi-model mean is large compared to natural internal variability (i.e., greater than two standard deviations of natural internal variability in 20-year means) and where at least 90% of the models agree on the sign of change. Otherwise, the figures will give a false impression of a larger certainty in the direction and amplitude of precipitation change than actually exists. [Fredrik Charpentier Ljungqvist, Sweden]	Noted.
9618					Overall, the assessments about impact of the global increase of 1.5 ° on natural and human systems is not enough, and many assessments have paid much more attention to the impact of increasing 4? above pre-industrial levels on the natural and human systems. Additionally, definition of the 1.5 ° above pre-industrial levels should be consistent with chapter 1, some assessments are the effects of 1.5 ° above pre-industrial levels in region not global scale. Additionally, adaptation and mitigation should be consistent with chapter 2 and chapter 4. [Jianguo Wu, China]	Noted - We will consider these comments as we reorganise and rewrite different sections.
2707					Chapter 3 is extremely valuable and the author team is to be congratulated for the impressive level of detail, despite lack of targeted literature. However, it is already very long and some sections are still to be developed, necessitating careful condensing of the text. [Penny Urquhart, South Africa]	Thank you very much for the compliment. We are rewriting the chapter in many places to help improve the narrative, evidence, and issues like competence language
9619					The assessments of the attribution and detection the impacts of the past climate change on natural and human systems are not inadequate. In addition, the effects of climate change on environmental pollution is been concern, including air pollution, water quality and soil pollution, so add some assessments for these aspects. [Jianguo Wu, China]	Noted - We will consider these comments as we reorganise and rewrite different sections.
2708					The risk tables presented in Chapter 3 are useful and should be further developed. They potentially provide a useful X-chapter summary mechanism – in this case, equity, poverty and sustainable development issues could be integrated into these tables - this could be discussed with Chapter 5. [Penny Urquhart, South Africa]	We have developed a series of new tables which I think will be more effective. Several other reviewers did not feel that they were effective and that they were too repetitive between AR5 and the present report.
9883					here are some references: Clayton, S., Manning, C., Krygsman, K., & Speiser, M. (2017). Mental health and our changing climate: Impacts, implications, and guidance. Washington, D.C.: American Psychological Association and EcoAmerica. <a href="http://ecoamerica.org/wp-content/uploads/2017/03/ea-apa-psych-report-web.pdf">http://ecoamerica.org/wp-content/uploads/2017/03/ea-apa-psych-report-web.pdf</a> [Susan Clayton, United States of America]	We have assessed these and will include those that are relevant but are missing
9884					Cohen, A. H., & Krueger, J. S. (2016). Rising mercury, rising hostility: How heat affects survey response. <i>Field Methods</i> , 28(2), 133-152. doi:10.1177/1525822X15627974 [Susan Clayton, United States of America]	We have assessed these and will include those that are relevant but are missing
9885					Fritze, J., Blashki, G.A., Burke S., & Wiseman, J. (2008). Hope, despair and transformation: Climate change and the promotion of mental health and wellbeing. <i>International Journal of Mental Health Systems</i> , 2, 13. [Susan Clayton, United States of America]	We have assessed these and will include those that are relevant but are missing
9886					Norris, F.H., Friedman, M.J., & Watson, P.J. (2002). 60,000 disaster victims speak: Part II. Summary and implications of the disaster mental health research. <i>Psychiatry</i> , 65(3), 240-60 Vida, S., Durocher, M., Ouarda, T., & Gosselin, P. (2012) Relationship between ambient temperature and humidity and visits to mental health emergency departments in Quebec. <i>Psychiatric Services</i> , 63 (11), 1150-1153. [Susan Clayton, United States of America]	We have assessed these and will include those that are relevant but are missing
6310					I hope that in the final version "Wartenburger et al., in review" will be replaced with a more definite reference [Dmitry L. Musolin, Russian Federation]	Wartenburger et al has been already published and it is included in the references.
19626					In general, treatment of soil carbon should be made uniform across chapters, including chapters 3, 4, and 5. [Doreen Stabinsky, United States of America]	We note this and will strive to make this happen.
9900					In order to take urgent action against the worst effects of the climate change, it is extremely important to be able to influence politicians and decision makers, which usually have poor or no scientific background. Within this context, a key factor is that the general public, and especially decision makers, understand that scientists know (not "believe") that a great part of the climate change is caused by human activities and anthropogenic emissions (as stated clearly in Section 3.2.2.3 and in lines 33-36, page 17, Chapter 3). If it is clear that humans are causing climate change, then it is also clear that humans can avoid the worst effects by changing their behaviour. While this is well known, scientists should emphasize it whenever possible. The attribution of global warming to human activities is stated clearly in Chapter 3, but it is not reflected in the Executive Summary. And this is crucial, because in the best scenarios, politicians and decision makers read the executive summaries, not whole reports. The Executive Summary of Chapter 3 can have a much stronger effect on the reader if it included a paragraph about the attribution of climate change to human activities. For example, lines 33-36 of page 17 (Ch 3) can be included in the Executive Summary. [Bruno Pisani, Spain]	Noted. This report is assessing the evidence or impacts on human and natural ecosystems. As the IPCC process, it carefully does this without laying out policy prescription dialogue.
20146					See Corner and Pidgeon (2010) on more social and ethical implications of SRM: Corner, A./Pidgeon, N. (2010) <i>Geoengineering the Climate: The Social and Ethical Implications</i> , in: <i>Environment: Science and Policy for Sustainable Development</i> , Vol. 52, No. 1: Is intentional large-scale manipulation of the climate ethical at all? Whose agreement and consent would need to be sought? [Lili Fuhr, Germany]	We have assessed these and will include those that are relevant but are missing
20658					For sections 3.5 and 3.6: Authors could align findings about impacts with the four pathways introduced in chapter 1 (that would generally be helpful for the reader to understand impacts associated with the different choices) to show what is at stake for key values to decision makers. It would be helpful if those subsections in 3.5 and 3.6 that COMPARE 1.5 with 2 degrees coordinate with authors of chapter 4 and 5--> either each chapter should contrast and compare 1.5 and 2 degrees impacts and options, or "save" the comparison of 1.5 and 2 degrees for Chapter 5. That would mean that chapters 1-4 present the pathways, general characteristics, impacts, and options for 1.5 (which will give the reader very clear ideas about what each of the four pathways presented in chapter 1 entail), and section 5 to close out the special report by showing the consequences for humanity of 1.5 vs. a 2C for the aspirations of sustainable development [Koko Warner, Germany]	This is a valid point. We are meeting to develop a better narrative between the various chapters - 1 of the ambitions is to develop stronger linkages between different sections - using the same way of integrating the biological and human implications is one of the key things that we want to do in the next set of drafts.

**IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3**

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20659					Make more clear in chapter 3 the trade-offs, co-benefits (not consistently represented), and impacts associated with the different pathways. Of particular concern: methods of assessment section could be better placed in Chapter 2, and its written in a way that can be hard for a decision maker or non-modeler to make sense of. [Koko Warner, Germany]	Agreed, including this in the rewriting of the chapter.
20660					Box 3.2 and Box 3.3 could better organize content. Title of Box 3.2 is not helpful because it doesn't describe the content of the box. Move Box 3.3 behind section 3.3.6 which also talks about snow and permafrost for the ease of the reader. [Koko Warner, Germany]	We will consider this in the light of the other comments about this sequence.
20661					Similar to Chapter 1, if its allowed under IPCC chapter outline rules, IF sections 3.3, 3.4., 3.5, and 3.6 stay in chapter 3 (suggest author teams coordinate to reduce redundancies and strengthen overall storyline of the special report), consider moving section 3.5 ahead of 3.3 and 3.4. this suggestion (if possible) would put society and people first, and then proceed to explain how the physical impacts and ecosystem impacts must be paid attention to because they contribute to the societal impacts associated with the possible different pathways that decision makers could "select"). [Koko Warner, Germany]	We will consider this in the light of the other comments about this sequence.
20148					Environmental Modification Convention (passed by the United Nations in 1977) bans the use of weather modification for military or other hostile use. Research on geoengineering has its roots in military strategies developed for weather modification. Geoengineering proposals may well violate the terms of this treaty. See Corner, A./Pidgeon, N. (2010) Geoengineering the Climate: The Social and Ethical Implications, in: Environment: Science and Policy for Sustainable Development, Vol. 52, No. 1 and M.C. MacCracken (2006) Geoengineering: 'Worthy of Cautious Evaluation', Climatic Change 77, pp. 235-243 and Robock, Alan, 2008: 20 reasons why geoengineering may be a bad idea. Bull. Atomic Scientists, 64, No. 2, 14-18, 59, doi:10.2968/064002006 [Lili Fuhr, Germany]	We have assessed these and will include those that are relevant but are missing
20150					Braun et al. 2017 Public perception of climate engineering and carbon capture and storage in Germany: survey evidence, in: Climate Policy, <a href="http://dx.doi.org/10.1080/14693062.2017.1304888">http://dx.doi.org/10.1080/14693062.2017.1304888</a> - show how SRM is "widely rejected" among the German public. [Lili Fuhr, Germany]	We have assessed these and will include those that are relevant but are missing
20153					Geoengineering also does nothing to challenge the systems of production and consumption that might be considered unsustainable for reasons other than greenhouse gas emissions associated with them. Corner, A./Pidgeon, N. (2010) Geoengineering the Climate: The Social and Ethical Implications, in: Environment: Science and Policy for Sustainable Development, Vol. 52, No. 1 [Lili Fuhr, Germany]	Noted
20155					(...) history shows us that complex technical and environmental systems often fail because of unanticipated interactions between their component parts, while the processes of societal oversight typically are insufficiently sensitive to emerging warning signs. Corner, A./Pidgeon, N. (2010) Geoengineering the Climate: The Social and Ethical Implications, in: Environment: Science and Policy for Sustainable Development, Vol. 52, No. 1 and B. A. Turner and N. F. Pidgeon. Man-Made Disasters (Oxford, UK: Butterworth-Heinemann, 1997); European Environment Agency, Late Lessons from Early Warnings: The Precautionary Principle 1896–2000, Environmental Issue Report no. 22 (European Environment Agency, Copenhagen: 2001). [Lili Fuhr, Germany]	Noted
20158					Robock, Alan, 2008: 20 reasons why geoengineering may be a bad idea. Bull. Atomic Scientists, 64, No. 2, 14-18, 59, doi:10.2968/064002006: 1. Effects on regional climate, 2. Continued ocean acidification, 3. Ozone depletion, 4. Effects on plants, 5. More acid deposition, 6. Effects on cirrus clouds, 7. Whitening of the sky, 8. Less sun for solar power, 9. Environmental impacts of implementation, 10. Rapid warming if deployment stops, 11. There's no going back, 12. Human error, 13. Undermining emissions mitigation, 14. Cost - especially when accounting for social and environmental costs and damages, 15. Commercial control of technologies, 16. Military use of the technology, 17. Conflicts with current treaties (ENMOD), 18. Control of the thermostat - impossibility of democratic governance and controllability, 19. Questions of moral authority, 20. Unexpected consequences. Chapter 3 authors should make sure these fundamental problems are adequately covered and reflected in their treatment of SRM. [Lili Fuhr, Germany]	Noted
3530					general comment on chapter [Sylvia Sander, Monaco]	Comment incomplete?
3535					entire chapter: the boxes are in a very premature draft version making their review impossible. [Sylvia Sander, Monaco]	Noted
2512					On attribution of impacts, see Carleton and Hsiang (2016) and references therein.	Noted. Reference included.
3536					entire chapter: often words are repeated in one sentence but with different meanings, e.g. increasing, following... more specific comments below [Sylvia Sander, Monaco]	Substantial amounts chapter have been rewritten, reducing overlap, typographical errors, and repetition of sections of the chapter..
2787					This chapter is very long and promises to get longer when missing sections are drafted and anticipated research results become available. Despite its length it does not the regional summaries found in WG II reports (there are a few regional boxes). Perhaps sections 3.3 through 3.7 could take the form of summary tables (already drafted) with no more than a page of key points for each table. Then there would be space for regional summaries that I think would be appreciated by governments and lay readers. [Erik Hailes, Canada]	We are undergoing rewriting and a process by which we will shorten chapter. Considering tables plus online material - for reducing page. We are also adding a table that summarises regional impacts.
3835					No comments [Mats Winroth, Sweden]	Noted.
7164					Consider summarizing in the executive summary if the difference between 1.5 °C and 2 °C of warming is only a matter of a gradual increase in climate risks and impacts or also includes some non-linear effects [Iulain Florin VLADU, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9476					I think this chapter is in excellent shape for a first order draft - It brings many pertinent findings together in a clearly expressed and coherent manner. I realise there are several places where the author team are waiting on imminent publications to provide assessment comments, produce boxes etc - I hope these come to hand in time. [David Wratt, New Zealand]	Noted.
2319					While the report focusses on a comparison of air temperature increases of 1.5 or 2°C by 2100 (compared to the reference period), it is not always clear in the discussion of impacts what the timing of these impacts will be. Responses in natural systems are also transient in nature and can lag behind the change in climate and it is not clear at times in the text whether we are considering an equilibrium response (the projected impact may occur well after 2100) or the impact that will occur in 2100. Is the idea to consider impacts that might occur over the next few decades (50-100yrs) to provide information on adaptation that may be required? Additional specific comments regarding this issue are also offered below. [Sharon Smith, Canada]	We agree and tightened the text around this particular issue - further developed in the TOD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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6168					In section 1.6, it is proposed to use specific confidence language. Throughout Chapter 3, different words are used to refer to levels of evidence, not necessarily in concordance with the three categories presented in Figure 1.7 (limited, medium and robust evidence). For example: substantial evidence (page 3-17, line 26), insufficient evidence (page 3-28, line 44), strong evidence (page 3-37, line 14), considerable evidence (page 3-43, line 26), etc [Vanessa Pántano, Argentina]	We also agreed that we have been inconsistent with the use of language and am working on rectifying that in the SO2. We're also going to eliminate loose use of the words associated with the competence language, as much as is possible.
6169					I assume resolution of the figures will be improved for the final version since some of them are difficult to read. For example: reference on the right in Figure 3.2 (page 3-18); lines in Figure 3.19; double caption in Figure 3.18 [Vanessa Pántano, Argentina]	Editorial - copyedit to be completed prior to publication
7450					Please check for consistency in use of terminology, such as for example "inundation" and "flooding". These terms are used somewhat synonymously. In this case flooding is a more accessible terminology for the average reader, but the most important point is consistency across the report and providing a definition of the chosen terminology. [Øyvind Christophersen, Norway]	Accepted. To be improved.
1310					General comments to the whole Chapter 3. Authors team have done great job composing the FOD. Comments below hopefully can help in preparation the SOD. In spite of the fact that literature on impacts, risks, opportunities and consequence for 1.5°C versus 2°C warming is scarce, authors team may want to focus on it preparing SOD. The greater part of the 165 pages of FOD is description of the AR5 results and subsequent papers not dealing with 1.5°C versus 2°C warming effects, there are whole sub-sections with no focus information. Authors team may want to cut these parts of the Chapter giving references to chapters and sections of the AR5 and other literature, where appropriate. Another way for decreasing size of the Chapter 3 is to avoid repetitions, see specific comments please.  Communication of confidence for statements on impacts, risks, opportunities and consequence for 1.5°C versus 2°C warming is virtually absent, confidence language should be used in SOD. If a statement based on one paper and authors' judgement, this should be clear for readers. Low/medium evidence and low/medium agreement to determine the level of confidence in a key findings may be rather common in this SR because of lack of literature. [GREGORY INSAROV, Russian Federation]	We thank the reviewer for some useful comments here. We are working to reduce the amount of AR5 and discussion on non-1.5°C versus 2°C comparisons. We are developing significant block of SOM material online. We appreciate we have not used competence language consistently across FOD CH3 and have worked on systematically adding language throughout the chapter where appropriate.
2336					There are some other major assessment reports, in particular related to the Arctic, that are relevant to this discussion of impacts and should probably be consulted. These include AMAP assessments which are in press (with the policy maker summaries or overview reports already available): update to 2011 Snow Water Ice and Permafrost in the Arctic (SWIPA 2017), regional reports for Adaptation, Actions for a Changing Arctic. Information on changes in natural systems is provided in the latest State of the Climate (published in BAMS) and Arctic Report Cards. Other recent assessments that might be of interest include Canada's Changing Coasts and Climate risks and adaptation practices for the Canadian transportation sector 2016 both of which are available at adaptation.nrcan.gc.ca [Sharon Smith, Canada]	Taken into account, at least in section 3.4
6180					The length of the Chapter can be reduced by extracting repetition. For example, lines 49-51 of page 3-105 are exactly the same as lines 31-33 of page 3-28. Another example, lines 20-23 of page 3-77 repeats the ideas already explained in sections 3.3.4 (for droughts) and 3.3.5 (for floods) [Vanessa Pántano, Argentina]	Accepted. Text revised.
17200					First of all my congratulations to all the authors and particularly to the chapter coordinator for the good work done. It constitutes a rigorous and very well documented report that will be very useful for scientists and society. [María-Carmen Llasat, Spain]	Noted.
5432					It is appreciated that the chapter compares the impacts of a 1.5 degrees world to a 2 degrees world. However, it would also be helpful to compare the impacts of a 1 degree world with those in a 1.5 degrees world - a change that we will have to manage within the coming 25 years! Given the significant impacts already now it would be important to stress the need to enhance adaptation action in this period and to make stronger efforts to mitigate GHG emissions now in order to avoid further warming after around 2050. [Klaus Radunsky, Austria]	This is a good point we have adopted this in places.
5433					It would be important to highlight that the current atmospheric concentration of GHGs would ultimately result in a warming of about 1.5 degrees given the inertia of the climate system. All emissions of GHGs in the atmosphere therefore would have to be compensated by CDR later on if we want to limit ultimate warming to 1.5 degrees. Chapter 2 should indicate the required investments that would be needed to achieve this. Current estimates are in the range above 150 USD per ton CO2!! [Klaus Radunsky, Austria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5434					This chapter on impacts should also address the problem that current NDCs - if implemented - would result in warming of around 3 degrees C by 2100 whereas the current actual efforts would result in warming of even 4 degrees C by the end of the century! This makes adaptation, in particular climate proofing of infrastructure projects - very challenging and might result in significant maladaptation! [Klaus Radunsky, Austria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5435					The treatment of SRM as reflected now in chapter 3 is supported. It would be misleading to include any emissions scenarios that assume a significant contribution of SRM to meet the goals of the Paris Agreement. Whereas CDR has been implicitly assumed to be deployed in the future in the past this was not the case for SRM, e.g. because of the large uncertainties in impacts, unintended side effects, lack of any recognition as a viable option at the global scale at the political level. [Klaus Radunsky, Austria]	We agree.
5437					The description of the risks of SRM does not mention the need to use that approach for the lifetime of CO2 in the atmosphere. The reader should be informed about the current knowledge about that lifetime which is in the range of millenia!!! This seems very important information that should be included in chapter 3. Such information could be found in AR5; the SR 1.5 should update the reader on any new findings, if any related to lifetime of CO2 in the atmosphere. [Klaus Radunsky, Austria]	We agree - have included this in TOD.
12356					[1/4 ] is an overarching issue with the interpretation of the Paris Agreements 'well below 2°C' language throughout the full report.  The expression 'holding ... well below 2 °C, pursuing 1.5' in the legally binding long term temperature goal (LTTG) of the Paris Agreement is a substantial strengthening of previous language from UNFCCC decisions at Cancun and requires increase a substantial increase in both the margin and likelihood by which warming is held well below 2 °C compared to 'hold below 2 °C' (e.g. Schlessner et al. 2016). This is the very raison d'être of this special report which appears to be have been overlooked in the way that the 'well below 2°C' has been interpreted. Disconnecting 1.5oC from 'well below 2°C' is also problematic throughout the report as this legally interpretative. These elements are indivisible parts of the Paris Agreement LTTG. ...ctd [2/4] [Bill Hare, Germany]	Thank you for these useful comments. We agree that disconnecting well below 2°C from 1.5°C is potentially problematic. However, chapter 3 is trying to be consistent with the overall position taken by the report. We will take this further in our next round of editing.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12357					[2/4] In the AR5, the IPCC whilst it did not use a single interpretation of 2°C pathways linked to the Cancun 'below 2°C' language it did draw a strong distinction between likely below 2oC scenarios, and the available 1.5oC pathways. This is clear from the structure of the WGIII SPM eg emphasis text ("Mitigation scenarios in which it is likely that the temperature change caused by anthropogenic GHG emissions can be kept to less than 2°C relative") and Table SPM.1 where it can be seen that there is a separate column for the 1.5oC pathways. At the UNFCCC (e.g. 1./CP21 paragraph 17) of level the hold below 2°C pathways from the AR5 are associated with the classificatin of 66% probability of holding warming below 2°C. It was concerns over the impacts identified under these pathways that led to the UNFCCC Structure Expert Dialogue and to the new LTTG in the Paris Agreement. ctd [3/4] [Bill Hare, Germany]	Some important points here which we have tried to take on.
1350					General comments to the whole Chapter 3. Authors team have done great job composing the FOD. Comments below hopefully can help in preparation the SOD. In spite of the fact that literature on impacts, risks, opportunities and consequence for 1.5°C versus 2°C warming is scarce, authors team may want to focus on it preparing SOD. The greater part of the 165 pages of FOD is description of the AR5 results and subsequent papers not dealing with 1.5°C versus 2°C warming effects, there are whole sub-sections with no focus information. Authors team may want to cut these parts of the Chapter giving references to chapters and sections of the AR5 and other literature, where appropriate. Another way for decreasing size of the Chapter 3 is to avoid repetitions, see specific comments please.  Communication of confidence for statements on impacts, risks, opportunities and consequence for 1.5°C versus 2°C warming is virtually absent, confidence language should be used in SOD. If a statement based on one paper and authors' judgement, this should be clear for readers. Low/medium evidence and low/medium agreement to determine the level of confidence in a key findings may be rather common in this SR because of lack of literature. [GREGORY INSAROV, Russian Federation]	We thank the reviewer for some useful comments here. We are working to reduce the amount of AR5 and discussion on non-1.5°C versus 2°C comparisons. We are developing significant block of SOM material online. We appreciate we have not used competence language consistently across FOD CH3 and have worked on systematically adding language throughout the chapter where appropriate.
12362					[2/4 # Treatment of regional issues: Similarly, the level of detail on which regional information is treated differently between the sections making it difficult to assess it and leading to a lot of repetition (I don't know, how often I read about the Med region drying or the Arctic sea ice melt...). Plus, key conclusions from the AR5 e.g. for 2°C warming for Africa are left unmentioned. Obviously, a comprehensive regional coverage cannot be done. But maybe the key risks from the regional chapters in the AR5 could be revisited and updated where appropriate? ..ctd [3/4] [Bill Hare, Germany]	We have significant different parts of the report and reduced the overlap. Further streamlining of the manuscript would occur as we also reduce the length of chapter 3.
12363					[3/4] # Tipping points: This issue is very confusingly dealt with. There's a box on it (that could be improved considerably), there are abrupt changes (e.g. 3.4.3.2.2), there is RFC5, and there are 'regional tipping points' 3.6.6. This needs to be improved. # Key concepts: RFCs, hot spots, key risks. All side by side. This does not help to streamline the chapter. # Adaptation potential: There is no mention of reduced adaptation pressure, or exceeded limits to adaptation at 1.5°C or beyond. ...ctd [4/4] [Bill Hare, Germany]	We have addressed these comments significantly reorganised and rewritten the text and box on tipping points. We still have considerable work to do in order to smooth out repetition and confusion that exists around tipping points.
12880					Congratulations to all that have been working on collaborating in this chapter, well done. [Jorge Carrasco, Chile]	Thank you.
5713					Chapter 3 has an exceptional number of references. Please check if they are all cited in the chapter. [Hong Yang, Switzerland]	Noted.
5728					Overall, Chapter 3 needs much more work, including completing many subsections, deleting the repetitions, and streamlining the text for coherence. [Hong Yang, Switzerland]	Noted.
2918					The whole chapter 3 is in my opinion to wordy and not really well organized. It could be much shorter and with clearer statements. As you already wrote in the beginning of chapter 1, there are only well known things presented. Then you add the findings from some new publications. Which is in general fine to me. But it should also be stated at the beginning of chapter 3 that also them do not lead to any groundbreaking news. [Sabine Wurzler, Germany]	Noted.
12358					[3/4] Throughout this report it seems that 'holding well-below 2°C' is solely interpreted as likely (66%) below 2°C in apparent contradiction to the factors mentioned above. This is, however, not stated explicitly apart from references on what is 'often used' (e.g. in Box 1.1). This apparent interpretation for the PA LTTG is policy prescriptive. It is clear from the UNFCCC and IPCC handlinh of this issues that 'well-below 2°C, pursuing 1.5C LTTG means that pathways consistent with this need to be hold warming significantly lower than the warming the 66% below 2°C previously applied, and hence a direct corollary of this is that PA LTTG consistent pathways must have a substantially higher than 66% probability of warming below 2oC. In addition to interpretations focussing on probability, 'hold well-below 2oC' requires that peak warming of pathways consistent with the PA LTTG must be significantly lower than in the former hold below 2oC pathways. Given the peak-and-decline nature of most stringent mitigation pathways, this is a distinct issue from e.g. probabilities in 2100. In this report it is essential that clear quantitative distinctions are drawn between the former hold below 2oC pathways from the AR5 generation and those consistent with the PA LTTG hold well below 2oC, 1.5oC pathways in relation to peak 21st century warming, and likelihood of 1.5oC over 21st century and in 2100. ctd [4/4] [Bill Hare, Germany]	The initial section of chapter 3 has attempted to take this issue on board. These are relevant comments.
12359					[4/4 ]Therefore, it is important to include a subsection in Ch 01 discussing different possible interpretations of the 'hold well-below 2°C, pursuing 1.5oC' language similar to the interpretation of 'balance' or 1.5°C. This should clearly differentiate from the earlier AR5 and UNFCCC interpretation of "hold below 2oC" and show quantitative distinctions between these in the available scenario literature ( eg pathways with a very likely (90%) probability of not exceeding 2°C over the 21st century and being below 1.5oC by 2100. Pathways consistent with a very likely below 2°C interpretation should also be assessed in a separate category in Ch 02. The usage of 'well below 2°C, pursuing 1.5oC' as a stand-alone phrase is in any case very problematic and should be replaced by classical IPCC terminology, i.e. likely or very likely below 2°C or associated probabilities. [Bill Hare, Germany]	Comment pertains to chapter 1 not chapter 3 - although we recognising the need to have consistent responses of both cases. Will be considered in the next draft ( and we will have conversations with chapter 1).

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12360					The use of temperature stabilization framing in relation to 1.5°C and the Paris Agreement LTTG is policy prescriptive. The Paris Agreement LTTG in Article 2.1 does nowhere refer to this, nor does it directly imply that temperature stabilization is the goal. In fact reference to the term stabilization was specifically rejected by a large number of countries in the formulation of this goal. Whereas there are scenarios in the literature that may stabilize warming at some level this does not mean they are consistent with the PA LTTG. There are several different ways in which A 2.1 can be interpreted, but one important way relevant to the vulnerable countries who sought 1.5 language in the legally binding objective of the PA is that 1.5°C is a limit in extremis. This means that it is an upper bound not to be exceeded and in the longer term to warming to be limited below this level. Consequently the stabilization framing of this section cuts across this interpretation and is hence policy prescriptive. [Bill Hare, Germany]	We accept the point being made here and have modified some of the language in the report. However, we are planning to revisit this issue in the next round of edits.
12361					[1/4] A lot of work remains in this chapter. The current state made it quite difficult to review, with key elements (i.e. boxes) missing and limited consistency between the sections.  Some general comments/remarks:  # A WG1/WG2 divide is very apparent in the chapter. WG1/WG2 approaches stand side by side and little to no integrations is achieved. By doing so, the chapter comes close to what was to be avoided – a mini-AR6. Just to illustrate my point: There are different concepts used between i.e. 3.3. and 3.4 – one linking back to the SREX, the other updating the key risks from WG2. One is using ‘hot spots’, other aggregate RFCs. There are very different ways evidence from the AR5 is being reviewed or build upon (sometimes not at all). I understand that this such an integration is a very challenging task in particular given the limited time left, but I am also optimistic that it can be achieved. While reading it, I felt that many sections could benefit from referencing back more clearly to the AR5 lining out what the AR5 and just focus on new science that would alter the AR5 conclusion on the matter or that is of key relevance for 1.5 ...ctd [2/4] [Bill Hare, Germany]	We have been working on integrating the narrative across the different sections and across the special report. We plan to work on this further in the next draft, with plans for a special report to improve the flow of the narrative.
6520					For the whole chapter, from the way it is written right now, it is not always clear, where this report gives additional/updated info compared to earlier IPCC reports. That should be kept in mind when further working on it. Also, the same information is repeated sometimes from one subchapter to the next. [Heike Hebbinghaus, Germany]	Accepted. Text revised and improved.
8824					Figures need to be cleared * 3.2, 3.7, 3.12, 3.17, 3.18, 3.20 [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8833					Many figures are inserted with captions. Therefore the figures are now has two captions. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
13699					Use of upper and lower case inconsistent throughout chapter (e.g. cross-chapter Box vs Cross-chapter box, vs. cross-chapter box; Pre-Industrial vs pre-industrial vs Preindustrial; HapPI vs HAPPI) [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
8836					Most of the Tables are in picture format. It should be written uniformly. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
13702					make sure that somewhere in the text it is referred to the Boxes (e.g. not done for Box 3.2) [Elvira Poloczanska, Germany]	Accepted. Text revised.
13703					use of , and ; should be consistent throughout chapter and report [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
5256					language is sometimes not precise or grammatically correct [Bart Van den Hurk, Netherlands]	Editorial - copyedit to be completed prior to publication
1417					Overall, I feel like large parts of this report do not focus on the +1.5C target specifically, it is more like an intermediate AR6 but less detailed. This is maybe due to the lack of studies focusing on that target but I'm afraid that this work and the forthcoming AR6 will be too similar. Moreover it seems that many results/findings are based on few papers [Philippe Roudier, France]	We agree and have been reducing the non-relevant 1.5°C and 2°C material and to improve the text so it doesn't sound like it's trying to be AR6!
12364					[4/4] # Interlinkages with other chapters: Is very limited currently (understandably). But I would like to in particular highlight the need for interlinkages to Chapter 5 (and e.g. 5.2 and Figure 5.2. ) # Pathway dependencies, reversibility, overshoot, impacts beyond 2100. These issues are not really addressed consistently throughout the report, but limited to only a few pages at the end. # Section that would benefit most from targeted improvements (from those which are already in a state that allows to comment on them): 3.3.10, 3.4.5.3.5. # There is no information on the impacts of climate change on mitigation potentials (e.g. carbon sinks or agricultural production), which would be very useful. [Bill Hare, Germany]	We are working on the narrative and linkages with other chapters. This file is planned to meet sometime soon to explore these issues in dynamics and to improve the narrative.
14986					The chapter could be tightened significantly. Several findings are repeated several times in multiple subheadings. Streamlining the report will improve it's readability [Farhan Akhtar, United States of America]	Accepted. Text revised and improved.
8843					Reference has major problem as most of the references do not include "ISSUE NUMBER". [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
14987					Throughout this chapter, it is important to focus on effects specifically to the mandate and scope of this report i.e. on warming of 1.5 deg C. If there is no specific literature relating effects at 1.5 deg C, authors should only note the information gap. Areas where there is currently insufficient literature could be addressed by the later special reports or by the working group contributions if this information becomes available. There is no need to reiterate AR5 findings on higher temperature levels including 2.0 deg C in this report. This appears to happen most often in the impacts on human systems section and in particular in the discussions on conflict and migration. This may mean that consideration of important topics will have to be taken up when information is available potentially in later reports this cycle. [Farhan Akhtar, United States of America]	Thank you very much. We have taken this on board - we agree that where there is no literature on 1.5°C, we should be registering a data gap. Point taken about AR5
7572					There is no discussion on possible macro-economic impacts in this chapter. Perhaps there is not enough information about this, but I would at least expect a discussion on this given recent literature on this topic (for instance Dell et al. 2014 in JEL, Burke et al. 2015 in Nature) [Andries Hof, Netherlands]	We will explore the literature - we thank the reviewer for pointing this out.
7586					My main concern with the chapter is that (at least for the physical climate analysis, such as temperature extremes) it is mainly done for the CMIP5 transient method (as described in James et al, 2017). I think some of the primary figures could be replaced by initiatives that have done the same analysis, but that were specifically designed for Paris Agreement. Such as HAPPI (Mitchell et al, 2017) or CESM initiative (Sanderson et al, 2017). The former also providing a multi-model analysis. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7587					Note there are a number of papers in the works that are comparing the different methodologies for estimated 1.5C and 2C worlds. The papers that I am aware of are King et al, 2017; Tibaldi et al, 2017; Uhe et al, 2017; all of which are currently in (or nearly in) review. Where my first point is not possible, or deemed not appropriate, the differences between projections using these papers should be discussed. There are large differences between the methodologies, so this needs to be reflected in the report. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1190					Chapter 3 has done very well to provide this much content in such a short amount of time! Undoubtedly there is more work to be done, particularly as new literature becomes available. Three areas that need to be addressed: (1) reduce repetition (i.e. section 3.6 seems to repeat much of what has already been stated in section 3.4 and 3.5); (2) strengthen evidence on human systems, beyond health; and (3) adaptation potential/experiences and limits to adaptive capacity need to feature much more strongly, particularly throughout section 3.5. The danger throughout the chapter is to slide toward a mini AR6 - too much material and not always well balanced. To make it more user-friendly (and shorter), consider summarizing the major findings from the AR5 upfront rather than in every sub-section. [Petra Tschakert, Australia]	The three issues have been taken on board. We have undergone significant re-writing with the aim of reducing repetition (which I think it's been improved somewhat) and have strengthened natural and human systems material.
1191					Is it useful to repeat the risk tables from WGII AR5 throughout? What about those entries that don't have any horizontal orange bars? Perhaps better to attempt a graphic like the one Ch5 has in section 5.2 that conveys more effectively, we think, what the avoided impacts may be. [Petra Tschakert, Australia]	We have moved away from using the AR5 risk tables and have included other tables which we plan to use to drive consistency and rigour and the SOD and beyond.
9134					This chapter on impacts gives many examples of impacts in developed countries, but as in AR5 there is still a relative lack of examples from developing countries. For example, the section on tourism does not even mention small islands, many of which are reliant on tourism for economic growth. [Susanna De Beauville-Scott, Saint Lucia]	We agree with the comment and point to the much lower levels of information available in developing countries. We have tried to address the concerns here as much as is possible.
9135					The overall structure of the chapter is repetitive, and it is difficult to know where to go for information on specific types of impact. E.g. for information on coral reefs one would need to read the sections on ocean acidification, framework organisms, fisheries, coral reefs etc. [Susanna De Beauville-Scott, Saint Lucia]	Accepted. Text revised and improved.
6834					The chapter is not discussing adaptation options and strategies sufficiently. Adaptation options are addressed in the various sections covering parts of the global system, but adaptation strategies seem to be left to chapter 4. In light of the need to improve the overall narrative of the report it would be important to move that material from chapter 4 to chapter 3 [Bert Metz, Netherlands]	We have added summary tables as well as new tables in each of the 'system' sections which capture and summarise adaptation option. These are picked up by chapter 4 which specifically looks at adaptation options - feasibility etc - and the potential for helping in a transition to a 1.5°C world.
1192					At LAM2, we agreed that Ch3 would cover risks and avoided impacts re poverty, inequality, and equity down to the regional level, but not lower (sub-regional, country, community, group, household). Ch5 (5.2) would do the rest. We concluded that 5 levels of security (livelihoods, human, food, water, and ecosystem) would be good boundary objects. Yet, several in Ch3 do drill below the regional level. Consider handing these pieces of evidence over to Ch5 - even better: share those in the literature tracking table we have circulated at LAM2 and we take it from there (e.g. relevant literature cited in 3.4.5.2.4) [Petra Tschakert, Australia]	We are taking this on board and have now added tables which will summarise at the helicopter level particular risks and options based on regions. However, information is quite sparse hence we are likely to have less than an exhaustive list.
6835					The chapter does a good job in describing the impacts of a 1.5 C warming. When it comes to adaptation it limits itself to adaptation issues in a 1.5C warmer world. However, in the context of an overall strategy of trying to stay below 1.5C warming, it would be unwise to just prepare for adaptation to such a level of warming, as chances are that temperatures would go beyond. I would therefore expect an overall message that says "aim for 1.5C, but prepare for 3C". In other words, while do an all out effort to reduce emissions to stay below 1.5C warming, lay out the efforts to increase resilience and reduce vulnerability for a 3C warmer world. So I strongly recommend to insert this approach in further developing the chapter. [Bert Metz, Netherlands]	We have added summary tables as well as new tables in each of the 'system' sections which capture and summarise adaptation option. These are picked up by chapter 4 which specifically looks at adaptation options - feasibility etc - and the potential for helping in a transition to a 1.5°C world.
10689					Many of the section headers are far too long and descriptive for a section header. For example, "Methods for the attribution of observed changes in climate and their relevance for assessing projected changes at 1.5 or 2 degrees global warming." Please revisit all headers and make them shorter and more focused. They do not need to restate everything. [Christopher Clark, United States of America]	Editorial - copyedit to be completed prior to publication
10690					I'm assuming that many of these Box titles are placeholders (e.g. "Variables that should be discussed?" [Christopher Clark, United States of America]	Editorial - copyedit to be completed prior to publication
10691					Organizationally, it seems odd to have a section 3.4.1.1. called "observed impacts." Is this level of the hierarchy needed? It also makes the table of contents a bit sloppy to have these not indented, though I understand the desire to not have too many levels. [Christopher Clark, United States of America]	We have rationalised our use of the subheadings.
10692					Section 3.4.5 ("Food security...") seems oddly placed. Typically, it straddles 3.4 and 3.5. It seems awkward to me to separate the systems that support human settlements (e.g. agriculture, fisheries), from the human settlements themselves. A corn field or fishery does not function the same as a natural system, so I'd recommend you either: (1) clarify up front the logic as to why managed and natural systems are together, (2) separate managed sections into their own subsection, or (3) move the information from 3.4.5 into section 3.5. [Christopher Clark, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10693					Section 3.5. The nomenclature here is a little sloppy. The "human systems" that are covered here are mostly "human settlements and economic sectors." So I would title it as such. "Human systems" are typically defined much more broadly than here, to include the systems that support human populations (like agriculture). [Christopher Clark, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10694					Section 3.6. In the introduction to the chapter, and the ES, it's unclear the distinction between 3.6 and the earlier sections. Both 3.6 and earlier sections discuss impacts at 1.5 and 2 degrees C for many of these topics (e.g. temp, drought, fire, etc.). Please clarify the difference. For example, 3.6.2.2.3. and 3.3.4.2 are both about drought. But while the latter is about the drought frequency and severity, the former is about the impacts of those changes in drought frequency and severity. So why isn't drought in the "impacts section" of 3.4, or in 3.5 in terms of drought and human settlements? [Christopher Clark, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10695					Section 3.8. Please subdivide section 3.8 into subsections somehow. For example, distinguish knowledge gaps in the empirical record, versus dynamic models, or some other grouping that makes sense. [Christopher Clark, United States of America]	Accepted. Table 1 of section on knowledge gaps present different areas where greater understanding and more research is needed.
10699					In section 3.2.2. I was expecting to read about the "methods of assessment", which in this report include literature reviews. I was not expecting to see a summary of all methods applied in the underlying literature, please clarify. [Christopher Clark, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft

**IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10197					Need to value choices such as "negatively affected" and "clear advantages to limiting warming". Try and be less policy prescriptive [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	We have taken this comment on board and have reduced policy prescriptiveness.
13790					This chapter assesses rich material. Suggest integrating WGI and II information by focusing the climate information on hazards causing impacts on ecosystems and human systems and specifying clearly the aspects related to 1.5°C or other climate futures. Integrating the text sections accordingly may help this process. [Elvira Poloczanska, Germany]	We agree and have started with in the submitted SOD, the intention to have a special workshop in Paris sometime soon to help achieve this end.
10207					The Annex with its massive table only confused me and the two first figures seemed better in Chapter 1 than here, so I would simply delete this document [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	We have considered this possibility and have partially adopted it
13791					There is a lot of repetition of material from AR5 and SREX, please consider how to reduce this, and how your tables and figures reduce the need for detailed discussion. The focus should be on the points in the annotated outline for the scoped chapter and a greater emphasis on drawing out impacts and risks at 1.5 and 2C and higher [Elvira Poloczanska, Germany]	Accepted. Text revised.
13792					There is much repetition within the chapter as the reader moves through different section (same material tends to be in each section. Please consider chapter structure and the placement of text and key messages in the discussion and tables. [Elvira Poloczanska, Germany]	Accepted. Text revised.
10208					The authors have reviewed an amazing amount of literature. I am very impressed. However, I fear the chapter is too long and overly ambitious. Some parts are more complete than others. This makes the chapter very unbalanced in my view. A lot of the literature cited is not about 1.5C or 2.0C at all. It is really just about impacts in general. I would simply leave all general impact discussion to AR6 WG2. I would only cite literature that has something important to say about 15C or 2C. This would massively shorten the chapter, allow important things to be brought to the fore and leave AR6 a role. Good luck [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	We agree with the reviewer and have taken on many of these recommendations in substantial rewrites of many of the sections. We are also continuing to work to remove text and shorten the overall narratives.
13793					Integration of material across the three WGs is not well done in this chapter – the special report offers an opportunity to provide a cross WG assessment. The chapter could be rearranged so some the relevant climate discussion is placed with natural and human system (ie terrestrial, ocean, urban?) risks. [Elvira Poloczanska, Germany]	We agree and rewritten sections with that in mind. See previous comment in terms of workshop that will work through better integration of the three streams.
13794					Consider moving some of the methodologies text (eg climate analysis) to the SOM – the SOM can be used to provide additional to support the chapter eg methods, uncertainty discussion, but not new messages [Elvira Poloczanska, Germany]	Accepted. Part of the text has been moved to SI.
13795					Please be clear in the application of impact and risk and when this terminology should be used – it is suggested that definitions are either put upfront in this chapter or in chapter 1 [Elvira Poloczanska, Germany]	Accepted. Improved in SOD.
13796					Many sections have few citations [Elvira Poloczanska, Germany]	Accepted. Improved in SOD.
13797					Ensure consistency with Ch1 and Ch2 on timeperiods, temperature ranges etc [Elvira Poloczanska, Germany]	We are working To improve the narrative inconsistency. See comments regarding workshop.
13798					The CA list contains only 3 DC/EIT authors from a list of 38. It is advisable to construct diverse group for a balanced assessment. [Elvira Poloczanska, Germany]	We will strive to be more inclusive.
13799					Please ensure appropriate balance of material in the chapter, the title of the chapter is "natural and human systems" yet in sections 3.3-3.6, 50 pages cover the physical world and only 34 pages cover both ecosystems AND human systems [Elvira Poloczanska, Germany]	We agree and are working to address this balance.
13801					There is still an overemphasis on climate physics. It seems recommendable to refrain from detailed analyses of the climate system in this chapter but focus on relevant climate related hazards that are related to impacts. The next version might try to integrate the hazard section with the impacts and vulnerability as well as adaptation sections. [Elvira Poloczanska, Germany]	We agree and are working to address this balance. One possibility is to move some of this material into the SOM, thereby reducing physical material.
2035					Although in next Decades in most of the Mideast, Presumably annual precipitation gradually will decrease, but Strong probability, low frequency of wet periods (especially in Fall and Warm episode of ENSO)will wetter than past records, because of increasing adjacent seas' SST and rising specific humidity(Based on My researches so far has not published). [Mohammad Ahmadi, Iran]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2036					In next Decades, the Iran Mod of STHP will gradually weaken, while STHP on East of the Mediterranean sea will intensify. Mentioned synoptic changes, probably cause wetter Mideast' Summers. Although North ward shift of STHP will help to this mechanisms. [Mohammad Ahmadi, Iran]	We are grateful for your suggestion, and will be including consideration of it in the next draft
14923					The following paper which talks about the extremes in Australia, and also the potential impacts on the Great Barrier Reefs is not cited: King, A.D., Karoly, D.J. and Henley, B.J., 2017. Australian climate extremes at 1.5 [thinsp][deg] C and 2 [thinsp][deg] C of global warming. Nature Climate Change, 7(6), pp.412-416. [Ambarish Karmalkar, United States of America]	Accepted. Reference included in SOD.
14939					This recent paper should be cited. Info could also be added to Table 3.7 on pg 165: 'Impact of a global temperature rise of 1.5 degrees Celsius on Asia's glaciers.' Citation: Kraaijenbrink, P.D.A., Bierkens, M.F.P., Lutz, A.F. and Immerzeel, W.W., 2017. Impact of a global temperature rise of 1.5 degrees Celsius on Asia's glaciers. Nature, 549(7671), p.257. [Ambarish Karmalkar, United States of America]	Noted. Reference will be considered.
2299					Health effects of a temperature increase have been considered in the report either directly related to the temperature (eg, heat waves), or to the increase of diseases caused by different vectors. However, the effects of a temperature increase on air quality through a possible change in the atmospheric dynamics and chemistry patterns associated with a warmed atmosphere have not been taken into account in the Chapter and they should be mentioned. Specific comments on this issue are included in the following lines as well as some references. [Begoña ARTIÑANO, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2970					Overall this Chapter presents a good overview. The executive summary is clear and to the point. Within my area of expertise (marine ecology/biological oceanography) I did not find any errors in the science. On the other hand there is a fair amount of text missing and quite a lot of repetition of sections of text, which seemed unnecessary, and there are many instances where the English is stilted or grammatically incorrect. I have restricted my comments, however, to places where the meaning was ambiguous or unclear. [Erica Head, Canada]	Noted. Repetition and missing text are addressed in SOD.
9785					The chapter was very well written in organization and contents related to 1.5°C global warming. [Rongshuo Cai, China]	Noted.
7321					Analysis on fisheries should be integrated to avoid repetitions. [Eleni Kaditi, Austria]	Taken into account - fisheries sections combined
5282					the many pieces of text that have not yet been filled up gives the impression of a too time-constrained assessment process [Bart Van den Hurk, Netherlands]	Noted. SOD integrate text which was not covered in FOD.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13157	1		153		The AR5 and the subsequent Structured Expert Dialogue under the UNFCCC concluded that the science on 1.5C is limited and that assessing the differential impacts is very challenging. There was a scientific debate about the feasibility of attributing differential impacts to climate change. Only two years later this draft of the SR1.5 reports with high certainty a significant difference in risks and impacts across scales and systems. This rapid increase in knowledge and certainty needs to be more carefully explained. [Christiane Textor, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
517	1		165		Chapter 3: While I mainly reviewed Section 3.3 (in which I am more familiar), I think this chapter is very long compared to IPCC AR5 chapters (which are typically 80-100 pages long). Too many details are present and the text could be considerably reduced if there is a stronger focus on changes at 1.5°C rather than a scan of all the existing literature since AR5 (which is more the focus of AR6). [David Docquier, Belgium]	Agreed. We are working to reduce the length as well as creating better balance sections chapter.
518	1		165		Chapter 3: I think much more reference should be made to Table 2 of Box 3.12. These storylines are a very nice way to explain the impacts of different emission scenarios. [David Docquier, Belgium]	Noted.
6411	1		165		The whole chapter 3 : This chapter has describe impact of global warming on fisheries sub sector, but still lack of information related to aquaculture sub sector (Fisheries and Aquaculture sub sectors are included to Marine and Fisheries sector). Aquaculture sub sector is very influenced by global warming impact, not only on water and environment quality but also on the cultured species, e.g. the physiological process in aquatic organisms which depend on water temperature, acidity, salinity, and also several oceanic condition and its change. Aquaculture activities are also very influenced by climate condition and its change, for example seaweed culture is conducted seasonally; grouper culture in North Bali (Indonesia) is interfered by jelly fish population which appear in particular season; fish breeding process (duration and frequency) is changed by seasonal change; etc. [Erlania Erlania, Indonesia]	Accepted: We now discuss literature on aquaculture in the context of 1.5°C.
2096	1		165		This chapter includes a great deal of potentially useful information regarding the likely impacts of 1.5C gblal warming, and the likely increases in impacts that would arise from an additional 0.5C warming over the 1.5C warming. However, the impact and utility of the chapter could be improved as discussed in my following comments. As well, the authors do tend to overestimate the confidence they have in some of their statements, considering the paucity of evidence on many of the topics they consider. [Neville Nicholls, Australia]	We agree and we are working on making our competence language more consistent and robust.
2097	1		165		Please use the IPCC calibrated language to describe the levels of confidence and uncertainty. [Neville Nicholls, Australia]	Noted.
2098	1		165		Please do not allow confusion between "statistical significance" and the common interpretation of the word "significant". If you mean "statistically significant" then say this - do not confuse people by just saying "significant" [Neville Nicholls, Australia]	Taken into account: yes we should keep this word for statistical significance
2099	1		165		Please run a spell check and grammar check over the complete draft chapter. There are very many spelling and grammatical errors that should have been corrected before this draft was sent out for review. [Neville Nicholls, Australia]	Accepted. Improved in SOD. Final grammar check will be done prior publication.
2100	1		165		The CLAs need to read through the entire report to ensure that every sentence reads sensibly and connects sensibly from the previous sentence. There are many examples where the current draft does not do this. [Neville Nicholls, Australia]	Accepted. Improved in SOD.
2101	1		165		I think the balance needs to be improved. There is too much detail regarding pathways to 1.5C and 2C. This is interesting to scientists but not very useful to decision makers. So the amount of time spent on this could be reduced substantially. [Neville Nicholls, Australia]	We agree and are working to reduce the page length and at the same time create a better balance across the chapter. Part of this will be the movement of some of the detail as SOD
20548	1		165		Taking the chapter as a whole, there is a lot of good material. However it needs a much clearer focus on 1.5 vs. 2 degrees. There is a considerable amount of general contextual information, often repeating what is in other papers or reports. This significantly diminishes the impact of the chapter. I would like to see this reduced substantially with references to a few key reviews to give more attention to the question of what difference 1.5 rather than 2 degrees makes. [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	We agree with this and other comments that have come to similar conclusions. We are in the process of reducing the page length and will also narrow down the material to a much finer focus on 1.5 versus 2°C.
20299	1		165		While the content of this chapter is pretty good for the most part and an interesting read, it appears to be in much more of draft stage compared to the previous two chapters: i.e., writing is a bit awkward in a few places and needs to be cleaned up, some figures still need to be made (adapted or reprinted from primary sources), more references and consideration given to the international literature in certain sections as noted above would strengthen the second draft. [Aaron Glenn, Canada]	Accepted. Text revised and improved.
17301	1		165		I think the whole chapter is very good and offers and thorough study, including relevant studies and many recent literature. Again, because of my field of expertise, I miss more references to soils and soil biodiversity. I would like to draw you attention on the Global Soil Biodiversity Atlas ( <a href="https://esdac.jrc.ec.europa.eu/content/global-soil-biodiversity-atlas">https://esdac.jrc.ec.europa.eu/content/global-soil-biodiversity-atlas</a> ). In chapter V potential threats to soil biodiversity, including climate change are discussed. [Maria Jesus Iglesias Briones, Spain]	We will consider this option. Soils was an oversight. We will fix that in the next draft.
13261	1		43		Due to the fact that the general public or the readers are more familiar with RCPs instead of 1.5°C and 2°C warming scenarios, it might be desirable to compare the impacts of RCPs with those of 1.5/2 °C warming. [Wei Zhang, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6181	1	1	1	1	General Comment on Chapter:First of all, I think this is a highly ambitious chapter. The authors are attempting to synthesise information on observed changes, detection and attribution studies, future projections and impacts. I don't think this has been done before – at least not in recent IPCC reports. Even the Synthesis Reports have tended to discuss these issues separately. To provide assessment from observations to projections to impacts for a few key variables (e.g. temperature and precipitation) would certainly represent a significant advance on what has been done before but there will be challenges in doing it. [Mat Collins, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
11707	1	1	160	1	The entire report is relatively poorly punctuated. Use commas to guide the reader to the meaning of the sentence and to avoid ambiguity. [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
5462	1	1	165	1	It is pity there is no mention of 2015 Paris Agreement in the introduction. Significant milestone on 1.5 was achieved in Paris and it should not appear first at the end of the chapter. This needs to be mentioned in the opening sections of this chapter and elsewhere. [Aliyu Barau, Nigeria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5463	1	1	165	1	I will consider this chapter incomplete fir not mentioning IPCC's long-term temperature goal (LTTG) [Aliyu Barau, Nigeria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5714	1	1	6	30	The title of Chapter 3 is Impacts of 1.5C global warming on natural and human systems. But from the content list here, almost all the sections involve the comparison between 1.5C and 2C warming. There is no clear reason to do this comparison as this is a special report on 1.5C warming. If addressing the higher degree of warming is necessary, it should not be confined to 2C only. [Hong Yang, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5459	1	2	1	2	can you revise the title to read as Impacts of 1.5°C global warming on human and natural systems. This is to allow the title to conform or yme with long established notions such as socio-ecological system or couple human and natural system. Please let this apply to the whole chapter. Indeed, chapter 1 has followed this notion. [Aliyu Barau, Nigeria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12365	1	6	1	7	This is not about uncertainty. It is about whether or not GMT alone is sufficient to describe all impacts. [Bill Hare, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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362	2		6		There are too many title levels in the table of contents: in the AR5 report, 3 levels are usually used (chapter, section, sub-section), while up to 5 levels are used in the SR15 report. This makes the readability of this table of contents very hard. I suggest to reduce the number of title levels to 3 as in the AR5 report (and a fourth level can still be used in the text without appearing in the table of contents). [David Docquier, Belgium]	Noted.
363	2		6		Consider shortening some sub-titles, which are very long. Reducing the number of title levels would partly solve this issue. [David Docquier, Belgium]	Noted.
372	2		6		The table of contents is too long (5 pages), in large part due to the too high number of title levels. Please consider comments above (especially 9 and 10). In the AR5 report, tables of contents are typically one page long. [David Docquier, Belgium]	Noted.
6303	2		6		Fonts are different (in numbering of subchapters) [Dmitry L. Musolin, Russian Federation]	Editorial - copyedit to be completed prior to publication
354	2	23	2	24	Shorten the title of this sub-section by removing 'Observed changes (including paleo); attributed changes; projected risks; avoided risks at 1.5°C'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
355	2	28			Shorten the title of this sub-section by removing 'including extremes and urban climate'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
356	2	29	2	30	Shorten the title of this sub-section by removing 'in regional temperature means and extremes, including urban climate'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
357	2	31	2	32	Shorten the title of this sub-section by removing 'in regional temperature means and extremes, including urban climate'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
358	2	33			Shorten the title of this sub-section by removing 'including heavy precipitation and monsoons'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
359	2	34			Shorten the title of this sub-section by removing 'in regional precipitation'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
360	2	35			Shorten the title of this sub-section by removing 'in regional precipitation'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
361	2	38			Shorten the title of this sub-section by removing 'in drought and dryness'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
364	2	43			Remove '(including upwelling)' [David Docquier, Belgium]	Accepted. Text revised.
6225	2	47			Small Island Developing States (not Small Developing States). [Muhammad Mohsin IQBAL, Pakistan]	Noted.
13800	2	47	2	47	Islands is missing from title [Elvira Poloczanska, Germany]	Noted.
21280	3		165		the authors of this chapter should give more importance to scientific research papers about the impact of climate changes on Bioms and regional systems, also they should refer to international bibliography like (GEO 6 report). in chapter 3 the authors ignore a very important phenomena related to climate change which is desertification. [Wael EL ZEREY, Algeria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7451	3		4		Difficult to understand the headings of 3.4.1.2, 3.4.2.2, 3.4.3.2 etc. The respective chapters do not seem to contain much information about projected adaptation. Does one mean "Projected risks and adaptation needs...."? [Øyvind Christophersen, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1077	3		9		At the very least bold key takeaway sentences in the Executive Summary in the front of each chapter for media and amplifiers. This was a great aspect of AR5 suggest it be repeated in this 1.5SR [Martini Catherine, United States of America]	Noted.
365	3	3			It is strange to have a supplementary sub-section after the global synthesis. I suggest to put this sub-section before the sub-section 'Global synthesis'. [David Docquier, Belgium]	Accepted. Improved in SOD.
15658	3	3	3	3	Add: "The likelihood of such abrupt termination of SRM is debated, which some pointing out that incentives to continue SRM would be overwhelming resulting in any capable entity to jump to the occasion if a deploying entity were to cease deployment." Study forthcoming by Parker and Irvine. [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
15659	3	5	3	5	Statement is incomplete and as a consequence inaccurate - insert: "global model experiments suggest that in case of SRM implementation to compensate for the full amount of GHG induced warming, ...." [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
7625	3	7	5	2	There are some impacts which affect both in natural and human systems (e.g., coastal erosion in Box 3.4). The impacts in natural and human systems might be summarized before the contents of sections 3.4 and 3.5. [Keiko Udo, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
619	3	11	3	12	The current text "Impact studies on agricultural crops were focused on several components that contribute to food productions (crop suitability and yield, CO2 fertilization, biotic and abiotic stresses)." is true, but I would suggest to add the text describing the fact that climate also influences harvested area and number of annual harvesting. An example of the text may be "However, most studies focus on the impacts on yields, and the climate impacts on remaining component of crop production, such as harvested area and the number of annual harvesting are under-studied (Iizumi and Ramankutty, 2016). A few available studies reveal that climate impacts on harvested area is comparable in the magnitude to those on yield (Cohn et al., 2016, Lesk et al., 2016)."  References: Iizumi, T. & Ramankutty, N. How do weather and climate influence cropping area and intensity? Glob. Food Secur. 4, 46–50 (2015); Cohn, A. S. et al. Cropping frequency and area response to climate variability can exceed yield response. Nat. Clim. Change 6, 601–604 (2016); Lesk, C., Rowhani, P. & Ramankutty, N. Influence of extreme weather disasters on global crop production. Nature 529, 84–87 (2016). [Toshichika Iizumi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1581	3	14	3	14	Use the same degree symbol as above. Use only one degree symbol throughout the report. [Alan Robock, United States of America]	Editorial - copyedit to be completed prior to publication
15660	3	14	3	14	A statement on the effects of fully compensating for 4xCO2 needs to be complemented with more recent study results on partial compensation of elevated CO2 levels, in particular since the results indicate that such type of SRM deployment would be much more meaningful for most if not all climate variables. [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
9858	3	16	3	16	I wonder if it would not make sense to add a section on projected changes in phenology as this is a key element for several ecosystem processes [Christopher Reyer, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15661	3	18	3	18	sentence unnecessarily complex - suggest to replace "with further improvements regarding coastal flood levels due to the attenuating effect on sea level rise". [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
366	3	20			Remove '(inc. small islands)'. [David Docquier, Belgium]	Noted.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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15662	3	22	3	22	Insert: "simultaneously and perfectly stabilize..." In fact what Ricke et al. have shown is that precipitation would be slightly overcompensated compared to temperature. Meaning that there is a point of optimization of both, which is not at pre-industrial levels, but closer to pre-industrial by far compared to the non-SRM climate to be expected at corresponding levels of GHG-concentrations! Additional reference on this: Moreno-Cruz, J. B., Ricke, K. L., & Keith, D. W. (2012). A simple model to account for regional inequalities in the effectiveness of solar radiation management. <i>Climatic change</i> , 110(3), 649-668. [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
620	3	23	3	24	As for the current text "whilst the effects on rice and soybean yields have been smaller.", another global modeling study (Iizumi et al., 2017) shows the consistent result on rice (small effects or even positive effects on rice) whereas it shows the opposite results for soybean (negative effects on soybean). The tendency that less negative impacts or even slightly positive impacts on rice is consistent across global modeling studies (Müller et al., 2014). References: Iizumi, T., Furuya, J., Shen, Z., Kim, W., Okada, M., Fujimori, S., Hasegawa, T., and Nishimori, M., 2017: Responses of crop yield growth to global temperature and socioeconomic changes. <i>Scientific Reports</i> , 7, 7800, doi: 10.1038/s41598-017-08214-4; Müller, C., J. Elliott, J. Chrystanthacopoulos, D. Deryng, C. Folberth, TAM Pugh and E. Schmid, 2015: Implications of climate mitigation for future agricultural production. <i>Environ. Res. Lett.</i> 10 (2015) 125004 doi:10.1088/1748-9326/10/12/125004. [Toshichika Iizumi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15663	3	27	3	28	Insert: "that global mean temperature would by itself not be a good proxy for ...." [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
621	3	32	3	33	The current text "Crop productions are strongly affected by increases in extreme events, but the quantification of these changes is more difficult." would read that "Crop productions are strongly affected by increases in extreme events, but the quantification of these changes is limited in the number of studies". However, available global analyses detected the climate change signals in yield variability (Osborne and Wheeler, 2013, Iizumi and Ramankutty, 2016). References: Osborne, TM, and TR Wheeler, 2013: Evidence for a climate signal in trends of global crop yield variability over the past 50 years. <i>Environ. Res. Lett.</i> 8, 024001, doi:10.1088/1748-9326/8/2/024001; Iizumi, T and N. Ramankutty, 2016: Changes in yield variability of major crops for 1981–2010 explained by climate change. <i>Environ. Res. Lett.</i> 11, 034003, doi:10.1088/1748-9326/11/3/034003. [Toshichika Iizumi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10704	3	34	3	36	The space around line 35 should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
15664	3	35	3	35	I know from the authors personally that the motivation behind the study was that they expected the results of partial SRM application to be much more meaningful than full compensation (which turned out true). Therefore the sentence is incorrect and I suggest to reformulate as follows: "Because it was to be expected that moderate deployment to compensate only partly for GHG-induced warming would result in a better attenuation of climate change across most if not all climate variables, more recent studies have assessed whether this was true. They have indeed found SRM deployment for such partial compensation to be a much more realistic option than full compensation". [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
367	3	36			Remove '(quantity and quality)'. [David Docquier, Belgium]	Noted.
15665	3	37	3	37	I do not think this is a "main issue" as described in this sentence. In my reading of the literature, SRM deployed for partial compensation moves regional climates almost without exception significantly closer (while not fully) toward their pre-industrial states. Mitigation of GHG emissions also does not have a uniform impact on regional climate outcomes since inherently climate change does not have a uniform impact, yet this is obviously not a "major issue" for mitigation. [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
15666	3	42	3	42	What is a "spacial footprint" of SRM and how is it to be measured? Also, how would this concept be relevant here? This is not a concept that is commonly used in the literature on SRM to my knowledge, and I have observed this area of research for the last 6 years quite intensely! [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
15667	3	43	3	45	How is this statement substantiated? If there is evidence to support this it should be referenced and put into context: The body of literature on this is too thin, to partially favor local SRM over global. The language here therefore should absolutely avoid favouring one over the other. There might be very severe changes in local climate or weather patterns due to local or regional albedo changes (potentially much worse than in case of globally uniform changes to albedo via stratospheric intervention). Taking an earth systems perspectives would in fact suggest this to be the case. [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
9968	3	50	3	50	in "1.5° warmer worlds", "C" is missing, it must be "1.5°C warmer worlds" [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
6635	3	52	3	56	Floods may also have an impact in coastal ecosystems, changing the sedimentation rates, coastal morphologies, nutrient availability, risk of red-tides, etc, which may have undesirable ecological, social and economics effects in some regions [Castor Muñoz Sobrino, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15657	3	55	3	55	Why is compensation of a quadrupling of CO2-levels chosen as illustration of what SRM could be doing? There's recent literature that illustrates why earlier modelling studies which have been conducted at such high compensation levels are inadequate representations of how SRM policies could actually look like: Such policies would much more likely aim to only partially compensate for elevated concentrations of GHGs. [Matthias Honegger, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
368	4	2			Remove '(including fisheries)'. [David Docquier, Belgium]	Rejected. To be considered in next draft.
10705	4	21	4	21	versus should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10706	4	28	4	28	vs should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10707	4	31	4	31	vs should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10708	4	34	4	34	vs should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10709	4	46	4	48	The space around line 47 should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10710	4	47	4	47	Box on should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Noted.
10711	5	2	5	2	The space between lines 2 and 3 should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
369	5	7			While it is scientifically interesting to compare impacts at 1.5°C vs. other warming levels, why do you also compare to 3 and 4°C as the section title mentions 2°C only? [David Docquier, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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10712	5	7	5	7	versus should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
5855	5	22	5	22	Please substitute "riks" with "risk". [Joan A. Lopez-Bustins, Spain]	Editorial - copyedit to be completed prior to publication
10713	5	31	5	32	futures should move from line 31 to line 32 [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
5856	5	33	5	35	This title is too long. [Joan A. Lopez-Bustins, Spain]	Noted.
16719	5	38	6	2	Formulation of the title, subtitles aims for exhaustivity, but when reading at sub- sub-sections (from 3.6.5.1 to 3.6.5.11) the "hot spots" are very unequal, mixing up large geographical scales, accurate biomes/sacred sites or crop production: "Tropics" to "Arctic sea-ice", until "Kailash Sacred Landscapes" or "Maize crop regions". Maybe putting things in order according to geographical scales could improve the comprehension of the sub-section 3.6 [Romain Courault, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10387	6		15		Annex 3.1, Table S3.3: The above mentioned study should be included in this table with the following key word:  Sector: water  Region: Europe  Metric: high flow (Q10 - median over a 30-year period of daily streamflow exceeded 10% of a year), flood (median of 30-year annual maximum daily streamflow).  Baseline: 1971 - 2000  Climate Models: 5 bias-corrected CMIP5 models used to drive 3 hydrologic models (mHM, PCR-GLOBWB, Noah-MP)  Scenarios: RCP2.6, RCP6.0, RCP8.5 Time periods of interested: time sampling approach to determine 30-year periods where a particular global warming level ranging (i.e., 1.5, 2, and 3 degree) is first exceeded for all combination of GCMs and RCPs  Projected impacts at 1.5 degree: No increases in high flows and floods larger than 10% in Europe (stronge decreases in southern Spain up to -20 %)  Projected impacts at 2 degree: amplified signal with respect to 1.5 degree, highest increases for high flows observed for tributaries of the Elbe river with more than 10%; at 3 degree global warming: large parts of Scandinavia show increases higher than 10% for high flows, but decreases in floods due to decreased snow water equivalent.  other factors considered:  Reference: Thober et al. 2017 (submitted to ERL) [Stephan Thober, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4782	6	1	9	8	Apart from health, other impacts on human systems are missing from the abstract. [Elena Georgopoulou, Greece]	Accepted. Improved in SOD.
10714	6	16	6	17	reaching should move from line 16 to line 17 [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
370	6	18			This subtitle is not clear. [David Docquier, Belgium]	Noted.
10715	6	18	6	18	vs should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
371	6	21			This subtitle is not clear. [David Docquier, Belgium]	Noted.
10716	6	34	6	34	Cross-chapter box on 'and 'Introduction' should be deleted, and 'land use' should change to 'Land use', so we will have: Box 3.11: Land use [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
373	7				Why not starting with a paragraph summarising the observed impacts as suggested by the outline of Section 3.3 before talking about the pathways to 1.5°C? [David Docquier, Belgium]	Noted and considered
3531	7		8		general comment on executive summary: the summary is very much focused on the 'benefits of a 1.5deg C warming' compared to a 2 deg C warming. Shouldn't we rather look at the damage of 1.5deg C warming compared to preindustrial or the cuirrent 1 deg C warming? [Sylvia Sander, Monaco]	Agree and will take on board
2102	7		9		The balance problem is especially clear in the ES. Too much on pathways and too little on impacts. [Neville Nicholls, Australia]	Accepted. Text revised.
2103	7		9		Please do not just say that the impact of 2C is "substantially" or "significantly different". You need to focus on the magnitude of the changes in impacts from 1.5 to 2. The paragraph between lines 20 and 28 on page 3-8 is a good example of what to do - also do the same thing with other changes/impacts (here and throughout the chapter). We know that the impacts will be worse for 2C than 1.5C, but decision makers need to know how much worse, if they are to try to limit warming to 1.5C. [Neville Nicholls, Australia]	Agree and will take on board
13156	7		9		The approach chosen for detection and attribution should be explained in detail including its shortcomings and uncertainties in the Executive Summary. [Christiane Textor, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5222	7		9		[Overall comments, especially for the Executive Summary] Through the summary as well as in the main text, regions and sectors that are benefitted from the shift from 2.0°C to 1.5°C are highlighted based on the literatures, that might be considered selective by some audiences. If the purpose of this SR is to find regions and sectors that are very vulnerable to climate change and think about the risk management for the regions/sectors more carefully than for other regions/sectors, emphasis of those regions/sectors might be suitable. However, if the primary purpose of the SR is to let policymakers compare the pros and cons of 1.5°C target based on neutral and objective scientific basis, I think the risks with just negligible difference between the two temperature targets as well as the risks that would become exacerbated under the 1.5°C world should be explicitly communicated. For example, carbon uptake by terrestrial vegetation (such as NPP and GPP) might be smaller in the 1.5°C world than in the 2.0°C world. For some regions and crops, yield increase expected in the 2.0°C world may be reduced. If we look at the regional/sectoral key risks assessed in AR5 (Assessment Box SPM.2 Table 1), the risk level for the Near-term (2030-2040; with dT smaller than 1.5°C) was judged to be same with that for the Long-term with 2°C (2080-2100) for some regional key risks. A matrix (region vs sector variable) for summarizing the difference of climate impacts between the 2°C world and the 1.5°C world may be useful for communicating availability of evidences, what we have known about the difference, and uncertainty more comprehensively. [KIYOSHI TAKAHASHI, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13158	7		9		Short comings of the IAM approaches should be also highlighted in the Executive Summary, including e.g. the consequences of using cost-efficiency as the main optimization criterion, and the uncertainty due to the choice of discount rates, or the neglectation of disruptive system changes, or avoided damages and co-benefits. [Christiane Textor, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17256	7		9		I found this overview quite uninformative to be considered as a Executive summary since it merely lists subsections. Some paragraphs (e.g P8 L54-55) is too short. [Maria Jesus Iglesias Briones, Spain]	NOTED - will work to increased number
377	7		9		The executive summary does not cover all the different parts of the outline of this chapter and the sub-titles seem evasive, especially the 2 last ones with very limited text ('Floods' and 'Health'). I suggest to re-write this executive summary according to the main findings in each section of this chapter. [David Docquier, Belgium]	Accepted. Text revised.
9686	7		9		Chapter 3 Executive Summary lacks any mention of ranges. I suspect that there are statistically insignificant differences in impacts between 1.5 and 2.0 degree warming in certain sectors. [Masahiro Sugiyama, Japan]	Agreed - but the methodology used by some of the published literature allows one to see me statistical differences - we may need to is more upfront in the executive summary.
10199	7		9		The ES has too many examples from Europe and the Med. It should try to be more globally representative. I realise where the literature is focussed. However, given the effort for global balance in the resto of the report and the same effort is needed here. [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	NOTED - will work to increased number
10200	7		9		The choice of topics in ES is odd. It has a long introduction and then a short section on floods - I guess this is a preliminary draft [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text revised.
13704	7		9		Executive summary needs revisions for clear and focused key statements [Elvira Poloczanska, Germany]	Accepted. Text revised.
9698	7	1	3	9	The question of pathways is to my opinion very important. It is only treated in the first part of the executive summary. It should also be mentioned in the other sections where the impacts are detailed. [Eric Martin, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19313	7	1	9	10	The executive summary is well written and clear. It should possibly be said even more explicitly that the impacts are highly non-linear hence the impacts of 1.5°C warmer plant are rather different from those of a 2.0°C warmer planet. [Marco Mazzotti, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3869	7	1	9	8	IPCC chapter summaries, including summaries of other chapters in this draft report, generally place the main conclusions in bold type as the first sentences of paragraphs, followed by details of each conclusion in regular type. This formatting effectively organizes the summary and clearly communicates to the reader the main conclusions, so please edit the executive summary of Chapter 3 to use this structure. [Patrick Gonzalez, United States of America]	Accepted. Improved in SOD.
9808	7	1	9	8	It would be preferable that in all executive summaries (like in chapter 1 and 4) the paragraphs are introduced with two or three short sentences containing the main message (instead of a short title). [Urs Neu, Switzerland]	Accepted. Improved in SOD.
5715	7	1	9	8	It is clear that the Executive Summary is not complete and needs more substantial work. All the three sub-titles do not reflect the theme of the Chapter, which is about addressing impacts of 1.5C warming. [Hong Yang, Switzerland]	Accepted. Text revised.
14985	7	1	9	8	All statements within the executive summary should still cite the underlying literature in addition to linking to later sections of the chapter. They should also include statements of uncertainty of these conclusions. [Farhan Akhtar, United States of America]	Accepted. Improved in SOD.
660	7	1	9	8	Chapter 3 has got many information and results. But the executive summary did not show well. Suggestion is to rewrite the executive summary. It should show more information and results than now. [Zong-Ci Zhao, China]	Accepted. Text revised.
1949	7	1	9	8	Would be improved by bolded key / take-away points as in Ch 1 [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
1193	7	1	9	8	The ES ends prematurely and does not cover the full range of content covered in the chapter. Where are the human systems (beyond health)? The plenary approved outline could help here... [Petra Tschakert, Australia]	Accepted. ES has been improved.
700	7	1	9	8	Chapter 3 has got many information and results. But the executive summary did not show well. Suggestion is to rewrite the executive summary. It should show more information and results than now. [Zong-Ci Zhao, China]	Accepted. Text revised.
5857	7	1	9	8	It is worthy the comparison of impacts magnitude between 1.5°C and 2°C warming, however, further attention should be paid to the direct impacts of 1.5°C warming in the Executive summary. Actually, "1.5°C" is in the title of the current report, not "2°C". [Joan A. Lopez-Bustins, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5461	7	3	7	3	Can you make the title to read 'Overview: Pathways to 1.5°C warming' the rest of the captions is a tautology [Aliyu Barau, Nigeria]	Accepted. Text revised.
7588	7	5			It is crucial to get this section right. I think it needs to be made clearer up front if 1.5C refers to TOTAL warming, or ANTHROPOGENIC warming. Chapter 1 will have important comments on this. The difference in what the impacts would be is huge. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5429	7	5	7	41	These paragraphs include very relevant information. However, it seems that they have only been partly addressed in other chapters. It is strongly recommended to enhance the coherence and readability of the report by indicating the type of 1.5oC pathway considered (type a, b, c, d) throughout the SR. [Klaus Radunsky, Austria]	Accepted. Text revised.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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2105	7	5	7	41	Reduce this section to a single short paragraph. It is far too detailed for the ES and it means you have less room to discuss the important matters that should be in the ES (impacts!) [Neville Nicholls, Australia]	Accepted. Text revised.
3870	7	5	7	5	Because the first three lines are somewhat duplicative of text in the next paragraph and also very generic, deleting them is recommended. The executive summary can start with the current line 8. [Patrick Gonzalez, United States of America]	Accepted. Text revised.
5460	7	5	7	7	Please remove this littl paragraph, the next paragraph is more straight forward [Aliyu Barau, Nigeria]	Accepted. Text revised.
9699	7	5	7	7	paragraph not informative. The information is done in the second paragraph. To be deleted [Eric Martin, France]	Accepted. Text revised.
16218	7	5	7	5	It really needs to be said first (or at least early on, but this seems to be best place to make the point) that a 1.5 C world may well not fulfill the objective of the UNFCCC, namely to avoid dangerous anthropogenic interference with the climate and therefore should not be the warming that we are aiming for. At 1.5 C, the world is likely committed to ongoing sea level rise at a rate that will require relocation of many coastal cities and abandonment of low-lying islands, that may involve a CO2 level that leads to so much ocean acidification that the marine food chain is disrupted, and that leads to ongoing pressures for further warming as a result of the permafrost thawing and the CO2 and or CH4 that may be released. In addition, it may well be that many forests are doomed to die and further CO2 will be released. So, it seems to me this chapter, and this report, simply must make clear that 1.5 C warming is not a level that is scientifically defensible as a non-dangerous level, that instead 1.5 C is mainly a political choice, and that every effort should be made to get back to something like 0.5 C or less above preindustrial. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10717	7	6	7	6	The point should move before braces, so: ... related impacts. {3.2.1; ... [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10718	7	6	7	6	cross-chpter' and "on "1.5C warmer worls"" should be deleted, so we will have: {3.2.1; 3.3; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
16219	7	6	7	7	Not only will there be uncertainties, but there will be ongoing change for likely many millennia as the physical and biological systems try to adjust to the warmer conditions. The sentence here just says there will be uncertainties—it does not make clear that these uncertainties are with respect to quite serious impacts that will be the new baseline; the world will be very different than the preindustrial baseline and still changing, and this needs to be emphatically stated (and this will be the case independent of the pathway that is involved—though, of course, as the next paragraph indicates, there will be differences. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20903	7	9	7	14	Might need to clarify that (b) and (c ) refer to stabilization by 2100 (compared to (d) that refers to stabilization after millenia) [Sonia Seneviratne, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5486	7	9	7	17	Written in a too complicated way. I suggest to simplify: "... whether global temperature reaches 1.5 (a) only temporarily... (b) after greenhouse gas... (c) after greenhouse gas ... but including an overshoot; or (d) as part of long-term..." [Ismael Nunez-Riboni, Germany]	Accepted. Text revised.
1022	7	9	7	17	Classification of 4 cases here is quite relevant and this sentence should be kept. [Mitsutune Yamaguchi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5243	7	9	7	9	Not only the pathway is important, also the natural variability of the climate system gives rise to considerable uncertainty of assessed impacts of 1.5 degree warming [Bart Van den Hurk, Netherlands]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10876	7	10	7	11	is pathway a) defined in chapter 1? the pathway definitions should be coherent with those included in chapter 1 [Carolina Vera, Argentina]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20471	7	13	7	14	This list is currently incomplete. I would suggest striking "or" in line 13 ("; or (d) reaches") and adding in line 14 after "after several millennia)"; or (e) through a mixture of emissions control and solar radiation management (SRM), for example with SRM deployed in such a way that the radiative forcing due to the peak atmospheric level of greenhouse gases is not felt to its full extent in terms of global mean temperature (this possibility is not discussed further in this report)." Without some such addition this sentence fails to capture all the possible variations which it seems to be enumerating. This is especially the case because in Box 3.12 the Special Report does specifically address SRM as a route to a 1.5C world. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10719	7	14	7	14	The point should move before braces, so: ... millennia) . {3.2.1; 3.3} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10720	7	14	7	14	The . should change to ; in braces, so: {3.2.1; 3.3} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
16220	7	14	7	17	Mention should also be made that the fate of the marine food system will be affected by peak CO2 concentration, and mention simply has to be made regarding that biodiversity will be very path dependent if one allows overshoot. And mention should also be mentioned that the duration of the overshoot will matter. In the paranthetical phrase giving sea level as an example, mention should also be made regarding the fate of ice sheets-- which would be the likely cause of the real difference in sea level results. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20904	7	16	7	16	can be very large for others (e.g. sea level rise): The largest differences for sea level rise would be between cases (b)/(c ) vs (d). Would be good to clarify this also here (the example only mentions (a) vs (b) vs (c ), not (d)). [Sonia Seneviratne, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10721	7	16	7	16	the sentence need a point after parenthesis, so we would have: ... rise, {3.2.1; ... [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10722	7	16	7	16	The . should change to ; in braces, so: {3.2.1; 3.3; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10723	7	16	7	17	cross-chpter' and "on "1.5C warmer worls"" should be deleted, so we will have: {3.2.1; 3.3; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13802	7	19	7	19	over a climatological period' Language such as this should be avoided, too technical and jargon [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10877	7	19	7	22	discussion already included in chapter 1 [Carolina Vera, Argentina]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9859	7	19	7	22	This statement somehow contradicts the statement about the "2017 warming" of 1 °C in chapter 3, page 7 Line 45-46 [Christopher Reyer, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10696	7	20			Add the word "average" to the idea that a world whose average temp is 1.5 deg warmer by definition has warmer and cooler areas. [Christopher Clark, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7227	7	20	7	21	suggest adding 'both' to sentence 'temperatures that are [both] warmer and cooler than'...for ease of understanding. [Butt Nathalie, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4310	7	20	7	21	...temperatures that are warmer and cooler... .temperature are not warmer or cooler are higher or lower [teodoro georgiadis, Italy]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4557	7	21			Change the text in brackets "20-30 years on average" by "30 years as minimum". [Radim Tolasz, Czech Republic]	Accepted. Text revised.
4558	7	21			Change the word "and" by "or"? [Radim Tolasz, Czech Republic]	Accepted. Text revised.
10724	7	21	7	21	The . should change to ; in braces, so: {3.2.1; 3.3.2; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10725	7	21	7	22	cross-chpter' and "on "1.5C warmer worls"" should be deleted, so we will have: {3.3.1; 3.3.2; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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12366	7	24			This mix of global GMT signal with regional warming is very confusing and should not be done. Same is true for indices other than GMT. [Bill Hare, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4356	7	24	7	36	Again, it is necessary to give more detailed information in these paragraphs. For example, why terrestrial regions will warm more than oceanic regions over the coming decades? [Gabriel de Oliveira, Brazil]	Accepted. Text revised.
10878	7	24	7	36	why are these paragraphs needed here? they do not provide an actual overview and instead they seem to fit better in the next sections. Are the regions explicitly mentioned the only ones with remarkable features? regions explicitly (or not) mentioned in the executive summary, should be well scientifically fundamented as they might have political implications [Carolina Vera, Argentina]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13803	7	24	7	36	Next the section focuses on climate, shouldn't his paragraph and the following be included in the next section? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13804	7	25	7	25	transient climate conditions' Not intuitively comprehensible [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6304	7	25	7	27	This sentence sounds a bit strange; please try to reword. [Dmitry L. Musolin, Russian Federation]	Accepted. Text revised.
10726	7	28	7	29	The , should change to ; in braces, so: {3.2.1; 3.3.2; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10727	7	29	7	29	cross-chapter' and 'on "1.5C warmer woris"' should be deleted, so we will have: {3.3.1; 3.3.2; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
18999	7	31	7	31	The sentence starts with "In some regions", please add in parantheses the regions concerned in order to be more precised. [JACQUES-ANDRE NDIONE, Senegal]	Accepted. Text revised.
18771	7	31	7	31	The sentence starts with "In some regions", please add in parantheses the regions concerned in order to be more precised. [JACQUES-ANDRE NDIONE, Senegal]	Accepted. Text revised.
10728	7	31	7	31	can' is better to change to 'could' [Seyed Muhammadreza Tabatabaei, Iran]	Accepted. Text revised.
5487	7	32	7	33	The sentence cannot be understood, a verb is missing? [Ismael Nunez-Riboni, Germany]	Accepted. Text revised.
18848	7	32	7	33	For instance, climate model projections show, on average, that a 4.5°C warming of the coldest nights over Arctic land with 1.5°C of global warming. The point of this sentence is not clear and I couldn't replace it as long as it is not understandable. [Marwa Hafez, Egypt]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9860	7	32	7	34	I wonder whether this is a good example given that the effects of 4.5°C warmer "coldest nights over the arctic land" might seem drastic but at the same time constitute a pretty specific impact that possibly not many readers can relate to. [Christopher Reyer, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13222	7	32	7	34	Unclear; please elaborate why "on average" considering these are climate model projections. [Lourdes Tibig, Philippines]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10453	7	32	7	34	either words missing or delete "that" line 33 [Jonathan Lynn, Switzerland]	Accepted. Text revised.
6226	7	33			The word 'that' is suggested to be deleted. [Muhammad Mohsin IQBAL, Pakistan]	Accepted. Text revised.
374	7	33			Remove 'that' [David Docquier, Belgium]	Accepted. Text revised.
6816	7	33	3	34	...over Arctic land is found with 1.5C of global warming... [Rafiq Hamdi, Belgium]	Not able to identify sentence or paragraph
7228	7	33	7	33	remove 'that' after the comma [Butt Nathalie, Australia]	Accepted. Text revised.
10374	7	33	7	33	Delete " that" to read "...average, a 4.5°C warming of the coldest nights..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text revised.
11921	7	33	7	33	ADD... over Arctic land "takes place"with 1.5°C of global warming.... [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6305	7	33	7	33	the "thah" seems to be out of place [Dmitry L. Musolin, Russian Federation]	Accepted. Text revised.
11937	7	33	7	33	ADD... over Arctic land "takes place"with 1.5°C of global warming.... [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20905	7	33	7	33	Remove "that" before "a 4.5°C warming" [Sonia Seneviratne, Switzerland]	Accepted. Text revised.
10729	7	33	7	34	The point should move before braces, so: ... warming. {3.3.1; 3.3.2} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10730	7	33	7	34	The , should change to ; in braces, so: {3.3.1; 3.3.2} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10731	7	35	7	36	cross-chapter' and 'on "1.5C warmer woris"' should be deleted, so we will have: {3.3.1; 3.3.2; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10732	7	35	7	36	The , should change to ; in braces, so: {3.3.1; 3.3.2; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
7589	7	38			I think is land use is specifically mentioned, then so should an argument on short lived and long lived climate forcings, such as aerosols, methane etc. See Fuglesvedt et al, 2017 (in review). [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9707	7	38	7	41	Saying that some elements like land use change are not considered seems like an abrupt turn. I would recommend to rephrase it in a more consistent way. [Kai Fang, China]	Accepted. Text revised.
14981	7	40	7	41	What is the implication of not considering these effects? [Farhan Akhtar, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13805	7	43	7	43	Suggest adding flood and sea level rise here, as part of the physical world [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9791	7	43	8	12	Please consider if the subtle and contents should put "drought" and "flood" together, because both of them could be attributed to the imacts of extrens precipitation. [Rongshuo Cai, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
655	7	43	8	12	The earliest and the most late years of 1.5 global warming should be provided. [Zong-Ci Zhao, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
695	7	43	8	12	The earliest and the most late years of 1.5 global warming should be provided. [Zong-Ci Zhao, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2106	7	45	7	45	Delete this paragraph - it is not necessary for the ES and restricts the space you have to discuss what really needs more attention in the ES (impacts!). [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9807	7	45	7	45	global warming should not be related to a single year, i.e. replace "(year 2017)" with a different explanation. See comment no.1 [Urs Neu, Switzerland]	Accepted. Text revised.
11922	7	45	7	45	CHANGE At present (year 2017), global ....to... "In 2017", global..... [Paul Doyle, Canada]	Accepted. Text revised.
11938	7	45	7	45	CHANGE At present (year 2017), global ....to... "In 2017", global..... [Paul Doyle, Canada]	Accepted. Text revised.
13806	7	45	7	45	Chapter 1 section 1.2 set out specific numbers and terminology; eg present decade is 0.9C warmer than 1850-1879 [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7165	7	45	7	45	Suggest to provide the temperature increase with decimal points and in line with the new baseline for temperature increase and per the definition used in this report (similar tom comment 6 above) [Iulain Florin VLADU, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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14982	7	45	7	46	A single year's temperature should not be used as an indication of global temperature increase. It should not be related to the 1.5 degree goal, as that these values are not comparable. This does not meet the IPCC standards for science. "approximately 1 degree C" is unclear when compared with IPCC AR5: "The globally averaged combined land and ocean surface temperature data as calculated by a linear trend, show a warming of 0.85 [0.65 to 1.06] °C, over the period 1880 to 2012, when multiple independently produced datasets exist. The total increase between the average of the 1850–1900 period and the 2003–2012 period is 0.78 [0.72 to 0.85] °C, based on the single longest dataset available." This report in particular should appreciate the difference that is implied between 0.78 and 1 degree C. The role of natural climate variability is a critical element missing from this discussion. [Farhan Akhtar, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7590	7	45	7	46	The idea of what GMT we are currently at is much debated. This should be very briefly discussed (in a sentence of so) here. I have seen reasonable estimates between 0.9 and 1.2. Such small differences matter a lot in the context of this report. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text revised.
6987	7	45	8	12	Needs to highlight sea level rise. [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7627	7	46			This statement is obvious, possibly could be deleted [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. Statement allows clarity.
17988	7	46	7	46	Is this "global mean temperature of 1.5°C" or "global mean temperature rise of 1.5°C"? [Wilfran Moufouma Okia, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20906	7	46	7	46	Add "a" before "global mean temperature of 1.5°C" [Sonia Seneviratne, Switzerland]	Accepted. Text revised.
13247	7	46	7	46	add "warming" after 1.5°C [Wei Zhang, United States of America]	Accepted. Text revised.
9861	7	47	7	47	does "present" here refer to 2017 or to some time period? [Christopher Reyer, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
14983	7	47	7	47	See comment above, further justification is needed on why the authors chose to represent current warming at 1 deg above preindustrial levels. The discussion should include the basis in observations and a sensitivity analysis to their assumptions, so readers can understand the potential impact that a different set of assumptions may have in terms of the available carbon budget and projection of climate impacts from uncertainty in climate sensitivity. [Farhan Akhtar, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13807	7	49	7	50	Incomprehensible, be more specific using common language [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
375	7	50			Box 3.12 is often cited in the executive summary. Consider removing some citations to this box. [David Docquier, Belgium]	Noted.
13248	7	50	7	50	1.5°C [Wei Zhang, United States of America]	Noted.
10733	7	50	7	50	cross-chapter' and 'on "1.5C warmer words"' should be deleted, so we will have: {3.2.1; 3.3.3; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10734	7	50	7	50	The , should change to ; in braces, so: {3.2.1; 3.3.3; Box 3.12} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
3958	7	52	7	52	the impacts of observed warming to date are likely to underestimate... What is the evidence to back this up? In some cases, responses to warming are likely to non-linear", so this is probably correct, but some references are needed. *Having said that, the assumption in many parts of the chapter is that responses ARE linear between 1.5 and 2C... [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2107	7	52	7	53	No, the previous paragraph does NOT indicate why the impacts of observed warming are likely to underestimate the consequences of an additional warming. The CLAs really do need to read the draft very carefully and do a "sense check" - when a sentence says something, is what it says actually correct? [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12262	7	52	7	53	This sounds rather obvious; I suggest rewording (even if some explanation is given in preceding para).. [Jan Fuglestad, Norway]	Accepted. Text revised.
18779	7	52	7	54	This para refers to 0.5C of additional warming compared to present levels, while chapter 1, page 12, line 23, speaks of 0.6 degrees C above the present decade 2010-2019. For final version of the report it would be good to ensure consistency here [Sven Harmeling, Germany]	Accepted. Text revised.
12780	7	52	7	54	The sentence is very hard to understand. Does it mean that from past observations one can estimate what a 0.5°C global warming adds as effects? [Robert Vautard, France]	Accepted. Text revised.
17703	7	52	8	4	It might be relevant adding the timing at which differences between 1.5C and 2C scenarios are detectable for each impact [Ana Bastos, France]	Noted.
5244	7	53	7	53	the previous paragraph does not hint at a likely underestimation of 1.5 warming impacts; the role of natural variability may also imply that current quantifications are overestimations [Bart Van den Hurk, Netherlands]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13808	7	53	7	53	0.6C warmer than present decade according to chapter 1 section 1.2 [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13809	7	53	7	54	reference unclear, are you generalizing saying that past 0.5°C had an effect so future 0.5°C will too? Or Are you saying that some regions have already experienced 1.5? see chapter 1 section 1.2 [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2108	7	54			The language in this draft is often ambiguous. This is just one example. When you say "already detectable" do you actually mean "has already been detected"? Or do you mean that we could expect to find the changes in extremes, if we could look for them? I dont think you mean the latter, so why allow a reader to be confused by your ambiguous language? [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10735	7	54	7	54	record' is better to change to 'records' [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
2109	7	55			What do you mean by "observable differences"? Since we haven't got to 2C warming yet, where does the "observable" come in? Do you just mean "large differences"? If so, how large is "large"? [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5245	7	55	7	55	observable -> "noticeable" or "detectable". Results from simulations cannot be observed [Bart Van den Hurk, Netherlands]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13810	7	55	7	55	provide an explanation for transient climate projection or reword [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
14984	7	55	7	57	Detectable how? Within computer models or through observations? There should be more discussion about the basis of these findings, including links to the underlying literature. [Farhan Akhtar, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13811	7	56	7	56	Do you mean temperature mean and temperature extremes? Or do extremes include other variables? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2110	7	57			Do you mean "large" when you say "detectable" here? Why do you keep using different words for what I think is the same meaning? This will just confuse readers (it certainly is confusing me). And please try to say how large these differences are likely to be. [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10736	7	57	7	57	The , should change to ; in braces, so: {3.3.1; 3.3.2;3.3.13} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
16221	7	57	8	1	We are presently experiencing very damaging Atlantic hurricanes because the water temperatures of the ocean in some regions are up a degree or so - it might be good to mention that one can end up with more intense storms as oceans are warmed. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10697	8				In the section in the ES on "natural and managed sections", please include a summary of terrestrial agriculture (e.g. cropland, corn, rice, etc.), which is a critical sector for humanity that appears to be left out of the ES. [Christopher Clark, United States of America]	Accepted. Revised.
10003	8		8		Row 52: This part (floods) is very short. It should be more comprehensive. [Nazan AN, Turkey]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20907	8	1	8	1	Add "for" before "precipitation extremes" [Sonia Seneviratne, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10737	8	1	8	1	land is better to be deleted [Seyed Muhammadreza Tabatabaei, Iran]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10738	8	1	8	1	The , should change to ; in braces, so: {3.3.1; 3.3.3; 3.3.13} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
7229	8	1	8	4	Slightly unclear sentence, could change to "For mean precipitation, there is substantially lower risk of meteorological drought (accumulated precipitation deficits), hydrological drought (streamflow deficits), and agricultural drought (soil moisture deficits), in the Mediterranean region at 1.5°C compared to 2°C. {3.3.4}" [Butt Nathalie, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12781	8	1	8	4	The mediterranean drought should be cited as "For example," [Robert Vautard, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3650	8	2	8	2	Change "hydrological drought (streamflow deficits)" to "hydrological drought (streamflow, lake storage, and renewable groundwater deficits)" [Sean Fleming, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2111	8	3			How large is "substantially lower risk"? The magnitude of these sort of predicted changes is crucial, if you want a decision maker to take note of your report. [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10880	8	3	8	4	is the Mediterranean region the only one highlighted here because it is the only one with literature available or after a global evaluation is the only one in the world with significant conclusions? [Carolina Vera, Argentina]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11923	8	4	8	4	ADD.....compared to 2°C, "for example" {3.3.4}. [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11939	8	4	8	4	ADD.....compared to 2°C, "for example" {3.3.4}. [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13249	8	6	8	6	Should be "a 1.5°C warming climate" [Wei Zhang, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13250	8	7	8	7	Should be "a 2°C warming climate" [Wei Zhang, United States of America]	Editorial - copyedit to be completed prior to publication
10739	8	7	8	8	Section' and 'and' in braces should be deleted, so we will have: {3.3.1; 3.3.2} [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
9792	8	8	34	36	The impacts of warmer ocean on fisheries and aquacultures vary regionally, e.g., the impact on fisheries might not be completely negative in High-Latitude Spring Bloom Systems, although the text emphasizes the region where corals will disappear. In addition, as a reader, I hope to know what kind of changes in coastal area are expected to experience? What types of coastal regions and communities will undergo positive or negative changes? [Rongshuo Cai, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9799	8	8	52	52	The subtitle of Floods should be added "runoff" here, if the "drought" and "flood" are discussed, respectively? [Rongshuo Cai, China]	Editorial - copyedit to be completed prior to publication
10881	8	8	8	12	This conclusion is very important, it should have a reference to a chapter section [Carolina Vera, Argentina]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16222	8	9	8	12	It might also be said that impacts with 1 C are a good bit greater than at 0.5 C as well. Regarding the second of the sentence, good to be saying that 1.5 C cannot be considered a safe option, but to suggest that adaptation can help in avoiding impacts seems unduly optimistic unless there are some qualifiers here--avoiding impacts of sea level rise will be virtually impossible in many locations, and will be able to be adapted to only for limited periods of time. Greater qualification is needed here. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13705	8	9	8	12	Is this message conveyed clearly in Chap1? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3959	8	10	8	10	a substantial increase in risk - what is the (un)certainly around this statement? [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17704	8	10	8	12	Suggestion: add that the increase in extreme events due to 1C warming is already resulting in great havoc to societies. [Ana Bastos, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9700	8	11	8	11	safe can be misinterpreted. I suggest to remove. The message is already clear. "substantial increase in risk" line above [Eric Martin, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10454	8	11	8	12	v important message, hope it's clear elsewhere [Jonathan Lynn, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12263	8	11	8	12	I think "safe" options " is a bit too imprecise and should be reworded. "Safe" builds on so many judgements that it cannot be used like this in the ES, in my view. [Jan Fuglestad, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13812	8	11	8	12	Adaptation and adaptation limits need to be addressed, clearly these are surpassed for some systems at 1.5°C [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6988	8	12	8	12	Suggest to add ", particularly considering the significant regional differences that may exist and the range of uncertainty among model projections." after " impacts are to be reduced or avoided". [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1023	8	12	8	12	While adaptation is touched upon here and there in this chapter, this is the sole description of adaptation. There should be at least one paragraph discussing how adaptation is effective and at what cost. [Mitsutsune Yamaguchi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2474	8	14	8	14	State at the outset: arid and tropical zones are expanding and concomitant features--for tropics, e.g., biodiversity and diseases (Malaria, dengue, zika, etc.) [Lisa Lucero, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10456	8	14	8	50	very clear exposition [Jonathan Lynn, Switzerland]	Noted.
1311	8	14	9	8	There is no references to sub-sections of the Chapter after each statement. Add them please. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
1351	8	14	9	8	There is no references to sub-sections of the Chapter after each statement. Add them please. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
10882	8	14	9	8	The conclusions and discussions presented in these paragraphs should include explicit references to chapter sections [Carolina Vera, Argentina]	Accepted. Text revised.
20544	8	14	8	50	This section currently only seems to address direct impacts of climate change. See: Smithers, R.J. and Blicharska, M. (2016) Indirect impacts of climate change. Science 354: 6318, 1386. The following quote may be useful: "Climate change will bring indirect impacts to biodiversity through changes in socio-economic drivers, working practices, cultural values, policies and use of land and other resources. Due to their scale, scope and speed, many could be more damaging than the direct impacts, especially those that affect our highly modified landscapes, coasts and seas" (Smithers et al. 2008). Smithers, R.J.; Cowan C.; Harley, M.; Hopkins, J.J.; Pontier, H. and Watts, O. (2008) England Biodiversity Strategy: Climate Change Adaptation Principles. Conserving biodiversity in a changing climate. Defra, London. 16pp. <a href="https://www.gov.uk/government/publications/england-biodiversity-strategy-climate-change-adaptation-principles">https://www.gov.uk/government/publications/england-biodiversity-strategy-climate-change-adaptation-principles</a> [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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5488	8	14	9	8	Up to this point, in the 2 previous subsections of the executive summary, every statement had a cross-references to the section of the IPCC report, where the statement is discussed in detail (example: "there is substantially lower risk in the Mediterranean region at 1.5°C compared to 2°C. (3.3.4)". However, in the present 3 subsections (Natural and managed systems, Floods and Health) there are no cross references anymore, why? Example: "limiting warming to 1.5°C rather than 2°C would carry significant benefits for terrestrial, wetland, coastal, and ocean ecosystems". Where in the report is such statement coming from? [Ismael Nunez-Riboni, Germany]	Point taken, we are working to improve traceability. The linkages into the primary literature for the different coastal ecosystems is quite strong. Papers by Lovelock, Hoodonk, and others indicate the advantages of the Long Term Stabilization Goal on these ecosystems - based on their sensitivity to sea level rise.
6306	8	16	8	16	This sentence can be read as if 1.5C is not a problem (it has benefits). I think, it should be reworded to stress clearly that 1.5C is just smaller problem than 2C – but still A PROBLEM [Dmitry L. Musolin, Russian Federation]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1024	8	16	8	18	Here it says "limiting warming to 1.5°C rather than 2°C would carry significant benefits". For this report to be policy relevant, it should be better to add information of additional cost in comparison to 2 degree target. If this is not the task of chapter 3, should refer to relevant chapters and pages for policymakers to check. [Mitsutsune Yamaguchi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16223	8	16	8	18	This paragraph also needs to give a sense of how serious the changes at 1.5 C will be. Yes, 1.5 C instead of 2 C will mean less damage, but to call these "benefits" given the seriousness of the impacts that will be occurring is like putting make-up on a seriously ill pig. Such a hiding of the impacts of 1.5 C is inappropriate. There should be no assurance given that stabilizing at 1.5 C will be acceptable—the world needs to return to a lower global average temperature increase than 1.5 C. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20589	8	16	8	18	With a warming of 1.5C, the anticipated impacts of natural and managed systems are likely to be significant. However, with a 2C warming, these impacts will be worst. From this perspective, instead of saying that ..... Would carry significant benefits....., I would say ..... would reduce significantly the negative impacts on..... [KENEL DELUSCA, Haiti]	We are grateful for your suggestion, and will be including consideration of it in the next draft
18849	8	16	8	18	According to the available literature on natural and managed systems, limiting warming to 1.5°C rather than 2°C would carry significant benefits to different ecosystems BUT It will not carry significant benefits but this 0.5°C could make a big difference in impacts on different ecosystems and societies. It could reduce the intensity and frequency of precipitation, heat waves, cold waves, water salinization, drought as well as other extreme weather events. [Marwa Hafez, Egypt]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12468	8	16	8	19	Requires evidence to support this statement. Also mitigation action could have negative impact which also need to be stated. [Dr Noim UDDIN, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
376	8	16	9	8	References to respective sections are missing: '{...}'. [David Docquier, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13706	8	18	8	18	agriculture should be included in the list of benefiting food production systems [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16224	8	21	8	21	While desirable to halve the risk of extinction, the sentence should indicate numerically what the two levels are (as is done in the next sentence for biome transformation). [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13813	8	21	8	21	Does this statement refer to terrestrial species or does it include marine species (where much less knowledge on species extinction risks exists) [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10455	8	22	8	22	"biomes" may not be clear in Exec Summary [Jonathan Lynn, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13814	8	22	8	22	Does this include marine? Please be explicit which biomes you are referring to [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13815	8	24	8	25	Does this include ocean and land? Not clear [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19000	8	25	8	25	Instead of writing "In the Mediterranean [...]", please said directly "The Mediterranean [...]" [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
13162	8	25	8	25	After a sentence "Limiting warming to 1.5°C, compared to 2°C is also projected to reduce climate change induced species range loss, forest fire risk, and the geographic spread of invasive species, pests and diseases.", the following sentence might be useful: "For example, potential habitats of invasive bamboo species (Phyllostachys edulis and P. bambusoides) in central and northern Japan was estimated to increase from 35% under the current climate (1980–2000) to 46–48%, 51–54%, 61–67%, and 77–83% under 1.5°C, 2.0°C, 3.0°C, and 4.0°C warming levels, respectively (Takano et al. in press)." *Takano et al. Ecology and Evolution, DOI: 10.1002/ece3.3471 [Kohei Takano, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13816	8	25	8	25	Be clear if you mean Mediterranean region, as Mediterranean biomes are found in Australia and south Africa..or Mediterranean Sea? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12264	8	26	8	26	Re the use of the concept "tipping points". The wording regarding abrupt changes, TPs, irreversibility, timescales should be carefully coordinated across chapters; especially with chapter 1 [Jan Fuglested, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13817	8	27	8	27	Does this include northern and southern hemisphere? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5430	8	30	8	30	It would be more appropriate to say: Large changes in ocean systems are expected to occur as the world warms to 1.5oC ... It would be great to include a likelihood of this statement. [Klaus Radunsky, Austria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13818	8	30	8	30	Projected to occur? or evidence suggests? Would be more suitable formulations of this sentence [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16225	8	30	8	31	What is the justification for talking about a "transition to 1.5 C"? It is clear that at least some impacts, such as the rate of sea level rise and loss of coral, will be far above acceptable levels at 1.5 C—this should be viewed as, if possible, a ceiling, and if not, a point on a path back toward a lower overall global warming. I just do not think this volume should be accepting the notion that 1.5 C is a proper (safe) new level—the basis for this level is political, not scientific—there are technological approaches to get back to lower levels so 1.5 C should just not be accepted as the new normal. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6227	8	31			changes in water temperature (not changes to water temperature). [Muhammad Mohsin IQBAL, Pakistan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13819	8	31	8	31	This is already occurring, suggest adding "to relocate further" [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13820	8	31	8	32	Novel ecosystems emerging due to biodiversity reshuffling and species local extinction? See work by William Cheung and by Jorge Garcia-Molinos (2016 nature climate change 6) [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6817	8	32	8	32	...less able to move, however, and will experience high rates... [Rafiq Hamdi, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13821	8	32	8	32	Relocate or Redistribute may be a more suitable term than move [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16229	8	32	8	33	Somehere in this section there needs to be special mention made of what such levels of warming will mean in high latitudes, making the point that the warming in high latitudes is typically something like double the increase in the global average temperature (and also making clear that land temperature changes are also greater than the global average). In any case, some specific mention (e.g., a special section or paragraph) is needed of high latitude effects, explaining how species will go extinct in high latitudes as the conditions suitable for many species will no longer exist, etc. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9477	8	33			I think this sentence refers to the behaviour of coral reefs in tropical and sub-tropical locations. Is there anything you can say from the literature about deep water corals, which support important exosystems in locations further away from the equator? (My recollection is that deepwater corals are quite vulnerable to ocean acidification - but I don't have references to hand since I am typing these comments waiting for a plane at San Francisco Airport). [David Wratt, New Zealand]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13440	8	34	8	36	Also, water quality issues is a major challenge in coastal cities, where aquifer pollution due to salinity intrusion and excessive usage of aquifers. [Vidyunmala Veldore, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13822	8	34	8	36	These are food production systems, maybe clarify with marine food production systems. Further be clear when you are talking about fish stocks vs fisheries (fishers) vs fishery businesses [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6228	8	35			- - - by relocating stocks, and the increased risk of - - - is suggested to be changed to - - - by relocating stocks with the increased risk of - - -. [Muhammad Mohsin IQBAL, Pakistan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13823	8	35	8	36	This should also be addressed for inland, according to AR5 crop production goes into high risk beyond 1.5, okay comes further down. Some reorganization of this and the next paragraph seems warranted. [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7230	8	36	8	36	remove 'Nevertheless' [Butt Nathalie, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17989	8	36	8	36	is this "changes to food" or "changes in food"? [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
6307	8	36	8	36	changes to food" sounds strange [Dmitry L. Musolin, Russian Federation]	Editorial - copyedit to be completed prior to publication
10740	8	36	8	36	food, income and livelihoods.' is better to change to 'foods, incomes and livelihoods.' or 'food, income and livelihood.' [Seyed Muhammadreza Tabatabaei, Iran]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13824	8	38	8	38	Clarify – declines in commercial fish stocks, or reduction of fisheries productivity? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10741	8	38	8	38	loss' is better to change to 'losses' [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
2112	8	40			Try to avoid starting senetnces with words such as "Studies reveal...". I think we can accept that you are not making this stuff up, so we can assume there are some studies underlying what you conclude. So don't say it. (You do this sort of thing a lot through the report - rewrite any snentence starting in this way). [Neville Nicholls, Australia]	Noted.
13825	8	40	8	40	also an economic source [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17705	8	40	8	40	substantial RELATIVE benefits. I think you meant comparing 1.5C to 2C scenarios? [Ana Bastos, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5246	8	40	8	41	Are the "substantial benefits to marine fisheries" here relative to the current situation or relative to 2 degree warming? [Bart Van den Hurk, Netherlands]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13827	8	41	8	41	Dependent on what? Ocean? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16226	8	41	8	41	1.5 C should not be a target, but a ceiling, or if that is not possible, a point along a path to a lower global warming [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13826	8	41	8	44	This jumps to human systems here which are addressed in the section below [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2113	8	41	8	44	Similarly, you do not need to start this sentence with "Similarly...". It just adds an extra word - just state your conclusions. And again, try to include a magnitude for the "much lower", as well as IPCC calibrated language to indicate uncertainty. [Neville Nicholls, Australia]	Noted.
2709	8	41	8	44	It would be good to make the connection with poverty and equity here, in addition to livelihoods [Penny Urquhart, South Africa]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20559	8	42			Instead of likelihood do you mean livelihood? This issue occurs in other points across this chapter. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
6229	8	42			The word 'the' between 'in' and 'hundreds' is suggested to be deleted. [Muhammad Mohsin IQBAL, Pakistan]	Noted.
7231	8	42	8	42	replace 'likelihoods' with 'livelihoods' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
3960	8	42	8	42	livelihoods (not "likelihoods") [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
10742	8	42	8	42	likelihoods' should change to 'livelihoods' [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13828	8	43	8	43	Erosion of what? Coastal erosion? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5221	8	46	8	50	Here, in the executive summary, there is an expression "In freshwater systems, constraining warming to 1.5°C, compared to 2°C, reduces climate-change induced increases in global water resources stress relative to 1980-2009 by an estimated 50%, with particularly large benefits in the Mediterranean." I think there are similar statements through the chapter on various affected sectors. [e.g. P8L20-L22: Constraining warming to 1.5°C, compared to 2°C, is projected to halve the climate change related increase in the risk of species extinction, as well as reduce the risks of decline in terrestrial and wetland ecosystem services.] There has been a global temperature increase (dT) of about 1°C from the pre-industrial period to the present period (1980-2009). With considering it, the additional temperature increase from the present to the 1.5°C world and the 2.0°C world are about 0.5°C and 1.0°C respectively. If the climatic impact (here water resource stress) is assumed to change in proportion to the dT, 50% reduction of the impact by shifting from the 2.0°C world to the 1.5°C world is quite natural and no surprise. I understand that the expression cited above is objective based on several studies without any flaws in it. However, at the same time, I am afraid that readers may be confused if they mistakenly compare the '50% decrease of impact (from the present state)' with the '25% decrease of dT (from pre-industrial)'. [0.5°C decrease from 2.0°C to 1.5°C is 25% decrease of the dT; (2.0-1.5)/2.0*100=25%]. What I want to stress here is that the authors should be very careful not to be considered that they are exaggerating the research evidences by rhetoric, especially for the executive summary. [KIYOSHI TAKAHASHI, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11924	8	47	8	47	Switched to 1980-2009 climate normals when all else is measured against pre-industrial base data. This needs to be emphasized in some manner. [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11940	8	47	8	47	Switched to 1980-2009 climate normals when all else is measured against pre-industrial base data. This needs to be emphasized in some manner. [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13829	8	48	8	48	New paragraph to be clear this isn't food production from freshwater environments [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2114	8	48	8	50	What do you mean by 'significantly' here? Is it "substantially" or "statistically significant"? (surely not the latter?). [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2115	8	48	8	50	Do you mean to imply that the risk to crop production in OTHER areas would not be decreased by restraining warming to 1.5C, compared with 2C warming? [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6818	8	48	8	50	what about Europe and north America? [Rafiq Hamdi, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19054	8	49	8	49	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasouy, Egypt]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11691	8	49	8	49	The word "significantly" appears often in the text. If this is not intended to reflect statistical significance, perhaps it could be replaced by a word with less "baggage", like "substantially", or something similar? [David Schoeman, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10743	8	49	8	49	SE' is better to change to 'South East' [Seyed Muhammadreza Tabatabaei, Iran]	Noted.
13441	8	49	8	50	However, excessive irrigation and land-use changes might need to be considered as a major threat that are not included in the Earth System Models. [Vidyunmala Veldore, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13830	8	52	8	52	Is this supposed to be a separate section? Why the focus on floods? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4357	8	52	8	55	The section 'Floods' must be improved, including more details, information, and references. [Gabriel de Oliveira, Brazil]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7723	8	52	8	55	The summary of the impacts of 1.5C global warming scenario on floods is too short for such an important phenomenon. It should be expanded to at least a ten-line paragraph. [Hilary Inyang, Nigeria]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19001	8	52	8	55	Sorry but the analysis is very weak; just two (2) lines and nothing on Africa... [JACQUES-ANDRE NDIONE, Senegal]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1153	8	52	8	55	This sentence does not do appropriate justice to the complexity of anticipated future changes to floods, which might arise from intensification of extreme precipitation at multiple timescales (e.g. less than hourly for flash floods, through to multi-month rainfall in large basins such as the Mississippi or Murray Darling basins), or from changes to snow melt timing or glacial melt, or changes to storm surge and sea levels for coastal and estuarine regions. Antecedent conditions are also critical for catchments that are capable of absorbing large volumes of rainfall prior to producing runoff. As a result, there remains very substantial uncertainty on future changes in floods, and current global models (both global climate models and global hydrological models) are not sufficiently advanced to capture this nuance. Furthermore, papers that assess historical trends in flood hazard (i.e. papers that seek to focus on the physical changes to flooding, rather than increased urbanisation and development in flood plains and other factors that influence total flood exposure and vulnerability) are suggesting more stations show decreases than increases, and thus further emphasise the uncertainty that needs to be placed on any future model projections. [Seth Westra, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9862	8	52	8	55	If this remains a "one-sentence section" I would suggest merging with the section above [Christopher Reyer, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6819	8	52	8	55	The length of the section about Floods and Health is considerably small compared to the previous sections, an effort is required from the authors to harmonize the length for all sections [Rafiq Hamdi, Belgium]	Noted.
20908	8	52	8	55	Regarding floodings, an additional aspect compared to effects of changes in precipitation include the possible combination with sea level rise. The IPCC SREX (chapter 3) pointed to the fact that there has been a "likely increase in extreme coastal high water worldwide related to increases in mean sea level in the late 20th century" (Seneviratne et al. 2012). That chapter also stated for projections that it is "very likely that mean sea level rise will contribute to upward trends in extreme coastal high water levels" and that there is high confidence that locations currently experiencing coastal erosion and inundation will continue to do so due to increasing sea level, in the absence of changes in other contributing factors" (see Table 1 of Seneviratne et al 2012). The potential relevance of this factor has for instance been illustrated with the hurricanes Harvey and Irma this summer, whereby most of the damage was induced by flooding rather than wind speed. [Sonia Seneviratne, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
20909	8	52	8	55	On a related topic, increases in heavy precipitation associated with hurricanes may need to be explicitly mentioned in this paragraph or elsewhere in the executive summary of this chapter. On this point as well, there was a clear statement in Chapter 3 of the IPCC SREX (For projections: "Likely increase in heavy rainfall associated with tropical cyclones", see Table 1 of that chapter) [Sonia Seneviratne, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9969	8	52	8	58	This part is very short and insufficient [Mustafa Tufan Turp, Turkey]	Accepted. Text revised.
9702	8	54	8	54	... pattern in precipitation.. Mean precipitation or extreme precipitation ? [Eric Martin, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2104	8	54	8	55	I do not know what you are trying to say here, or why you want to include this in the ES. [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7232	8	54	8	55	Does this mean in comparison with 2C? Is there a sentence or phrase missing here? [Butt Nathalie, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16227	8	54	8	55	It is not at all clear what point is being made. An expansion is needed here covering not just storm track changes but also the likelihood of extreme precipitation, such as from tropical cyclones, rain onto snow, etc. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5247	8	54	8	55	No dependence on sea level, evaporation, reservoir operation etc that is worth mentioning in this executive summary? [Bart Van den Hurk, Netherlands]	We are grateful for your suggestion, and will be including consideration of it in the next draft
14241	8	54	8	55	The section on floods is insufficient for the purpose of an executive summary. Please expand on this important topic further. [Jason Donev, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10457	8	54	8	55	not really clear. E.g. is it increased precipitation or floods in the areas described. Maybe worth another line or two to spell it all out [Jonathan Lynn, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17660	8	54	8	55	How about the flood risks in coastal areas due to sea level rise or tidal wave? Does the floods cause only by higher rainfall intensity or extremes? A sentence may help readers to understand the context and circumstance. Also a brief information on distinguishing between climate extremes and climate related hazards. [Perdian Perdian, Indonesia]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3651	8	54	8	55	Exceedingly brief discussion of floods here isn't adequate, even for the executive summary of a concise summary chapter. Yes, of course, increasing precipitation will tend to increase flood risk. But two other major factors - increased human populations living on floodplains leading to greater impacts and therefore risks, and LULC change (specifically, urbanization and loss of permeable area) leading to increased flooding for a given precipitation amount and therefore greater hazards and therefore risks - are controllable and therefore offer important mechanisms for climate change adaptation. We absolutely have to mention that here, because it's key information for policy makers, planners, etc. [Sean Fleming, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1704	8	54	8	55	In the context of discussion on floods, there is need to mention occurrence of 'hurricanes'. While changes in hurricane frequency remain uncertain, basic physical understanding and model results suggest that the strongest hurricanes (when they occur) are likely to become more intense and possibly larger in a warmer, moister atmosphere over the oceans. This is supported by available observational evidence in the North Atlantic. Some conditions favourable for strong thunderstorms that spawn tornadoes are expected to increase with warming, but uncertainty exists in other factors that affect tornado formation, such as changes in the vertical and horizontal variations of winds. [Mishra Santosh Kumar, India]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1714	8	54	8	55	In the context of discussion on floods, there is need to mention occurrence of 'hurricanes'. While changes in hurricane frequency remain uncertain, basic physical understanding and model results suggest that the strongest hurricanes (when they occur) are likely to become more intense and possibly larger in a warmer, moister atmosphere over the oceans. This is supported by available observational evidence in the North Atlantic. Some conditions favourable for strong thunderstorms that spawn tornadoes are expected to increase with warming, but uncertainty exists in other factors that affect tornado formation, such as changes in the vertical and horizontal variations of winds. [Mishra Santosh Kumar, India]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1719	8	54	8	55	In the context of discussion on floods, there is need to mention occurrence of 'hurricanes'. While changes in hurricane frequency remain uncertain, basic physical understanding and model results suggest that the strongest hurricanes (when they occur) are likely to become more intense and possibly larger in a warmer, moister atmosphere over the oceans. This is supported by available observational evidence in the North Atlantic. Some conditions favourable for strong thunderstorms that spawn tornadoes are expected to increase with warming, but uncertainty exists in other factors that affect tornado formation, such as changes in the vertical and horizontal variations of winds. [Mishra Santosh Kumar, India]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1724	8	54	8	55	In the context of discussion on floods, there is need to mention occurrence of 'hurricanes'. While changes in hurricane frequency remain uncertain, basic physical understanding and model results suggest that the strongest hurricanes (when they occur) are likely to become more intense and possibly larger in a warmer, moister atmosphere over the oceans. This is supported by available observational evidence in the North Atlantic. Some conditions favourable for strong thunderstorms that spawn tornadoes are expected to increase with warming, but uncertainty exists in other factors that affect tornado formation, such as changes in the vertical and horizontal variations of winds. [Mishra Santosh Kumar, India]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11925	8	55	8	55	Why no comparison of flood risks between 1.5°C and 2°C warming? [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11941	8	55	8	55	Why no comparison of flood risks between 1.5°C and 2°C warming? [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9701	8	55	8	55	Be more precise or at least consistent in next draft. Asia is considerably larger than US! And all 3 have a wide variety of climate! [Eric Martin, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10004	9		9		Row 1: This section should also mention the water-borne or vector diseases that are not yet fully understood such as Zika [Nazan AN, Turkey]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7591	9	1			I think the word 'detectable' or something similar should be used in the health section, to make the point that we have statistically robust differences between these low emission scenarios. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13707	9	1		8	I am assuming this is not all there will be in the Exec Summary on human systems? It's very limited. Some headings and bullet points would have been useful to include. Impacts are not just to do with morbidity and mortality but also e.g. impact on mental health, psychological resilience, impaired sense of place/identity, loss of cultures; also heat related violence, intergroup conflict over reduced or degraded resources. [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9970	9	1	9	10	It would be better if it could be highlighted the risk of another kind of diseases such as Zika, vector and water-borne diseases as well [Mustafa Tufan Turp, Turkey]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13831	9	1	9	8	why limited to health? Why doesn't include eg livelihoods, poverty, economics, urban, security? See chapter 4 and 5 [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4358	9	1	9	9	The section 'Health' must be improved, including more details, information, and references. [Gabriel de Oliveira, Brazil]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2116	9	3	9	4	What does "complex regional patterns" mean? I think this means that some areas will NOT see "greater risks" from 2C warming, but I don't think you mean this. [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9703	9	3	9	4	It is strange to have in the same paragraph "complex regional pattern" and "linear association". Linear means a simple impact. Be more precise in next draft and clearly separate linear and more complex type of impacts [Eric Martin, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16228	9	3	9	8	There needs to be mention that with greater risks anywhere, global transportation and economic systems interconnect the world such that risks anywhere really are risks (virtually) everywhere. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4720	9	3	9	8	This short section on health is incorrect. It would be expected that warming above 2C would provide greater changes in disease risks than warming only to 1.5C, but we really do not know. It is likely that, depending on disease, patterns will change - increasing risks on some locations, decreasing risks in others and more epidemic behaviour of some diseases in some circumstances. Effects of climate change on health go much further than effects of temperature only. There is no clear expectation that relationships between disease risks and temperature will increase linearly - for some that may happen but we also expect thresholds to be crossed that cause non-linear increases in risks. So this section needs to be re-written and uncertainty included. [Nicholas Ogden, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2117	9	4			Linear associations can mean one of two things. But most people will think you mean that you can fit a straight line between temperature and impacts. But this isn't the case for heat-related mortality is it? There the association is U-shaped. [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14242	9	4	9	4	'Linear associations between temperature and adverse health outcomes'. It seems to me (way outside my field though!) that we're largely talking worse than linear, rather than linear. Could some sort of confidence be reported here? [Jason Donev, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4311	9	4	9	6	I suggest to include the effects on dementia parkinson and alzheimer, and not only direct health outcomes, because it societal impacts (i.e. ref."Climate Change and Human Health Scenario in South and Southeast Asia", R.Akhtar Editor. Springer, 2016) [teodoro georgiadis, Italy]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2118	9	7	9	8	I think "on mitigation for risks past mid-century" might confuse readers. Perhaps say something like "emission reductions after 2050"? I presume you mean "mitigation" as it is used by IPCC, and not a synonym for "adaptation"? [Neville Nicholls, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
18778	9	12	9	14	I support the inclusion of the statement made that 1.5C cannot be considered a "safe" option and that it requires climate change adaptation [Sven Harmeling, Germany]	Noted.
6182	10	1	10	29	Although I appreciate this is only the FOD, I find a distinct lack of discussion of uncertainties and signal-to-noise issues. I would think it appropriate to note right up-front, perhaps in section 3.1, that at low levels of global warming such as 1.5C, the signal of climate change may be considerably masked by natural internal variability, especially at the regional scale. I also think that it is important to note that, because of natural internal variability (and, to a lesser extent, modelling uncertainty) it may not be possible to distinguish the difference between the impacts of 1.5C and 2C warming for many variables. [Mat Collins, United Kingdom (of Great Britain and Northern Ireland)]	IPCC Uncertainty Language will be improved in SOD and FGD. Climate change signals are analysable through the ensemble method for robustness and significance and can be found for the respective variable.
16230	10	3	10	6	In that the world is on a path that will take global average temperature to well above 2 C, even more so beyond 1.5 C, I would be expecting that, to provide appropriate context, the chapter would also be talking about the new findings on also going above 2 C and even 3 C. [Michael MacCracken, United States of America]	done for 2", but focus of the SR on 1.5 and 2°.
19055	10	4	10	4	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbaisouny, Egypt]	Editorial - copyedit to be completed prior to publication
2119	10	5			It is worrying that even a basic spell check and grammar check has not been applied to this draft, and that it appears no-one has read through it to remove glaring errors. This is just one simple example, of which there are a very large number: "scenarios" should be singular, not plural. The presence of so many obvious errors that should have been picked up before sending the draft to review makes a reader/reviewer worry about the quality of the assessment overall. [Neville Nicholls, Australia]	Agreed and we apologize, but the time was so short that for the FOD we focused on the content of the text. More careful spell check for SOD was done.
5248	10	5	10	5	Why not on a comparison between 1.5 and 1 degree warming? [Bart Van den Hurk, Netherlands]	Taken into account. The comparison was made to assess the implications of constraining warming to 1.5°C and 2°C as specified in the Paris Agreement. More information on current impacts (at today's 1°C of global warming) is expected in the AR6.
10458	10	5	10	5	"scenario" not "scenarios"? [Jonathan Lynn, Switzerland]	Editorial - copyedit to be completed prior to publication
10744	10	5	10	5	versus should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13832	10	6	10	6	Add pointer to relevant chapter/section of AR5 [Elvira Poloczanska, Germany]	Noted.
7166	10	6	8	12	Note that, under UNFCCC, the discussions in the structured expert dialogue referred to "safe" limits of global warming considering adaptation measures to reduce risks and impacts [Ulain Florin VLADU, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13833	10	8	10	8	Why not just say climate-related hazards, otherwise policy would not be concerned about climate change. [Elvira Poloczanska, Germany]	Noted.
10745	10	8	10	8	Section' should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13834	10	9	10	9	But a large part of section 3.4 focuses on climate and physical variables and not specifically on water from ecosystems and/or human perspective. [Elvira Poloczanska, Germany]	Accepted. The chapter has been restructure and the comment was taken into account
10746	10	9	10	9	Section' and 'to' should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13835	10	10	10	10	avoided not avoid [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
17990	10	10	10	10	avoid impacts -- avoided impacts [Wilfrin Moufouma Okia, France]	Editorial
5249	10	10	10	10	avoid -> "avoided" [Bart Van den Hurk, Netherlands]	Editorial - copyedit to be completed prior to publication
20910	10	10	10	10	Replace "avoid" with "avoided" [Sonia Seneviratne, Switzerland]	Editorial - copyedit to be completed prior to publication
10459	10	10	10	10	"avoided" not "avoid" [Jonathan Lynn, Switzerland]	Editorial - copyedit to be completed prior to publication
10747	10	10	10	10	Section' should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
378	10	10	10	13	This sentence corresponds to Section 3.6 and not to Section 3.7. I suggest to remove this sentence, as no precision is given for Sections 3.3 to 3.5, and to add some text related to Section 3.7. [David Docquier, Belgium]	Accepted. Sections 3.4 to 3.6 have been restructured. Text has been changed
10748	10	11	10	11	versus should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13836	10	13	10	13	rates of change of what? [Elvira Poloczanska, Germany]	Accepted. Temperature change included.
10749	10	13	10	13	Section' should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
379	10	14			The description of Section 3.2 should appear in the beginning of the paragraph and not at the end. [David Docquier, Belgium]	Noted.
10750	10	14	10	14	Section' should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13838	10	15	10	15	Do you mean previous IPCC assessments? [Elvira Poloczanska, Germany]	Noted. Yes, IPCC assessments.
13839	10	17	10	17	Hot spot needs to be defined in the context of this chapter [Elvira Poloczanska, Germany]	Accepted. Addition will be considered in Second Order Draft.
5489	10	18	10	18	Boxes should not be capitalized unless accompanied with a number (like Box 3.3)? [Ismael Nunez-Riboni, Germany]	Editorial - copyedit to be completed prior to publication
13840	10	19	10	19	Spell out SIDS [Elvira Poloczanska, Germany]	Noted. Corrected in SOD.
17442	10	19	10	19	Delete "the" at the end of this line [Xiaolin Zhang, China]	Editorial - copyedit to be completed prior to publication
16231	10	19	10	19	I'd urge spelling out SIDS for the general reader--in the US this abbreviation is for "Sudden Infant Death Syndrome" and so does not really help the reader quickly understand what Box 3.4 will be covering. [Michael MacCracken, United States of America]	Noted. Corrected in SOD.
10751	10	19	10	22	Box names should be deleted, so then we will have: (Box 3.3; Box 3.4; Box 3.7 ... [Seyed Muhammadreza Tabatabaei, Iran]	Noted. Corrected in SOD.
10752	10	24	10	24	cross-chapter' should be deleted, so: (Box 3.12) [Seyed Muhammadreza Tabatabaei, Iran]	Noted. Referencing to boxes, which contain content from different chapters has been clarified.
5858	10	24	10	29	In IPCC Report the "Impacts" chapter is scheduled before "Mitigation" chapter. Please explain shortly why this is reversed in this special report. [Joan A. Lopez-Bustins, Spain]	This follows the approved outline.
11926	10	25	10	25	CHANGE to...definition of "a"potential 1.5°C warmer "world" (cross-chapter Box 3.12). [Paul Doyle, Canada]	Accepted. Revised.
11942	10	25	10	25	CHANGE to...definition of "a"potential 1.5°C warmer "world" (cross-chapter Box 3.12). [Paul Doyle, Canada]	Accepted. Revised.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13837	10	32			Methods of assessment section: content needs to be balanced with content of chapter 1 [Elvira Poloczanska, Germany]	Taken into account. Material has been more strongly streamlined with Chapter 1. Also, this section has been shortened (e.g. removed previous sections 3.2.2.2 and 3.2.2.3 and moved material to suppl. Information or chapter 1).
10753	10	36	10	51	All 'WG1' and 'WG2' should be 'WG1' and 'WGII' [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10698	10	40			Is there a missing word after "main relevant"? "Information"? [Christopher Clark, United States of America]	Editorial. Note that the text was revised to make it clearer.
10754	10	41	10	46	Some of references are not complete in the references of the chapter. i.e. the coauthors are not clearly detected. e.g. Seneviratne et al. 2012; Handmer et al. 2012; Hartmann et al. 2013; Bindoff et al. 2013; Collins et al. 2013; Church et al. 2013; Christensen et al. 2013; Settele et al. 2014a. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13251	10	49	10	49	should be "globally" [Wei Zhang, United States of America]	Editorial. Text has been corrected (added "warming" after "global").
6820	10	53	10	53	What is the meaning of the word weather in the sentence? [Rafiq Hamdi, Belgium]	Accepted - remove "weather"
13841	10	55	10	55	Only human settlements? What about human health (in exec summary), industry etc? [Elvira Poloczanska, Germany]	Accepted - change settlement by systems
17991	10	56	10	56	applied, should delete the comma after "applied" ? [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
10005	11		11		Row 29: 2° C must be adjacent. [Nazan AN, Turkey]	Editorial - copyedit to be completed prior to publication
20656	11		15		Section 3.2 overlaps with methods explained in chapters 1 and 2. Potential here for reducing redundancies and streamlining chapters and narratives. [Koko Warner, Germany]	Taken into account. Some of the text has been removed, shifted to the suppl. Information or to Chapter 1. Some material is nonetheless necessary as a background for the chapter 3 assessment.
13842	11	1			To reduce chapter length and achieve balances in cover between different sections of the chapter, the supplementary material could be used for supporting technical and methodological material [Elvira Poloczanska, Germany]	Taken into account - the section has been reduced; a part of the information (climate models) will shift to chapter 1; information needed to understand the chapter is kept.
13843	11	1			Much of this would nicely complement what is insufficiently said in chapter 1. This should be addressed in the framing, suggest to transfer text to there or to suppl material [Elvira Poloczanska, Germany]	Taken into account - the section has been reduced.
2120	11	1	15	56	I don't think this detailed description of the methods of assessment need to be in the main body of the report - it would make the report flow better if this stuff was in an appendix. [Neville Nicholls, Australia]	Taken into account - the section has been reduced; a part of the information (climate models) will shift to chapter 1; information needed to understand the chapter is kept.
10700	11	3			Seems odd to imply that only climate models are used in investigating climate systems. I'd reword the sentence to "Climate models and the empirical record are necessary..." [Christopher Clark, United States of America]	Rejected. This sentence refers to climate conditions under additional warming compared to present, hence they have to be assessed with climate models.
16232	11	4	11	4	The use of the phrase "climate predictions" here is simply not justified—all of the models are running projections based only on projections of changes in emissions and/or atmospheric loading and leaving out any possible changes due to natural influences such as solar variations, volcanic influences, etc. There is not really any useful skill in decadal predictions and quite limited skill out to seasonal time periods—and certainly no skill of any kind from now out to when 1.5 or 2 C is reached. [Michael MacCracken, United States of America]	Noted. This will be fixed in the FGD.
13252	11	5	11	5	Does the coming century mean "the end of this century"? We are not sure of what will happen at the end of this century, not mention the next (22nd) century. [Wei Zhang, United States of America]	Accepted - end of this century
10755	11	6	11	6	Section' should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10756	11	9	11	9	IPCC 2007, 2013' is better to be written as 'IPCC AR4, AR5' [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
9971	11	10	11	11	Beside the reference of Nakicenovic et al. (2000), regarding the new scenarios the reference of van Vuuren et al. (2011) should be added: Van Vuuren, D. P., Edmonds, J., Kainuma, M., Riahi, K., Thomson, A., Hibbard, K., ... & Masui, T. (2011). The representative concentration pathways: an overview. Climatic change, 109(1-2), 5. [Mustafa Tufan Turp, Turkey]	Noted. This will be fixed in the FGD.
7233	11	12	11	12	remove 'and so' after 'framework,' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
10375	11	13	11	13	Delete apostrophe after "emissions" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
13844	11	14	11	14	Be clear, do you mean projected temperatures are slightly below 1.5... [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
10460	11	14	11	14	"a little" or "somewhat" better than "a bit" [Jonathan Lynn, Switzerland]	Editorial - copyedit to be completed prior to publication
10757	11	15	11	16	Some of references are not complete in the references of the chapter. i.e. the coauthors are not clearly detected. e.g. Kirtman et al. 2013; Collins et al. 2013. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10758	11	16	11	16	A'' is needed after 'Given that', so we have: Given that, this report ... [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
20590	11	17	11	18	the expected mean temperature response is with respect to a reference perio: pre-industrial era, for clarity there's a need to specify the referenc period (even when it's redundant) [KENEL DELUSCA, Haiti]	Rejected. This topic is addressed in chapter 1 and also referred to in the cross-chapter box on 1.5°C climates.
3537	11	20			use of word 'following' twice in one sentence, bad style! [Sylvia Sander, Monaco]	Editorial - copyedit to be completed prior to publication
13845	11	29			Much of this is redundant to chapter 1. Merge there or move to suppl material [Elvira Poloczanska, Germany]	Taken into account. Material has been shortened. However, some background material is essential to understand the analyses reviewed and the assessments provided in the present chapter.
9972	11	29	11	29	in the heading 3.2.2.1 Definition of a '1.5°C or 2° C climate projection', "C" must be adjacent to ""; in other words "2°C" [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
5716	11	29	13	11	The definition of 1.5C warming projection is already given and also should be given in Chapter 1. Chapter 3 should not repeat it. Overall Chapter 3 is too long. Many repetitions and overlaps to Chapters 1 and 2 should be avoided to reduce the length of the text. Also, much text on 2C can be dropped or shortened. [Hong Yang, Switzerland]	Taken into account. Material has been shortened. However, some background material is essential to understand the analyses reviewed and the assessments provided in the present chapter.
8820	11	29	13	11	The section discussing about the challenges of assessing climate change while the heading written was definition. [Lubna Alam, Bangladesh]	Taken into account. The structure has been revised.
12265	11	29	13	11	Section 3.2.2.1 is of course very important and will probably be useful for a long time. It is important to communicate these approaches clearly to various groups of users. I wonder if some kind of illustration could help. [Jan Fuglestedt, Norway]	Taken into account. However, a figure that could illustrate these points well was not identified. This could possibly be revisited for the FGD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6183	11	29	13	12	The issues discussed in 3.2.2.1 highlight the main challenge for this chapter. Mostly it will have to rely on assessments of scenarios passing through 1.5C or 2C warming, as multi-model experiments for the other types of approaches (e.g. equilibrium) do not exist, as we clearly see in Table 3.1. The example of sea-level rise is given as one in which different approaches will give very different responses. However, I presume for some variables the approach could work quite well e.g. land-sea warming contrast, tropical precipitation changes? I think it would be useful to stress which variables are more or less susceptible to uncertainties induced by the choice of approach used to estimate their response. [Mat Collins, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. The revised chapter now includes comparisons between estimates of change in climate extremes at 1.5 and 2 based on transient simulations vs based on simulations from the HAPPI experiment. Overall, the results are quite consistent (see e.g. new Figs. 3.8, 3.9., 3.12). We also note in the text that the time scale is nonetheless important for several variables, in particular sea level rise.
10198	11	29	13	12	This section could be shortened and refer to other chapters [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This section has been shortened.
10759	11	30	11	30	Line 30 should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10760	11	35	11	35	'- should be deleted between 21st and century. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
17443	11	36	11	36	...mean global warming to 1.5oC or 2oC by 2011 instead of "...mean global warming to 1.5oC or 2oC C by 2011" [Xiaolin Zhang, China]	Editorial - copyedit to be completed prior to publication
5250	11	36	11	36	remove "C" [Bart Van den Hurk, Netherlands]	Editorial - copyedit to be completed prior to publication
9973	11	36	11	36	in te sentence "...scenarios stabilizing mean global warming to 1.5°C or 2°C C..." there is one extra C [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
16233	11	36	11	38	That the only long-term equilibrium values being looked at are 1.5 and 2 C is presumably a result of not giving any consideration at all to Carbon Dioxide Removal (amplifying natural sinks and/or Direct Air Capture) techniques. This seems a serious and inappropriats limitation in the cases being considered. There is no question that the impacts at 1.5 C will be serious (consider Hansen et al. paper), and so it should not be indicated that stabilizing at 1.5 or 2 C would be acceptable and that efforts like CDR need to be considered vital (costs may well end up being well below impact costs). [Michael MacCracken, United States of America]	Rejected. It is not clear what the reviewer is suggesting, but if it refers to an assessment of impacts for global temperature anomalies below 1.5, this does not fit in the scope of the report.
10761	11	37	11	37	Second 'i.e.' in the end of line should be deleted [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
5251	11	38	11	38	the assumption that the climate can come into "equilibrium" after several millennia is strongly subject to the definition of equilibrium. Even with unchanging forcings climate variability will remain manifest at all time scales [Bart Van den Hurk, Netherlands]	Rejected. Too detailed.
10376	11	38	11	38	"...several millennia..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Not clear what is the comment.
10762	11	43	11	43	The word 'probable' is italic which is not necessary to be [Seyed Muhammadreza Tabatabaei, Iran]	Editorial. Italics used for emphasis.
16234	11	43	11	52	That CDR is an option to lower the ultimate stabilization level needs to be mentioned, and its potential indicated. [Michael MacCracken, United States of America]	Taken into account. This seems too detailed for the present section, is addressed in cross-chapter box on "1.5 warmer worlds". May be considered again for the FGD.
10763	11	46	11	46	' around 'i.e. 33% is better to be replaced by '()', so we will have: (i.e. 33%) [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10764	11	46	11	47	Cross-chapter' and 'on '1.5C warmer worlds' should be deleted. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
3538	11	54			what is a '2°C emissions scenarios'? I think this must be explained clearly again at the beginning of the report as the expression itself without a definition does not make any sense. [Sylvia Sander, Monaco]	Noted. This should be clear from Chapter 2. Will double check consistency for FGD.
11028	11	55	11	57	Not sure if the upper end of the temperature range is consistent with what has been stated in chapter 2 [Oliver Geden, Germany]	Noted. This is an upper bound given considered scenarios, but it could also be larger (see next comment). Will be checked for FGD.
16235	11	56	11	57	The phrase "at most" is simply not justified--present commitments will only limit the warming to somewhere between 3.5 and 4 C, and it will take much more commitment to limit the warming to below 3 C. And this is before one considers the potential for natural carbon feedbacks (oxidation of permafrost, deaths of tropical forests, etc.) to push the ultimate temperature change upward. The phrasing here seems to me far too reassuring. [Michael MacCracken, United States of America]	Noted. This is an upper bound given considered scenarios from chapter 2, but it could indeed be larger if emissions reductions are not large enough (but in this case 1.5°C warming may not be reachable within the 21st century). This question will be checked again for the FGD.
10006	12		12		Row 6: There must be 'C' in 1.5° ; Row 7: Expansion of AR is already Assesment Report, so there must not be used AR6 and report one after another [Nazan AN, Turkey]	Editorial - copyedit to be completed prior to publication
10007	12		12		Row 11: A more reasonable word should be used, like no warming instead of (for 0 C warming) [Nazan AN, Turkey]	Editorial - copyedit to be completed prior to publication
19081	12		12		Resolution of fig. 3.12 is low so it will not be readable Page 3-12 [Fathy Elbehiry, Egypt]	Editorial - copyedit to be completed prior to publication
7235	12	4	12	44	level' not 'levels' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
10765	12	6	12	6	Cross-chapter' and 'on '1.5C warmer worlds' should be deleted. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
10766	12	6	12	6	the box with name'on 1.5C Warmer World' is Box 3.12 which should be corrected from 3.11 to 3.12. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
13846	12	6	12	6	It is box 3.12 [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
13253	12	6	12	6	1.5°C [Wei Zhang, United States of America]	Editorial - copyedit to be completed prior to publication
9974	12	6	12	6	in "1.5° warmer worlds", "C" is missing, it must be "1.5°C warmer worlds" [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
13847	12	7	12	7	Too prescriptive, please recommend instead and let the AR6 scoping and authors decide [Elvira Poloczanska, Germany]	Noted. Can rephrase for FGD.
9975	12	7	12	7	Since AR6 already means Assessment Report 6, instead of saying "...as part of the IPCC AR6 report." it would be "...as part of the IPCC AR6." [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
5925	12	9	12	20	Could this report perhaps be clearer on how to define the 1.5° C threshold? This is very value-laden, but is an interesting discussion and policy makers need help to define this. For instance, that the global temperature has to be above this limit on average for a period of 30 years? The report can also be clearer on a suggestion of the exact reference time period. My second point is to link clearer the text on the reference starting point to the Industrial Revolution, large scale emissions, and the timing of this, that is, why is pre-industrial pre-industrial. [Borgar Aamaas, Norway]	Rejected. Since the report cannot be policy prescriptive, we need to provide assessments illustrating the impacts of different definition choices instead.
13848	12	9	12	9	Please consult the structured expert dialogue where all WGs participated and addressed the question of 1.5 vs 2. [Elvira Poloczanska, Germany]	Noted. Will be checked again for FGD.
9976	12	11	12	11	for 0°C warming this phrase can be changed (e.g. no warming). [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
4559	12	12			Change the text in brackets "i.e. 20 or 30 years" by "i.e. 30 years or long". [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
10883	12	13	12	13	The sentence talks about "1.5C climate". Instead, shouldn't be better to talk here, and at anyplace ese where this name appears, about "1.5C world climate" or "1.5C global warming climate"? [Carolina Vera, Argentina]	Editorial - copyedit to be completed prior to publication
13849	12	14	12	20	Such clear wording is urgently needed in chapter 1 [Elvira Poloczanska, Germany]	Noted. This is a citation of Chapter 1.
5859	12	16	12	18	Please specify in some part of the paragraph that the 1,5°C increase is derived from both land and ocean temperature. [Joan A. Lopez-Bustins, Spain]	Noted. This is mentioned in the cross-chapter box on 1.5°C climate. Because of space constraints cannot be mentioned in the present section. Might be considered in FGD.
7724	12	28	12	28	Put a comma after the word "present" [Hilary Inyang, Nigeria]	Editorial - copyedit to be completed prior to publication



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7452	12	28	12	35	Consider whether this paragraph deserves a new bullet point on its own (F). Feels like this paragraph describes a significant challenge similar to point A-E. [Øyvind Christophersen, Norway]	Noted. This is a valid point. Was not implemented in SOD but could be done for FGD.
4783	12	31	12	33	It would be better to say that 'Any new relevant literature after the report needs to be addressed in AR6 to provide a comprehensive assessment ...'. If during AR6 the lack of simulations for short and long term stabilization continues to exist, then how the shortfall will be addressed as IPCC does not produce new literature? [Elena Georgopoulou, Greece]	Noted. Will consider to make the text less prescriptive for the FGD.
13850	12	32	12	32	Too prescriptive, please recommend instead and let the AR6 scoping and authors decide [Elvira Poloczanska, Germany]	Noted. Will consider to make the text less prescriptive for the FGD.
9977	12	33	12	33	C is missing, it must be "1.5°C" [Mustafa Tufan Turp, Turkey]	Editorial - copyedit to be completed prior to publication
12367	12	33	12	34	SRM should not be described as an 'unconventional mitigation pathway' [Bill Hare, Germany]	Accepted. Text was rephrased.
16236	12	33	12	35	It is not just solar radiation management that is left out—it very much appears that CDR is left out, and this is becoming technologically more feasible and is without the significant governance and potential side effect aspects of SRM. So, some discussion of CDR possibilities is needed. [Michael MacCracken, United States of America]	Rejected. This is not correct. The concept itself of "overshoot", which is discussed in depth in this section presupposes that there are CDR methods being implemented.
12881	12	37			) is missing after Section 3.3 [Jorge Carrasco, Chile]	Editorial - copyedit to be completed prior to publication
404	12	37			Close bracket after 'Section 3.3'. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
10767	12	37	12	37	vs should change to vs. [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
6636	12	37	12	37	) needed at the end of the line. [Castor Muñoz Sobrino, Spain]	Editorial - copyedit to be completed prior to publication
13851	12	37	12	51	Language difficult to comprehend and filled with jargon. This paragraph does not convey why it is relevant for assessing impacts. It would turn policymakers away... [Elvira Poloczanska, Germany]	Rejected. Text was supported by other reviewer (see comment 7725). In addition, policymakers can focus on the SPM material, but the underlying methodological background needs to be clarified in the chapter text.
7725	12	37	12	51	This is excellently explained. It will help readers and policy makers in reckoning with the approximations that have been incorporated to enable general assessments. [Hilary Inyang, Nigeria]	Noted. Thank you.
13254	12	37	12	55	The low-warming experiments made by NCAR CESM should be mentioned. The experiments are available to the general public. [Wei Zhang, United States of America]	Rejected. Could not highlight material from a single modeling group. But if key publications based on these simulations are available, they could be cited in the FGD.
405	12	38			Add 'of' between 'approach' and 'James'. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
7234	12	38	12	38	add 'of' to 'approach James et al.'. [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
17992	12	38	12	38	reference format of 'James et al. (2017)' should be (James et al. 2017) [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
10377	12	38	12	38	"...approach of James et al. ...." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
11927	12	38	12	38	CHANGE to... approach "(James et al. 2017)" which..... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
11943	12	38	12	38	CHANGE to... approach "(James et al. 2017)" which..... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
406	12	40			Typo: 'Seneviratne' instead of 'Senevirante'. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
7592	12	42	12	44	One problem with pattern scaling is that it is known to not hold up for high temporal and spatial variables, such as extreme precipitation. It might do ok for temperature, but certainly not for most other variables. It should be made clearer the drawbacks of this method. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Shortcomings were already mentioned. It does not seem necessary to provide more details, in particular because several reviewers found the text of Section 3.2 too long.
1419	12	44			expert judgement: I am not sure an IPCC report should be based on "expert judgement". What is an expert? Is a judgement similar to a point of view? [Philippe Roudier, France]	Rejected. Expert judgement is a common assessment approach in IPCC reports.
10378	12	44	12	44	"...temperature level..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
12368	12	50	12	51	I agree that the applicability of observations to project future impacts is limited. But the justification given (related to non-linearities) is true for e.g. pattern scaling as well. In fact, the dealing with potential non-linearities in partly time-lagged systems is an issue that requires more attention in this section. The main potential of using the observational record in this report, however, in my view is to allow assessments of 0.5°C warming impacts (probably lower bounds of future warming impacts) for sectors and systems for which no quantitative models are available. I see no systematic attempt to this in this report, but would argue that it could be highly beneficial. [Bill Hare, Germany]	Noted. It is not possible to address this topic in more detail. A difference to pattern scaling is that the extrapolation based on observations is necessarily only using a small range of possible global temperature levels, while pattern scaling can build upon simulations available over the a much wider range of climate forcings.
13852	12	53	12	55	No assessment of the details and uncertainty? As said before this should happen in the framing or Suppl. Mat. [Elvira Poloczanska, Germany]	Noted. Because other reviewers suggested to shorten this section, this text has been now moved to the suppl. Information.
6999	12	53	12	56	As the method to define a 1.5C or 2C warming period from transient climate simulations is crucial in this report, it is suggested that method in Vautard et al (2014) should be briefly introduced here. [Sai Ming Lee, China]	Noted. Because other reviewers suggested to shorten this section, this text has been now moved to the suppl. Information.
10768	12	54	12	54	Refrence is not in the chapter references [Seyed Muhammadreza Tabatabaei, Iran]	Editorial - copyedit to be completed prior to publication
17706	12	55	12	55	Vautard et al. 2014 not in reference list [Ana Bastos, France]	Rejected - Reference was included in the list of references
6821	13	9	13	11	update on results from HapPI-MIP if available [Rafiq Hamdi, Belgium]	Noted. Some results from the HAPPI experiment have been now added in chapter 3.
9863	13	9	13	11	You may wish to cite/refer to the ongoing ISIMP2b efforts here (Frieler et al.). Frieler K, R Betts, E Burke, P Ciais, S Denvil, D Deryng, K Ebi, T Eddy, K Emanuel, J Elliott, E Galbraith, SN Gosling, K Halladay, F Hattermann, T Hickler, J Hinkel, V Huber, C Jones, V Krysanova, S Lange, HK Lotze, H Lotze-Campen, M Mengel, I Mouratiadou, H Müller Schmied, S Ostberg, F Piontek, A Popp, CPO Reyer, J Schewe, M Stevanovic, T Suzuki, K Thonicke, H Tian, DP Tittensor, R Vautard, M van Vliet, L Warszawski, F Zhao (2017) Assessing the impacts of 1.5°C global warming - simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMP2b). Geoscientific Model Development. https://www.geosci-model-dev-discuss.net/gmd-2016-229/ [Christopher Reyer, Germany]	This text needed to be shortened, also following comments from other reviewers on Section 3.2. This article will be considered for the FGD.
7593	13	10	13	11	correct acronym: HAPPI not HAPPI-MIP. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
7236	13	11	13	11	remove 'at present' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
13853	13	13			Much of this is redundant with what chapter 1 would cover. Merge there or move to suppl material [Elvira Poloczanska, Germany]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
3840	13	17		17	I don't know what the reference is for starting with "e.g." Did Le Treut et al say as such? Then "e.g." is not necessary. [Woonsup Choi, United States of America]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10769	13	17	13	17	Refrence is not in the chapter references [Seyed Muhammadreza Tabatabaei, Iran]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
17707	13	17	13	19	Suggestion: add one sentence explaining in more detail the differences between GCMs and ESMs [Ana Bastos, France]	This whole section has been removed and moved to the Suppl. Information / chapter 1.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3652	13	18	13	19	List which biogeochemical cycles are included in the GCMs whose results are invoked in this report. Water, clearly? Is the full carbon cycle now present in all these GCMs? If I understand correctly, it wasn't actually included in most of the models used in prior IPCC reports, until the last one. What about the nitrogen cycle, which also plays a key role in climate change? Etc.? As currently written, the passage is too vague. [Sean Fleming, United States of America]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
7237	13	21	13	22	rephrase as: 'In many cases, typical ESM simulations have too coarse a resolution (100km or more) to assess the impact and risk of projected climate changes on ecosystems or human systems.' [Butt Nathalie, Australia]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
6637	13	21	13	28	Inside a particular region the geomorphology also may have an important role modifying some relevant climatic parameters (e.g. rain). Of course it may be almost impossible to include all of them in detail when running some models, but it may be important to have some of this parameters in mind when e.g. try to detect areas with the greatest risks of floods or drought inside a larger region (>100x100 km cells). [Castor Muñoz Sobrino, Spain]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
408	13	21	13	35	I feel that this paragraph constitutes a link between Sections 3.2.2 (climate projections) and Section 3.2.3 (impacts). Shouldn't it be moved at the end of Section 3.2.2? At least, it could go after the following paragraph about climate model information. [David Docquier, Belgium]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
9978	13	21	13	35	Here, a hybrid approach (dynamical+statistical downscaling combination in some cases) can also be defined as a third approach [Mustafa Tufan Turp, Turkey]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
17661	13	21	13	35	Can the authors add a discussion on the strengths and weaknesses or differences in the use of downscaling approaches? Winkler et al. 2011 on climate scenario development can be a potential reference. [Perdinan Perdinan, Indonesia]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11928	13	22	13	22	SHIFT "a".....ESM simulations have too coarse "a" resolution..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11944	13	22	13	22	SHIFT "a".....ESM simulations have too coarse "a" resolution..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
9979	13	25	13	25	Regional Climate Models (RCM) must be "Regional Climate Models (RCMs)" [Mustafa Tufan Turp, Turkey]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
20778	13	25	13	35	Now, RCM will be used in an ongoing collaboration project between France and Egypt with title "Health mapping of infectious diseases vulnerable to climate change". (2017-2019) [Amal Hussein, Egypt]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10884	13	28	13	28	Is CORDEX defined before? Shouldn't be included a reference here instead of the acronym? The comment applies to other mentions to CORDEX [Carolina Vera, Argentina]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11929	13	29	13	29	ADD..... some cases even higher "than that" (convection..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11930	13	29	13	29	CHANGE..... models, "e.g." less than 4 km.... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11945	13	29	13	29	ADD..... some cases even higher "than that" (convection..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11946	13	29	13	29	CHANGE..... models, "e.g." less than 4 km.... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
12782	13	31	13	31	Needs a citation for statistical downscaling, maybe Maraun et al. 2010 Rev. Geophys. [Robert Vautard, France]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10885	13	33	13	33	Add e.g. within the brackets and before the references [Carolina Vera, Argentina]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11931	13	33	13	34	CHANGE... the time of "this writing, there are only"..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11947	13	33	13	34	CHANGE... the time of "this writing, there are only"..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
625	13	33	13	33	An example of recent study on statistical downscaling (or bias correction) is Izumi et al. (2017a) which offers climate change scenarios used to estimate the differences in the impacts on global mean crop yields between 1.5 and 2 degree C warming described in Izumi et al. (2017b). It is just for your reference.  References: Izumi T., H. Takikawa, Y. Hirabayashi, N. Hanasaki, and M. Nishimori (2017a). Contributions of different bias-correction methods and reference meteorological forcing data sets to uncertainty in projected temperature and precipitation extremes, J. Geophys. Res. Atmos., 122, doi:10.1002/2017JD026613; Izumi, T., Furuya, J., Shen, Z., Kim, W., Okada, M., Fujimori, S., Hasegawa, T., and Nishimori, M., 2017b: Responses of crop yield growth to global temperature and socioeconomic changes. Scientific Reports, 7, 7800, doi: 10.1038/s41598-017-08214-4. [Toshichika Izumi, Japan]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
19002	13	37	13	37	The second sentence starts with "First", but nowhere in the paragraph we find "Second"... Is it possible to cancel "First"? [JACQUES-ANDRE NDIONE, Senegal]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11932	13	41	13	41	DELETE... "We note that" at the beginning of the sentence. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11948	13	41	13	41	DELETE... "We note that" at the beginning of the sentence. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11933	13	43	13	44	The acronym "coordinated regional climate model experiments (CORDEX)" should be explained earlier on lines 27/28 on this page. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11949	13	43	13	44	The acronym "coordinated regional climate model experiments (CORDEX)" should be explained earlier on lines 27/28 on this page. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10886	13	44	13	44	Add e.g. before the reference to CORDEX. It might be the largest but it is not the only RCM intercomparison project. [Carolina Vera, Argentina]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
8821	13	45	13	46	What is the meaning of SOD? [Lubna Alam, Bangladesh]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
12882	13	46			define SOD [Jorge Carrasco, Chile]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11934	13	46	13	46	Don't remember the acronym "SOD" being explained anywhere previously. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11950	13	46	13	46	Don't remember the acronym "SOD" being explained anywhere previously. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
9864	13	46	13	49	This sentence is unclear: do you mean "other models are available to assess impacts of changes in..." or do you want to say that the sea-level rise and flood models etc do also allow to assess changes in regional and global climate systems? I think the former makes more sense and in that case you could add models dealing with biogeochemical cycling and vegetation distribution. [Christopher Reyer, Germany]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
6638	13	46	13	49	Again, many of them can be changed inside a region depending on altitude, orientation, rain-shadow effects, etc [Castor Muñoz Sobrino, Spain]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10887	13	47	13	47	Those "other models" are usually called "impact models" [Carolina Vera, Argentina]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11935	13	47	13	47	ADD "s" and comma ..... climate system"s" (e.g., models.... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11951	13	47	13	47	ADD "s" and comma ..... climate system"s" (e.g., models.... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
407	13	48	13	49	What is the difference between cryosphere models and models for glaciers and ice sheets? I would suggest to delete one of them in the sentence (preferably cryosphere models, which is not the right terminology). [David Docquier, Belgium]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
5252	13	49	13	49	Sea level rise in response to ice cap mass balance processes are particularly useful to include here [Bart Van den Hurk, Netherlands]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11936	13	49	13	49	Remember to include "SOD" references. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11952	13	49	13	49	Remember to include "SOD" references. [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
5860	13	49	13	49	Please rewrite this sentence. A typographic mistake was found. [Joan A. Lopez-Bustins, Spain]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
13708	13	51	13	51	delete one "project" [Elvira Poloczanska, Germany]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11953	13	51	13	51	DELETE second "Project"..... Intercomparison Project (ISI-MIP) (Warszawski ..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
9865	13	51	13	52	Please add the model protocol description paper for the current isimip2b round: Frieler K, R Betts, E Burke, P Clais, S Denvil, D Deryng, K Ebi, T Eddy, K Emanuel, J Elliott, E Galbraith, SN Gosling, K Halladay, F Hattermann, T Hickler, J Hinkel, V Huber, C Jones, V Krysanova, S Lange, HK Lotze, H Lotze-Campen, M Mengel, I Mouratiadou, H Müller Schmied, S Ostberg, F Piontek, A Popp, CPO Reyer, J Schewe, M Stevanovic, T Suzuki, K Thonicke, H Tian, DP Tittensor, R Vautard, M van Vliet, L Warszawski, F Zhao (2017) Assessing the impacts of 1.5°C global warming - simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development. <a href="https://www.geosci-model-dev-discuss.net/gmd-2016-229/">https://www.geosci-model-dev-discuss.net/gmd-2016-229/</a> [Christopher Reyer, Germany]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10770	13	53	13	53	Refrence is not in the chapter references [Seyed Muhammadreza Tabatabaei, Iran]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10008	14		14		Row 2: There must be 'C' in 1.5° [Nazan AN, Turkey]	Editorial - copyedit to be completed prior to publication
13854	14	1			Much of this is redundant to chapter 1. Merge there or move to suppl material [Elvira Poloczanska, Germany]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
8822	14	1	14	12	not clear [Lubna Alam, Bangladesh]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10201	14	1	14	28	I did not understand what this section was saying, delete? [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
5464	14	1	14	57	It is not a bad idea to acknowledge in between any section how the Annex I countries' current initial nationally determined contribution (INDC) would not allow the world to effectively arrive at 1.5 °C scenario within specified targeted time (see Hare et al 2016) [Aliyu Barau, Nigeria]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10379	14	5	14	5	"...the reader is referred..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11954	14	8	14	9	REWORD sentence..."In the literature, 'attribution' is sometimes used.... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
5253	14	11	14	11	the phrase "this definition is not used" is ambiguous [Bart Van den Hurk, Netherlands]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
2619	14	14	14	28	what methodology is used to determine current impacts that can be attributed to human induced warming? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
13855	14	15	14	15	1C Be consistent with chp 1 [Elvira Poloczanska, Germany]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
10888	14	15	14	15	Chapter 1 assessment of the current global warming is smaller than 1C (their section 1.2.1.2 [Carolina Vera, Argentina]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11955	14	20	14	20	CHANGE to.... "assessed, in part," from regional..... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
12783	14	20	14	28	This section needs clarification, on exact assumptions and what can be concluded. There seems to be underlying assumptions of linearity of regional response. This may also require a schematic figure. As I understand it from L27, the 1.5°C will be assessed by "interpolating" projections that go to higher warming to 1.5°C, provided it is consistent with D&A knowledge. I am not sure to having well understood but if so I do not see why, beyond the additional strength D&A provides to the statement, restricting to attributed changes only, as other non detected changes may emerge between 1 and 1.5. [Robert Vautard, France]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
7238	14	22	14	24	Sentence unclear - needs rewriting. [Butt Nathalie, Australia]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
11956	14	26	14	27	CHANGE... influence up to "the" present "(for 1°C global warming)" and.... [Paul Doyle, Canada]	This whole section has been removed and moved to the Suppl. Information / chapter 1.
13856	14	31			Methodology not described in this section [Elvira Poloczanska, Germany]	Taken into account - we have better focused on methods used for impacts but we remain succinct as this section must be reduced
13857	14	31			This aspect is largely missing from chapter 1. Suggest to include some there and summarize here as this is the core of this chapter. [Elvira Poloczanska, Germany]	Taken into account - it is not possible to detail all the methods used to study risks for natural and human systems, but rather how the difference between impacts at 1.5°C and 2°C are studied
5254	14	34	14	35	strange sentence, not clear what is implied here [Bart Van den Hurk, Netherlands]	Accepted - it will be clarified (Most of the known impacts are of lower amplitude than those projected for a global warming of 1.5°C)
12266	14	38	14	38	Re "confounding factors": Would be useful to explain a bit more what other types of factors that are affecting the systems; just very briefly. [Jan Fuglestad, Norway]	Accepted - an example is given: urbanization
5255	14	40	14	41	the extrapolation can only be done when there is information on the trend throughout the era that 1 degree warming is reached. This implies that you need observed quantities in 1850 to be able to make this extrapolation [Bart Van den Hurk, Netherlands]	Taken into account - the term of extrapolation is confusing, see reply to comment 5255
1420	14	40	14	41	I am wondering about this "extrapolation" procedure: are we not going back 20 years in the past where climate projections were not available? Why linearly? According to me this kind of methodology should not be seen as "impact studies" but maybe as "what if" studies [Philippe Roudier, France]	Taken into account - Replace by 'consists of roughly multiplying observed impacts of 1°C by a 1.5 factor'
11957	14	42	14	42	CHANGE..... may be too coarse "an" approximation, the [Paul Doyle, Canada]	Accepted - a too strong approximation
13858	14	42	14	44	This sentence isn't clear, do you mean a further half a degree warming? [Elvira Poloczanska, Germany]	Accepted - sensitive to an additional half degree
13859	14	42	14	44	This has obviously been done already so the reader would appreciate learning to what extent climate sensitivity changes the picture. [Elvira Poloczanska, Germany]	Rejected - this is just a review of existing methods
9478	14	43	14	44	Should this be expressed as : " ... that are sensitive to half a degree of FURTHER warming" ? [David Wratt, New Zealand]	Accepted - comment 13858
985	14	44	14	46	For more detail regarding paleoclimate data and observed impacts of past climate change, see Anthony McMichael (2017): Climate Change and the Health of Nations: Famines, Fevers, and the Fate of Populations. Oxford University Press [Attila Buzási, Hungary]	Taken into account - it will be described in Box 3.1
10701	14	47	49		Can you add one sentence summarizing what caused these earlier warmer periods if not GHGs? That context is key for decision makers and their technical staff to understand - that earlier warming may have been caused by other factors, AND that those factors are not in play today. [Christopher Clark, United States of America]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
4937	14	49			the sentence "... Mid-Holocene (8000-6000 years BP), or Eemian period (125-1200 year BP)." should be: "..., Mid-Holocene (8-6 ka BP), or the Eemian interglacial period (129-116 ka BP)." following data and style from the WGI 5AR IPCC [Alejandro Cearreta, Spain]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20560	14	49			First time the acronym BP is introduced. A lay person might not understand what this is. Has this been introduced in other chapters? Would be easy to add a Glossary to the full report were BP would be represented as Before Present. [Vera Barbosa Araujo Soares Sniehoffa, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
10380	14	49	14	49	The Eemian period was c.130 – 115 ka (or 130 000 to 115 000 BP) [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
3727	14	49	14	49	Change "125-1200 year BP" to "125-120 year BP". [Fredrik Charpentier Ljungqvist, Sweden]	Editorial - 120
4560	14	49	14	51	Add explanation of "BP" [Radim Tolasz, Czech Republic]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
10461	14	49	14	51	"BP" not clear (guessing it's a culturally neutral alternative to BC like BCE but could be spelled out at first reference) [Jonathan Lynn, Switzerland]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
2475	14	50	14	51	Ruddimen reference above—evidence for increasing GHG at advent of agriculture nearly 10,000 years ago [Lisa Lucero, United States of America]	Rejected - Ruddiman's hypothesis is not proved; in any case, the variations of Neolithic CO2 is very small according to present changes
20561	14	51			Same issue for Ma. Important to present acronyms before using them or at least to have a glossary for this whole document. [Vera Barbosa Araujo Soares Sniehoffa, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
7628	14	51		52	Another reason that far past paleo records are difficult to use for this is in addition to sparse data is that species will have evolved and changed over this long period and therefore may not respond in the same way. It may be more useful for physical than biological processes [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
11958	14	51	14	51	SHOW Ma (1 million years) the first time used. [Paul Doyle, Canada]	Taken into account - rows 46-51 have been removed as they are redundant with Box 3.1
13255	14	51	14	51	change to "The third approach" [Wei Zhang, United States of America]	Editorial - copyedit to be completed prior to publication
13860	14	52	14	52	If the citations are examples, if so then say so [Elvira Poloczanska, Germany]	Accepted - add e.g.
5257	14	52	14	52	you mean, manipulation in the field? [Bart Van den Hurk, Netherlands]	Taken into account - lab or field
13862	14	53	14	55	This is a bit narrow as described. Understanding system properties and associated vulnerabilities as well as the underlying and unifying mechanisms of impact are crucial in assessing risk. Relevant literature exists which goes much beyond what is described here. [Elvira Poloczanska, Germany]	Accepted - Replace by "on the causal effect of a key factors and helps to develop impact models. Last sentence of the paragraph is removed"
9245	14	54			spelling mistake: insights should be insights [Marie-Jeanne S. Royer, Canada]	Editorial - copyedit to be completed prior to publication
13861	14	54	14	54	correct spelling of insights [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
7239	14	54	14	54	correct to: 'insights into' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
9311	14	54	14	54	The last word in "provide key insights" should be "insights." [Sir KILKIS, Turkey]	Editorial - copyedit to be completed prior to publication
11692	14	54	14	54	"Insights" is misspelled [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
11959	14	54	14	54	TYPO... "insights" [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
13256	14	54	14	54	insighths to "insights" [Wei Zhang, United States of America]	Editorial - copyedit to be completed prior to publication
986	14	54	14	54	An erratum can be found in the middle of the line: "insighths". Please correct it. [Attila Buzási, Hungary]	Editorial - copyedit to be completed prior to publication
13863	14	57	14	57	Awkward wording [Elvira Poloczanska, Germany]	Accepted - Replace by "Risks for natural and human systems are often assessed with impact models where inputs are provided by RCP-based climate projections"
10889	14	57	14	57	They are generally used for "risk assessment" or "risk estimation" [Carolina Vera, Argentina]	Accepted - see reply to comment 13863
10009	15		15		Row 2: There must be 'C' in 1.5° and there must be "C" in 1.5 [Nazan AN, Turkey]	Editorial - copyedit to be completed prior to publication
10010	15		15		Row 20: There must be 'C' in 1.5 and 2 [Nazan AN, Turkey]	Editorial - copyedit to be completed prior to publication
3532	15		16		Box 3.1: this box needs more explanation. t stands there, unreferred to in the text and the purpose of it is not clear at all. [Sylvia Sander, Monaco]	Taken into account - the box will be fully written in SOD
13864	15	1	15	1	please clarify what the thresholds of concern are [Elvira Poloczanska, Germany]	Accepted - Replace by "Even if the four RCP scenarios used in the AR5 are not strictly to 1.5° and 2°C global warmings, studies on 1.5 and 2°C impact projections have increased in recent times"
409	15	2	15	3	What comes after 'global warmings' seems to be out of sentence. [David Docquier, Belgium]	Accepted - see reply to comment 13864
17993	15	3	15	3	Reference: Schleussner et al. 2016c, no 2016b could be located in the text but it appears in the reference list. Guiot and Cramer 2016a can't find its 2016b in the text but in the reference list [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
626	15	3	15	4	lizumi et al. (2017) is a good example of the approach discussed in the text that uses four RCP scenarios to infer the impacts of 1.5 and 2 degree C warming. References: lizumi, T., Furuya, J., Shen, Z., Kim, W., Okada, M., Fujimori, S., Hasegawa, T., and Nishimori, M., 2017: Responses of crop yield growth to global temperature and socioeconomic changes. Scientific Reports, 7, 7800, doi: 10.1038/s41598-017-08214-4. [Toshichika lizumi, Japan]	Accepted - reference added
410	15	8			Shouldn't the reference in bracket be 'Section 3.2.2.1' instead of 'Section 3.2.2.2'? [David Docquier, Belgium]	Taken into account - the text has been completely changed
11960	15	10	15	10	(2016 ?) which one a, b or c?? [Paul Doyle, Canada]	Taken into account - the text has been completely changed
13257	15	15	15	15	Change to "1.5°C and 2°C warming" [Wei Zhang, United States of America]	Taken into account - the text has been completely changed
411	15	16			I cannot find Section 3.2.3.3. [David Docquier, Belgium]	Taken into account - the text has been completely changed
17994	15	17	15	17	Guiot & Cramer 2016 "&" should be replaced by "and" [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
11961	15	18	15	18	(2016 ?) which one a, b or c?? [Paul Doyle, Canada]	Accepted - see comment 17993
17995	15	20	15	20	After "1.5° vs 2°" - need to add letter C [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
9866	15	20	15	20	for clarity I would add: "1.5°C vs 2°C global warming" [Christopher Reyner, Germany]	Accepted - add global warming
4312	15	20	15	20	°C centigrade is missing [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
10890	15	25	15	28	Section 1.2.2 also discuss global versus regional warming [Carolina Vera, Argentina]	Taken into account - possible but here it is done in a specific objective
2710	15	25	15	28	It would be preferable to mention other regions as well, or provide a x-reference to sections where this is discussed, as the text at the moment is likely to raise questions (factual and political) on why these regions are mentioned and not others. [Penny Urquhart, South Africa]	Taken into account - Brazil is added
2121	15	28	15	29	I don't know what you mean by "the local impacts are assessed on the basis of large local threshold". [Neville Nicholls, Australia]	Accepted - removed sentence

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13865	15	29	15	29	what does large local threshold mean? [Elvira Poloczanska, Germany]	Accepted - removed sentence
7240	15	29	15	29	thresholds' [Butt Nathalie, Australia]	Accepted - removed sentence
10462	15	29	15	29	does not read. Maybe "on the basis of a large local threshold"? [Jonathan Lynn, Switzerland]	Accepted - removed sentence
12784	15	30	15	30	Suggestion: Here I think there could be a paragraph or section on the S/N ratio: at regional scale long-term variability also gets much larger. Post-AR5 results are many in this direction, see papers from Deser et al. and others. [Robert Vautard, France]	Accepted - it is a good idea, a sentence has been added: At a regional scale, the signal to noise ratio decreases and the temporal variability increases. Amplitude of the signal may be larger but not necessarily more significant.
2122	15	32	15	38	Has anyone actually read this paragraph? There are spelling mistakes and mistakes of logic and the paragraph actually doesn't say anything useful. The second half of the first sentence does not follow from the first half - the logic is missing. And what does the last sentence of the paragraph mean? And what do you mean by "The separation concerns then two types of drivers" (even if we recognise you mean "types")? And what "other natural factors" are there other than "natural climate change"? [Neville Nicholls, Australia]	Accepted - This section should be removed
10891	15	32	15	38	Notice that this topic is also discussed in page 14, lines 7-11. [Carolina Vera, Argentina]	Accepted - This section should be removed
12809	15	35	15	35	I would not say "climate community and in the impact community", as the first one includes the second one. The first "climate" should be "physical climate" [Robert Vautard, France]	Accepted - This section should be removed
7241	15	35	15	35	humans' [Butt Nathalie, Australia]	Accepted - This section should be removed
10381	15	35	15	35	"...to humans"? "...to human activity"? [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - This section should be removed
11962	15	35	15	35	ADD "s".... attributing it to human"s" using.... [Paul Doyle, Canada]	Accepted - This section should be removed
12267	15	35	15	35	I suggest changing "human" to "anthropogenic forcing". That is also more constant with later wording. [Jan Fuglestedt, Norway]	Accepted - This section should be removed
10463	15	35	15	36	"human using causal relationships" does not read [Jonathan Lynn, Switzerland]	Accepted - This section should be removed
412	15	36			Typo: 'two types' instead of 'two ypes'. [David Docquier, Belgium]	Accepted - This section should be removed
14340	15	36	15	36	...two "types of drivers [Alessio Giardino, Netherlands]	Accepted - This section should be removed
17444	15	36	15	36	two types of drivers.... instead of "two ypes of drivers" [Xiaolin Zhang, China]	Accepted - This section should be removed
20779	15	36	15	36	spilling mistake two types of drivers the (t) of types is missed. [Amal Hussein, Egypt]	Accepted - This section should be removed
7242	15	36	15	36	correct to: 'two types of driver' [Butt Nathalie, Australia]	Accepted - This section should be removed
17996	15	36	15	36	is this "two ypes of drivers" or "two types of drivers"? [Wilfran Moufouma Okia, France]	Accepted - This section should be removed
7000	15	36	15	36	Typo: "ypes" should be "types" [Sai Ming Lee, China]	Accepted - This section should be removed
9312	15	36	15	36	The second word in "two ypes of drivers" should be "types." [Siir KILKIS, Turkey]	Accepted - This section should be removed
4721	15	36	15	36	types not "ypes" [Nicholas Ogden, Canada]	Accepted - This section should be removed
13442	15	36	15	36	misspelt "types" [Vidyunmala Veldore, Norway]	Accepted - This section should be removed
5258	15	36	15	36	example of type (but many more): "ypes" -> "types" [Bart Van den Hurk, Netherlands]	Accepted - This section should be removed
5259	15	36	15	36	Which two types? Anthropogenic and other? [Bart Van den Hurk, Netherlands]	Accepted - This section should be removed
13709	15	36	15	36	t missing in "types" [Elvira Poloczanska, Germany]	Accepted - This section should be removed
10382	15	36	15	36	"...two types of drivers..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - This section should be removed
11963	15	36	15	36	TYPO... "types" [Paul Doyle, Canada]	Accepted - This section should be removed
10464	15	36	15	36	types [Jonathan Lynn, Switzerland]	Accepted - This section should be removed
5861	15	36	15	36	Please substitute "ypes" with "types". [Joan A. Lopez-Bustins, Spain]	Accepted - This section should be removed
12268	15	36	15	36	I suggest inserting "i.e., anthropogenic and natural forcing" after "...of drivers". (And correct "ypes" -> "types") [Jan Fuglestedt, Norway]	Accepted - This section should be removed
9980	15	36	15	37	... then two ypes of drivers. must be " then two types of drivers." and "natural climatic change" should be "natural climate change" [Mustafa Tufan Turp, Turkey]	Accepted - This section should be removed
13258	15	37	15	37	change "differentiates" to "differentiate" [Wei Zhang, United States of America]	Accepted - This section should be removed
12808	15	39	15	39	Suggestion for the whole section, to be potentially added here and results summarized elsewhere in the temperature, precip etc sections: there is a recently growing literature (several papers published, in press or submitted) on extreme event attribution using global and regional simulations ensembles, or multi-ensembles, to detect and attribute extremes likelihood changes that occurred between either a counterfactual world or a world that has less warming (end of 20th century (Stott et al 2016, WIRES CC). This can be used for shwing detectable changes in extremes for a 0.5°C global change. For instance, comparing return periods in observations or regional simulations in the late 20th century and currently (2001-2030) could be used here. One example using CMIP5 and EURO-CORDEX simulations can be found in Hauser et al., 2017, Earth's Future, in press in for summer 2015 precipitations; another (Philipp et al., 2017) for spring floods is submitted; Other could be found eg in BAMS supplement reports on attribution 2015, 2016 and 2017. See also Eden et al. 2016, ERL, on Boulder event, detection studies from observations for mediterranean extreme rain events (Vautard et al., BAMS supplement 2015; Ribes et al., 2017, submitted), etc... [Robert Vautard, France]	A section has been added on extreme events (section 3.2.3)
2476	15	40	15	40	I assume Box 3.1 will be expanded and discussed? [Lisa Lucero, United States of America]	Taken into account - the box will be fully written in SOD
11964	15	40	15	40	Why does Box 3.1 not immediately follow para 40-57 on p.14? [Paul Doyle, Canada]	Taken into account - Box 3.1 will be moved to section 3.3
6515	15	40	16	11	Would it be useful to add a note in the box, that there may have been other (or secondary) influencing factors for (past) climate impacts than just temperature? E.g. land use changes, that may enhance or lower the temperature impact? So that a 1:1 transfer of past climate impacts at 1.5°C / 2°C temperature may not necessarily reflect future impacts at that temperature? [Heike Hebbinghaus, Germany]	Taken into account - the box will be fully written in SOD
5260	15	40	16	11	The purpose of this box is not clear; the caption must give more details on what this box tries to show [Bart Van den Hurk, Netherlands]	Taken into account - the box will be fully written in SOD
413	15	40	16	12	Is it really necessary to have Box 3.1? Since the text has not been written yet, I cannot see the added value of this box. Maybe adding some supplementary references in the text (page 14, line 46) is sufficient. [David Docquier, Belgium]	Rejected - this box will give really interesting results from the paleo while reference to paleo in page 14 has been removed
19003	15	45	15	45	Please add "i." after the word "climate" [JACQUES-ANDRE NDIONE, Senegal]	Taken into account - the box will be fully written in SOD
19004	15	46	15	55	Please add "i." at the end of each sentence, and "i." after "feedbacks, line 55 [JACQUES-ANDRE NDIONE, Senegal]	Taken into account - the box will be fully written in SOD
17257	15	52	15	53	terrestrial vegetation and ecosystems (?) I think it should be better referred as to "terrestrial ecosystems" and "peatlands" across the document are referred as "freshwater/wetlands" so there should be some consistency throughout the text. [Maria Jesus Iglesias Briones, Spain]	Taken into account - the box will be fully written in SOD
17708	15	55	15	55	Suggestion: add extreme events to point 2 [Ana Bastos, France]	Taken into account - the box will be fully written in SOD

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10011	16		16		Row 34: (RCP 2.6) must be written adjacent [Nazan AN, Turkey]	Noted. This figure is no longer in the main text (now in suppl. Information - white cells are described there)
19005	16	1	16	1	Please add ":" after the word "events" [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
5862	16	1	16	1	Please consider including other teleconnection patterns as Pacific North American pattern (PNA index) or Madden-Julian oscillation (MJO). [Joan A. Lopez-Bustins, Spain]	Taken into account - the box will be fully written in SOD
9999	16	1	16	5	PDO, PDV, and AMO can be listed as well [Mustafa Tufan Turp, Turkey]	Taken into account - the box will be fully written in SOD
3653	16	1	16	5	Add PDO to the list. For example, see PDO teleconnection changes inferred from paleoclimatic data by Fleming and Sauchyn (2013, Water Resources Research, 49: 64-74.) [Sean Fleming, United States of America]	Taken into account - the box will be fully written in SOD
6639	16	1	16	5	Extreme droughts should be also specified here? [Castor Muñoz Sobrino, Spain]	Taken into account - the box will be fully written in SOD
19006	16	2	16	4	Please add "," at the end of each sentence, and "." after "NAO, line 4 [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
17445	16	3	16	4	Are "ENSO" and "NAO" defined anywhere in this report? If this is the first time these two words are used, need to give the full expressions [Xiaolin Zhang, China]	Taken into account - the box will be fully written in SOD
2031	16	4			Can be added: Monsoon Actives phase as 2010 Pakistan's Flood and Sun Spots. [Mohammad Ahmadi, Iran]	Rejected - not really paleo
17709	16	4	16	4	Instead of ENSO and NAO only, a comprehensive insight on changes in atmospheric circulation and climate variability patterns could be given in point 3. (e.g. Coumou et al. 2014 PNAS; Francis & Vavrus 2015 ERL; Woolings & Blackburn 2011 Jclimate; Mann et al., 2017 Sci Rep) [Ana Bastos, France]	Taken into account - the box will be fully written in SOD
19007	16	6	16	6	Please add ":" after the word "points" [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
19008	16	7	16	9	Please add "," at the end of each sentence, and "." after "ecosystems, line 9 [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
13867	16	14			In this chapter focusing on climate related hazards may provide a better focus. Discussing the wider climate context may not be needed and irrelevant for this chapter. In some ways it buries the relevant aspects. If risk analysis is introduced earlier, e.g. by burning ember diagram the differences between 1.5 and 2 could be elaborated. See structured expert dialogue 2015. [Elvira Poloczanska, Germany]	Rejected. Overall changes in climate (means and extremes) are essential to understand the associated changes in risks and potential impacts.
3841	16	14		15	I suggest not using semicolons in the section heading [Woonsup Choi, United States of America]	Editorial - copyedit to be completed prior to publication
13866	16	14	16	15	If this section is focused on climate and hazards, should the title be projected hazards and avoided hazards? Please check WGI risk terminology [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6185	16	14	46	3	In general there seems to be a heavy reliance on AR5 throughout section 3.3. This is, of course, fine where there is no new information but I think there is no need to repeat the AR5 findings in detail. It is enough to briefly state the findings and then note if there is anything new to add. [Mat Collins, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. The text based on AR5 has been shortened and new references have been added.
505	16	14	51	16	Section 3.3: While this section provides very interesting results, I think it could be substantially reduced and simplified by keeping only the essential information, i.e. highly relevant to impacts at 1.5°C. At the moment, I have the feeling that a state-of-the-art is given for each sub-section rather than a synthesis of impacts at 1.5°C. [David Docquier, Belgium]	Taken into account. The section has been shortened.
6184	16	14	46	3	I realise that there is very little literature to draw from in section 3.3. Nevertheless, approaches to displaying information from multi-model ensembles are well established e.g. AR5 with hatching indicating responses which are small in comparison to natural variability and stippling indicating model agreement (WGI, Ch12, box 12.1). While these approaches are very basic, I think it could be useful way of displaying the gross characteristics of projections, their uncertainties and the differences between 1.5 and 2C projections. Thus, not every variable will need a dedicated set of papers on changes at 1.5/2C. [Mat Collins, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The level of model agreement (>2/3 of models) is shown for the differences plots on Figs. 3.4, 3.5, 3.6, and 3.10. The authors will consider including more details (e.g. small vs large changes) for the FGD.
506	16	14	51	16	Section 3.3: It is hard to find out what are the key results of each sub-section (topic). There could be an introductory paragraph for each sub-section summarizing the key findings, and there could be much more reference to Table 3.1. [David Docquier, Belgium]	Noted. The text has been substantially revised. The authors will consider including a summary paragraph at the end of section 3.3.1
10702	16	21			Reference the summary table. [Christopher Clark, United States of America]	Editorial - copyedit to be completed prior to publication
414	16	22	16	23	As mentioned in Comment 12 above, it is strange to have a supplementary sub-section (Section 3.3.13) after the global synthesis (Section 3.3.12). The global synthesis should go at the end of Section 3.3. [David Docquier, Belgium]	Noted. Section was modified.
415	16	26	16	27	I think references to Vaughan et al. (2013, Chapter 4 of IPCC AR5 WG1 report on the Cryosphere) and Church et al. (2013, Chapter 13 of IPCC AR5 WG1 report on Sea Level Changes) are missing here. Some results of these two chapters are presented in Section 3.3.10 (Sea level). [David Docquier, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11965	16	27	16	27	CHANGE... as well as "on" more recent ...to... as well as "from" more recent..... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
11966	16	28	16	28	Wartenburger et al. (????) Cited numerous times in 3 different ways. Reference in REFERENCES section shown in 2 different ways. Needs consistency. [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
13868	16	40			Suggest focusing on climate related hazards that can cause impacts. A more general description of climate is not needed in this chapter. It could be deleted, find its place in the framing or supplementary material. [Elvira Poloczanska, Germany]	Rejected. Overall changes in climate (means and extremes) are essential to understand the associated changes in risks and potential impacts.
20657	16	40	71	11	For sections 3.3 and 3.4: Authors could align findings about impacts with the four pathways introduced in chapter 1 (that would generally be helpful for the reader to understand impacts associated with the different choices) to show what is at stake for key values to decision makers. It would be helpful if those subsections in 3.3 and 3.4 that COMPARE 1.5 with 2 degrees coordinate with authors of chapter 4 and 5-> either each chapter should contrast and compare 1.5 and 2 degrees impacts and options, or "save" the comparison of 1.5 and 2 degrees for Chapter 5. That would mean that chapters 1-4 present the pathways, general characteristics, impacts, and options for 1.5 (which will give the reader very clear ideas about what each of the four pathways presented in chapter 1 entail), and section 5 to close out the special report by showing the consequences for humanity of 1.5 vs. a 2C for the aspirations of sustainable development [Koko Warner, Germany]	Noted. The text has been more strongly aligned with text from Chapter 1. Coordination with Chapter 4 and 5 will be enhanced for the FGD version.
10204	16	42	19	14	I am not convinced that this section (3.1.1.1) is needed. Which are now is covered in Chapter 1 in a less confusing way. The next sections only seem to compare 1.5C to 2C, so I was left confused about how they compare to present-day. I think a present day, 1.5C and 2C climates are all useful to assess, it just was not that clear in the present draft [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The text has been more strongly aligned with text from Chapter 1.
6822	16	43	16	43	Global Mean Surface Air Temperature [Rafiq Hamdi, Belgium]	Rejected. Over the oceans SST is sometimes used for GMST as discussed in the text.
4313	16	43	16	43	warming of the global mean surface temperature I do not like a temperature warm, but increasing [teodoro georgiadis, Italy]	Noted. We use both terms "temperature warming" and "temperature increasing". For a general public, "warming" is easier to understand.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5863	16	43	16	43	Please specify that GMST is derived from both land and ocean temperature. [Joan A. Lopez-Bustins, Spain]	Noted. The revised text mentions that the GMST is computed from both land and ocean data. This could be also further clarified for the FGD.
6516	16	45	16	48	Are there any newer studies that extend the trend beyond 2012? [Heike Hebbinghaus, Germany]	Noted. This may be updated for the FGD (also in coordination with Chapter 1).
6167	16	47	16	48	Minor comment: 'when multiple independently produced datasets existed' refers to the period 1880-2012 but it would be more suitable for the period 1951-2012, which is mentioned in the same sentence. I suggest moving that segment to the end of the sentence so as to refer to the more recent period. [Vanessa Pántano, Argentina]	Noted. This text is no longer in the chapter (following shortening).
6640	16	49	16	50	This seems to be a common fact during other warming stages recorded everywhere in the past. For example, similar conclusions were reached by Heiri et al. (2014) after reconstructing paleotemperatures by using a number of comparable multiproxy data, taken for the Lateglacial period, in all Western Europe. Heiri, O. et al. (2014) Nature Communications 5: 4914 <a href="http://dx.doi.org/10.1038/ncomms5914">http://dx.doi.org/10.1038/ncomms5914</a> [Castor Muñoz Sobrino, Spain]	Noted. Because there were suggestions to shorten this section, further aspects on paleoclimate were not added. But we will possibly still consider this for the FGD.
987	16	49	16	53	According to the report, some regions facing stronger trends in the global mean average. In my opinion, a short description of the background of above mentioned anomalies shall be added to the chapter. [Attila Buzási, Hungary]	Noted. More background on this topic is available in the chapter.
10465	16	50	16	51	"With a few exceptions, most land regions display stronger trends in the global mean average." seems illogical: how can most be above the average? [Jonathan Lynn, Switzerland]	Rejected. This is because the global average is for both land and oceans and the oceans warm less.
12785	16	53	16	53	It would be nice to have a global number for land vs. ocean with error bars, to support "much larger warming" [Robert Vautard, France]	Noted. Figs. 3.8 and 3.9 include numbers for land vs ocean.
3533	17				Figure 3.1, very bad quality/resolution, in fact mist figures are substandard quality resolution and most of them almost unreadable. [Sylvia Sander, Monaco]	Editorial
7594	17	1			Figure 3.1: I think there are more relevant figures that could be used here. Figure S1 in Mitchell et al, 2017 (Kris Ebi is an author on this paper), shows a similar figure, but with updated observations, extended to present day, and most importantly has a focus on 1.5C by putting contours at locally warmed areas above this temperature. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This figure is no longer in the main text (now in suppl. Information)
13329	17	1	17	6	Figure 3.1: Include what white areas mean in figure legend (as text in caption may not be easily noticed) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This figure is no longer in the main text (now in suppl. Information - white cells are described there)
13330	17	1	17	6	Figure 3.1: Temperature scale/legend may be more quickly understood if the legend is rotated to the vertical instead of horizontal. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This figure is no longer in the main text (now in suppl. Information )
17446	17	3	17	3	determined by linear regression from one dataset....It will be better to specify which dataset is used here. [Xiaolin Zhang, China]	Noted. This figure is no longer in the main text (now in suppl. Information )
11967	17	6	17	6	Hard (impossible) to see the plus sign on Fig 3.1. [Paul Doyle, Canada]	Noted. This figure is no longer in the main text (now in suppl. Information )
10202	17	8	17	18	It is too strong to describe the hiatus as erroneously labelled - it depends how the word is used and the trend defined - I would kust avoid the word altogether [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. Changed text to "incorrectly labelled".
2513	17	8	17	31	This discussion of the 'hiatus' is poorly written and needs a better overall structure. [Robert Koppu, United States of America]	Taken into account. The text was revised.
10203	17	8	17	31	This is why Chapter 1 developed the human induced warming - which hiatus like events to not affect. Reference needs to be made back to this and working definitions of 1.5C harmonised. I am not convinced that all this detail on the last decade GMST trend is needed. Chapter 1 also covers it [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. We have added the following sentence at the end of this paragraph: "Overall, the issue of internal climate variability is the reason why a 1.5°C warming level needs to be determined in terms of "human-induced warming" (see Chapter 1 for additional background on this issue). "
12786	17	8	17	31	This is a very long section on the hiatus, which is a bit standalone in the storyline of the chapter and report. It should be shortened and a suggestion would be to have a s/n section on variability which would include it. Otherwise it should be better focused on what the hiatus teaches to the 1.5°C issue, and summarized. [Robert Vautard, France]	Taken into account. The text was revised and shortened.
12883	17	9			GMST is already defined, so delete "global mean surface temperature" [Jorge Carrasco, Chile]	Editorial.
5261	17	9	17	9	refer to this period as "known as the warming hiatus" [Bart Van den Hurk, Netherlands]	Noted. Written now as "which has been referred to by some as the 'global warming hiatus'". Will consider proposed alternative wording for the FGD.
6539	17	11	17	11	Instead of just mentioning the 2015 and 2016 were the two warmest years, I'd suggest that it is framed as 'the most recent years; 2015 and 2016, were the two warmest years, ...'. This is to stress of how temperature has increased in the recent past. [Victor Ongoma, Kenya]	Noted. Will consider this wording for the FGD (also including an update for 2017 if available)
11968	17	11	17	11	SHORTEN "We note as discussed in" Medhaug et al. (2017) that 2015....to...Medhaug et al. (2017) "note" that 2015... [Paul Doyle, Canada]	Accepted.
9313	17	11	17	12	The phrase, "We note as discussed in Medhaug et al. (2017) that 2015 and 2016 were the two warmest years on 12 record (based on GMST)" may be updated by additional evaluations from the year 2017. For example, based on NASA, August 2017 was the second warmest on record < <a href="https://climate.nasa.gov/news/2630/august-2017-was-second-warmest-on-record/">https://climate.nasa.gov/news/2630/august-2017-was-second-warmest-on-record/</a> >. [Siir KILKIS, Turkey]	Noted. We only focus on mean annual values, not single months. We will consider adding an update for the full 2017 year if available for the FGD.
17998	17	13	17	15	Is this really the temperature response from radiative forcing on shorter time scale, not the effect of natural variability? It might be worth substantiate the statement with references from literature [Wilfran Moufouma Okia, France]	Noted. Will consider rephrasing for FGD.
5262	17	14	17	14	event ->"episode" [Bart Van den Hurk, Netherlands]	Noted. Will be edited in the FGD.
6517	17	15	17	18	Using the term "cooler temperature" here is misleading. The mentioned period did not actually show a cooling, and even less a cooling below pre-industrial levels, so there were no cooler temperatures. Instead, by choosing an exceptionally hot year as starting point, the temperatures looked cooler, but only compared to that record high year. Maybe better phrase along the line of "year to year change are not linear and a year with record-high temperatures can be followed by several less hot years, as during the recent ...". [Heike Hebbinghaus, Germany]	Noted. The text has been revised.
5263	17	16	17	16	why "erroneously called"? [Bart Van den Hurk, Netherlands]	Noted. Changed text to "incorrectly labelled". Based on most recent literature, there is no evidence of a "hiatus" in climate forcing or even climate response. But will consider editing this text for FGD.
17997	17	16	17	18	The issue of global warming hiatus seems a topic still under debate, so the expression "erroneously labelled" may be too prescriptive. It would be appropriate to add references about "warming hiatus". In addition, the speculation in Line 17-18 need to be backed up with evidence from relevant literature. [Wilfran Moufouma Okia, France]	Noted. Changed text to "incorrectly labelled". Based on most recent literature, there is no evidence of a "hiatus" in climate forcing or even climate response. But will consider editing this text for FGD.
10466	17	20	17	22	"... the apparent slowdown... was overestimated..." OK this is clear but for many people at first reading "overestimated" will mean the whole thing was bigger, not the slowing trend. Can it be expressed be more clearly? (Maybe this only a consideration for SPM/TS/ES not chapters, for non-specialists) [Jonathan Lynn, Switzerland]	Noted. Kept text but will consider clearer rewording for the FGD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17447	17	20	17	31	Since 2015-2016 is one of the biggest El Ninos in the history, I'm just wondering how it influences the global mean surface temperature trend (GMST) [Xiaolin Zhang, China]	Noted. Cannot address this level of detail in the text.
17710	17	22	17	22	Recent study worth adding: Santer et al 2017: Causes of differences in model and satellite tropospheric warming rates [Ana Bastos, France]	Noted. Will consider to include a reference to this article in the FGD.
9769	17	22	17	24	In addition, there is evidence that the slower pace of surface warming was due, in part, to lower surface heating of the oceans accompanied by higher rates of heating at depth.' Reference(s) needed to support this statement. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text is no longer there following shortening.
12884	17	23			What about PDO? [Jorge Carrasco, Chile]	Rejected. Too detailed.
14921	17	24	17	24	by higher rates of heating at depth.' Citation required. Suggestions: Yan, X.H., Boyer, T., Trenberth, K., Karl, T.R., Xie, S.P., Nieves, V., Tung, K.K. and Roemmich, D., 2016. The global warming hiatus: Slowdown or redistribution?. Earth's Future, 4(11), pp.472-482. & Liu, W., Xie, S.P. and Lu, J., 2016. Tracking ocean heat uptake during the surface warming hiatus. Nature communications, 7. [Ambarish Karmalkar, United States of America]	Noted. Text is no longer there following shortening. May consider for FGD if reviewers ask for more background on this topic.
17999	17	24	17	25	The following statement "Thus, it can be concluded that the period in question did not reflect, to any extent, a slowdown in the overall heating of the Earth's climate system" is rather bold and need to be nuanced or further substantiated [Wilfran Moufouma Okia, France]	Noted. This text is no longer in the chapter following shortening.
2514	17	26	17	26	melting' rather than 'meltdown' of Arctic sea ice? [Robert Koppu, United States of America]	Noted. This text is no longer in the chapter following shortening.
18000	17	26	17	27	The following statement 'continued meltdown of the Arctic sea ice (Stocker et al. 2013), the unabated increase in global sea level' may be not proper examples. [Wilfran Moufouma Okia, France]	Noted. This text is no longer in the chapter following shortening.
417	17	27			I think it is better to cite Vaughan et al. (2013, Chapter 4 of IPCC AR5 WG1 report on the Cryosphere) for the continued meltdown of the Arctic sea ice, and Church et al. (2013, Chapter 13 of IPCC AR5 WG1 report on Sea Level Changes) for the unabated increase in global sea level rather than the more general technical summary of Stocker et al. (2013). [David Docquier, Belgium]	Noted. This text is no longer in the chapter following shortening.
2515	17	27	17	27	There is some negative interannual variability in GMSL, so I'm not sure it makes sense to talk about GMSL rise being 'unabated' on such fine timescales as the last five years. For example, per the current update of Nerem et al. (2010), deseasonalized GMSL was higher in mid-2015 than mid-2016. [Robert Koppu, United States of America]	Noted. This text is no longer in the chapter following shortening.
418	17	28	17	30	I agree that GMST has drawbacks but it is still a relevant variable in the context of global warming. Furthermore, the last part of the sentence is not clear ('which has importance relevance...'). Consider rephrasing: 'For this reason, GMST must be used with care in assessing the impact of greenhouse gas forcing on the Earth's climate system in a transient climate context. Other diagnostics (e.g. ocean temperature, sea ice cover, sea level rise, extreme temperature) are also relevant to produce an accurate assessment.' [David Docquier, Belgium]	Noted. We now refer to Chapter 1 on this point in particular regarding the relevance of the definition of GMST in terms of "human-induced warming". See text at the end of paragraph: "Overall, the issue of internal climate variability is the reason why a 1.5°C warming level needs to be determined in terms of "human-induced warming" (see Chapter 1 for additional background on this issue)."
10892	17	28	17	31	AR5 already used multiple and independent lines of evidences to assess the observed global warming. Instead GMST is practically the only measure considered by the Paris agreement [Carolina Vera, Argentina]	Noted. Text was revised. We now refer to the notion of "human-induced warming" introduced in Chapter 1.
2711	17	28	17	31	This should be stated upfront, to prevent any misunderstanding - and as a key message in the Executive Summary. [Penny Urquhart, South Africa]	Noted. We have revised this text to now highlight the need to consider changes in GMST in the context of "human-induced warming" a concept introduced in Chapter 1. We have added the following sentence at the end of this paragraph: "Overall, the issue of internal climate variability is the reason why a 1.5°C warming level needs to be determined in terms of "human-induced warming" (see Chapter 1 for additional background on this issue)."
9770	17	29	17	29	GMST is not the most accurate measure'. This implies there are more accurate measures and some brief discussion of what these are may be merited here. For example, some combination of sea level rise, Arctic sea ice reduction, OHC change and GMST could be used although, of course, this would be difficult to define and some of these individual measures are not independent. So, I'm not suggesting that a more accurate measure can be easily defined rather than a somewhat broader discussion (extra sentence or two) of this issue is needed here. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text was revised. We now refer to the notion of "human-induced warming" introduced in Chapter 1.
416	17	36			Consider re-arranging figures since Fig. S3.1 is referenced after Fig. S3.2 (page 17, line 22) in the text. [David Docquier, Belgium]	Editorial
9967	17	36	17	36	Please see Chapter 3, Annex3.1: In the caption of Figure S3.1 "... (from IPCC AR5, Bindoff et al. 2013)", one of the brackets is missing or unnecessary, it must be "... (from IPCC AR5, (Bindoff et al. 2013)) or "... (from IPCC AR5, Bindoff et al. 2013) [Mustafa Tufan Turp, Turkey]	Editorial.
11969	17	38	17	38	CHANGE "lie"...to..."be"..... [Paul Doyle, Canada]	Editorial
11693	17	39	17	39	Use a proper minus sign (-): an em-dash does not convey the same meaning [David Schoeman, Australia]	Editorial
10467	17	39	17	40	when quoting figures with different signs suggest no space between minus and figure, and + sign for positive figure [Jonathan Lynn, Switzerland]	Editorial
419	17	40	17	43	How does this sentence fit into this paragraph about attribution? I would remove it. [David Docquier, Belgium]	Rejected. This sentence is based on attribution literature. However, the text was shifted to the suppl. Information for space reasons.
10893	17	45	19	6	As it is said in the discussion, to make an analogy of the changes between 1.5C and 2C with the observed between around 0.5 and 1, has large limitations because of the non linearities and tipping points. Therefore, to base the assessment of extreme changes on just one article (Schleussner et al. (2017)) seem to be very limited, and it is not evident which is the added value to the AR5+SREX findings. [Carolina Vera, Argentina]	Rejected. This is interesting additional evidence that is complementary to that based on climate model analyses, and is rooted in observations. The limitations are noted in the text.
5264	17	46	18	3	complex sentence. What do you imply? [Bart Van den Hurk, Netherlands]	Editorial
20562	18				The quality (DPI) of figure 3.2 needs to improve, when the size is increased to 200% is hard to read the words describing the y axis. It is specially hard to read the legend. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. Using full description of the analysed variables would be too complex as well.
7243	18	1	18	1	assess' not 'assessed' [Butt Nathalie, Australia]	Editorial
9314	18	1	18	1	The last word in the phrase "can be used to assessed" should be "assess." [Sir KILKIS, Turkey]	Editorial
10383	18	1	18	1	"...used to assess past..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Editorial
6823	18	1	18	1	can be used to assess past changes... [Rafiq Hamdi, Belgium]	Editorial
11694	18	1	18	1	"Assess" not "assessed" [David Schoeman, Australia]	Editorial
11970	18	1	18	1	CHANGE "assessed"...to..."assess"..... [Paul Doyle, Canada]	Editorial



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10468	18	1	18	1	"assess" not assessed [Jonathan Lynn, Switzerland]	Editorial
17712	18	1	18	20	Mann et al. 2016 assessed the anthropogenic fingerprint in record breaking global temperature records in the recent years [Ana Bastos, France]	Noted. Will possibly consider for the FGD.
17201	18	1	20	30	Following the reference of Schleussner et al. (2017) the report says that "robust increases in observed precipitation extremes can also be identified for annual maximum 1-day precipitation (RX1day) and consecutive 5-day precipitation (RX5day). The analysis also reveals that a quarter of the land mass has experienced an increase of at least 6.9% for extreme precipitation (RX5day)". Would be it possible to include some information about the region/regions of the Planet where these increases are robust? (following AR5 they are probably in the Northern part of Europe, or SREX shows NorthAmerica...). For instance, this is not the case of the Mediterranean Region (including North Africa) as it is also show in Figure 3.6 page and the associated explanations when projections are analysed. I have seen that Schleussner et al. (2017) do not include any explanation about the regions where these increases are found, but in the following paragraph they says "the change in extreme event indices exhibits distinct regional patterns". Consequently I would suggest to add a comment like "(...) 5-day precipitation (RX5day), although change in extreme precipitations exhibits distinct regional patterns" [Maria-Carmen Llasat, Spain]	Rejected. No analyses available from literature to our knowledge.
17711	18	3	18	3	its limitations? [Ana Bastos, France]	Editorial
11695	18	3	18	3	"Limitations" not limitation. There are many typos...some careful copy editing will be required. [David Schoeman, Australia]	Editorial
5864	18	7	18	8	Is there any other recent subperiod to be compared besides 1960-1979 and 1991-2010? [Joan A. Lopez-Bustins, Spain]	Noted. To our knowledge, no further analyses are available in the literature.
18001	18	11	18	14	Further clarification is needed on the following sentences "For observational datasets ..." [Wilfran Moufouma Okia, France]	Noted. Text clarified.
420	18	12			Something is missing before 'show that'. Isn't it 'Schleussner et al. (2017) show that'? [David Docquier, Belgium]	Accepted. Text clarified
421	18	13	18	14	I would not use TXx and TNn abbreviations in the text since it is rather complex for the non-expert reader. I would keep the original names instead. [David Docquier, Belgium]	Rejected. It is also unpractical to use full name of quantities.
11971	18	14	18	14	MOVE "TNn" from line 14 to here on line 13.... intensity of cold extremes "(TNn)" by.... [Paul Doyle, Canada]	Noted. Will be fixed for FGD.
5265	18	16	18	16	provide reference for 20CR product [Bart Van den Hurk, Netherlands]	Noted. Will be added for the FGD.
11972	18	16	18	17	What do "20CR" and "ERA" stand for? [Paul Doyle, Canada]	Noted. Will be clarified for the FGD.
13869	18	18	18	20	This is the relevant information needed. However, progressive shifts in temperature, ocean acidification, shifted precipitation patterns also have relevant impact. Focus on hazards that relate to impacts in a 1.5°C world. [Elvira Poloczanska, Germany]	Noted. This section is on changes in climate variables, hence the other aspects (e.g. ocean acidification) are addressed elsewhere as clarified in Section 3.1.
5266	18	19	18	19	I would replace "global impacts" by "regional impacts", as only fractions of the land area show significant trends in extremes [Bart Van den Hurk, Netherlands]	Rejected. The analyses in Fig. 3.2 are for the global land.
6274	18	21	18	31	figure 3.2 is illegible because graphs are blurry [Milton Nogueira da Silva, Brazil]	Noted. Will be improved for FGD.
19009	18	22	18	23	Please improve the quality of this figure 3.2; the legend at the right of this figure is unreadable [JACQUES-ANDRE NDIONE, Senegal]	Noted. Will be improved for FGD.
11496	18	22	18	23	Texts in the figure are too blurred, and text in the legend is both blurred and too small, I could not read it. [Meimalin Moreno, Venezuela]	Noted. Will be fixed for FGD.
13331	18	22	18	29	Figure 3.2: figure resolution is currently very poor - unable to read the labels in the figure legend. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be improved for FGD.
13332	18	22	18	29	Figure 3.2: explanation of shading (and colours) of the thick bands needs to be explained more prominently in figure legend (as the text in caption may not be read when initially trying to interpret the information). [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will consider revisions to caption for FGD.
422	18	22	18	29	Fig. 3.2: The quality of this figure is not good. The text in the axes and legend is too small. [David Docquier, Belgium]	Noted. Will be improved for FGD.
423	18	22	18	29	Fig. 3.2: According to the text above, there was a 'reduction of the intensity of cold extremes by at least 2.5°C' (page 18, lines 13-14). What we see in the middle panel (TNn) is an increase of 2.5°C. Or something is unclear in the figure. [David Docquier, Belgium]	Rejected. The figure shows that cold extremes are 2.5°C warmer, hence indeed their intensity is reduced.
424	18	22	18	29	Fig. 3.2: Is it really necessary to include results from internal variability (light-coloured envelopes)? This complexifies the figure and the message (and this is not used in the text above). [David Docquier, Belgium]	Noted. Will consider to simplify amount of provided information for FGD.
9708	18	22	18	29	The resolution of Figure 3.2 could be improved. The same holds for Figures 3.8, 3.9 and 3.12. [Kai Fang, China]	Noted. Will be improved for FGD.
11973	18	24	18	24	Fig. 3.2 needs larger font for easier read. [Paul Doyle, Canada]	Noted. Will be improved for FGD.
5267	18	27	18	27	I see two different "light colored envelopes". What's the difference between them? [Bart Van den Hurk, Netherlands]	Noted. Will clarify this point in the caption for the FGD.
4176	18	32		48	NOAA and the EPA back up claims of precipitation changes since 1901. In fact, according to data published by NOAA in 2016, most of the continental United States has seen an increase in total annual precipitation. The exceptions are the SW United States where precipitation levels have actually shown to decrease in the period 1901-2015. Also, while data may be limited, looking at historical weather forecasts would point to precipitation anomalies and overall shifts in precipitation. While yearly totals may be similar the intensity and duration with which precipitation occurs has changed. ie: Fewer events with higher totals of precip. etc. [Michelle Leslie, Canada]	Noted. Cannot provide that level of detail.
425	18	38			Isn't it better to cite Hartmann et al. (2013) instead of Stocker et al. (2013)? [David Docquier, Belgium]	Rejected. Both are cited.
426	18	38	18	40	Delete from 'but when virtually' until the end of the sentence. I do not think this part of the sentence is necessary since you do not explain the reconstruction method. And I do not see the added value. [David Docquier, Belgium]	Noted. Kept text but will consider clearer rewording for the FGD.
6641	18	40	18	48	Total precipitation (rain and others) locally depends on factors like orography (point of condensation, rain-shadows), distance to sea, temperature of the sea (evaporation, point of condensation). It may be very difficult to implement many of them in global reconstruction models, but in some Mid-latitude locations these factors may be critical to predict floods and droughts; and also for the preservation of very sensible ecosystems (e.g.peatlands, rainforests, cloud forests, etc). [Castor Muñoz Sobrino, Spain]	Noted. Cannot provide that level of detail.
5268	18	45	18	45	insert "limited" before "data quality" [Bart Van den Hurk, Netherlands]	Text was shortened, no longer there.
10012	19		19		Figure 3.4; figure headings are written in 2.0 °C and there is same thing in Row 30. Positive comment: This figure is very clear in terms of content. I think that it has contributed positively to the report. [Nazan AN, Turkey]	Noted. Thank you for positive comment. Units have been fixed.
427	19	4	19	5	I would not use RX1day and RX5day abbreviations in the text since it is rather complex for the non-expert reader. I would keep the original names instead. See also Comment 68. [David Docquier, Belgium]	Rejected. Using full description of the analysed variables would be too complex as well.
5865	19	5	19	5	Please homogenize "RX5day" writing. Along the manuscript, sometimes it appears as "Rx5day", and other "RX5day". [Joan A. Lopez-Bustins, Spain]	Editorial

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13333	19	8	19	14	Figure 3.3: explanation of shading (and colours) of the thick bands needs to be explained more prominently in figure legend (as the text in caption may not be read when initially trying to interpret the information). [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be considered for the FGD.
428	19	8	19	15	Fig. 3.3: This figure looks much better than Fig. 3.2. Maybe consider only putting 2 panels in Fig. 3.2. [David Docquier, Belgium]	Noted. Will be considered for FGD.
429	19	8	19	15	Fig. 3.3: Is it really necessary to include results from internal variability (light-coloured envelopes)? This complexifies the figure and the message (and this is not used in the text above). [David Docquier, Belgium]	Noted. Will be considered for FGD.
7595	19	17			See my first comments. I think this section could provide a better balance between the methods, and my preference would be to focus on the dedicated Paris Agreement initiatives. Similar figures to that of Figure 3.4-3.6 have been reproduced in Shiogama et al, 2017; Mitchell et al, 2017; Wehner et al, 2017. All currently under review. They show, for instance larger changes over Africa than this plot, and that is important here. Uhe et al, 2017 have a 'methods synthesis' version of this plot. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be considered for the FGD.
13870	19	17	19	17	changes of what?? [Elvira Poloczanska, Germany]	Rejected. Changes in climate (title of section 3.3.1)
6989	19	17	21	22	Can make use of the information presented in Section 12.4.2.2 of WGI AR5 which pertains to projected local temperature and precipitation change scaled by global temperature increase. [Sai Ming Lee, China]	Noted. Thank you for positive comment. Units have been fixed.
11974	19	18	19	18	CHANGE Figure 3.4 "shows 3 maps" of... [Paul Doyle, Canada]	Noted. Changed to "depicts".
4314	19	18	19	18	...local mean temperature warming... change in "...local mean temperature increase..." [teodor georgiadis, Italy]	Rejected. "warming" can also be understood.
11696	19	18	19	19	"local mean temperature warming at 1.5°C vs. 2°C global mean warming..." is a bit clumsy...reword? [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
430	19	20	19	21	Are TXx and TNn exactly the same as the ones in page 18 lines 13-14? Because the definitions are more detailed here. If yes, consider moving these definitions to page 18 lines 13-14. Anyway, I think using these abbreviations is too complex for the non-expert reader (see also Comment 68). [David Docquier, Belgium]	Noted. Will consider this for FGD. Yes, this is the same definition.
13871	19	22	19	22	CMIP5 definition was already provided in 3.2.2.2; use only acronym here [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
13710	19	22	19	22	CMIP5 definition already introduced in 3.2.2.2, acronym sufficient here [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
13872	19	23	19	24	Despite all the previous lengthy discussion, it is not clear how the RCPs come into play here [Elvira Poloczanska, Germany]	Noted. Will consider further clarification for FGD.
5490	19	23	19	25	What is it meant with "... stabilize below / at around 2°C"? Either "below 2°C", "at around 2°C" or even perhaps "at roughly below 2°C", but the way it is now, it is not clear. [Ismael Nunez-Riboni, Germany]	Accepted. Using now "at around"
11975	19	25	19	25	See comments for p 28, line 16 for here and elsewhere. [Paul Doyle, Canada]	Not able to identify comment.
9981	19	25	19	25	Year is missing in the reference of "Wartenburger et al.," it should be stated that the paper is in review [Mustafa Tufan Turp, Turkey]	Editorial. Article is now published.
5717	19	28	19	29	Figure 3.4 is not needed as it is about the difference between 1.5C and 2C global distribution. In general, all the Figures should focus on 1.5C warming. [Hong Yang, Switzerland]	Rejected. Differences to 2°C are also relevant for assessment.
9982	19	28	19	29	The units of figures are wrong "C"; they must changed with "°C" [Mustafa Tufan Turp, Turkey]	Accepted.
13334	19	28	19	34	Figure 3.4: Useful to make figure panel titles clearer and more concise, so the eye can quickly see which relates to 1.5 and 2.0. Separate out the 'difference' panel, e.g. by providing more white space or a vertical line between it and the other two panels. Will then be easier for people to compare the 1.5 and 2.0 panels. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will take suggestions into account for FGD.
13335	19	28	19	34	Figure 3.4: temperature scale/legend may be more quickly understood if the legend is rotated to the vertical instead of horizontal. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will take suggestions into account for FGD.
13336	19	28	19	34	Figure 3.4: remove longitude and latitude tick marks and labels in the maps (as unnecessary visual clutter) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will take suggestions into account for FGD.
13337	19	28	19	34	Figure 3.4: figure resolution is currently very poor. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will take suggestions into account for FGD.
16237	19	28	19	34	The color bars for the left two plots in Figure 3.4 lead to an impression, with a quick glance, that warming is not occurring everywhere, whereas this is occurring, as is more evident in the third plot. I'd suggest changing the color bar for the two left figures that perhaps has purple instead of blue for the lower warming levels--save blue for areas that are actually cooling. The same comment applies to Figure 3.5 on page 20. As a further comment, might it be helpful to the reader to also have plots for the changes normalized by the natural variability (so variability about some human-induced trend curve) over some period of time like the mid- or late 20th century. It just seems it might be helpful to give a sense of the significance of the changes. While the changes over the ocean are less in absolute amount over land and in low latitudes, the normalized changes are likely not so much different than the changes over land. [Michael MacCracken, United States of America]	Noted. Will consider this change for FGD.
6990	19	28	20	20	Please re-consider the colour legends of Figure 3.4 and 3.5. The blue colour gives an impression of cooling but the temperature change is positive instead. [Sai Ming Lee, China]	Noted. Will consider this change for FGD.
4315	19	30	19	30	Projected local mean temperature warming... change in "Projected local mean temperature increase..." [teodor georgiadis, Italy]	Editorial
7167	19	30	19	30	I believe the figures depicting, for example, mean temperature warming at 1.5C, 2C and the difference are very useful. However, consider providing some interpretations. For example, figure 3.6 shows little differences between 1.5C and 2C in terms of mean and extreme precipitation over Africa, while [meteorological] drought was emphasized an issue for this region (I have seen the explanation in 3.3.3.2 on p28 and 29 and Figure 3.12 and Table 3.1 (p45), but a reference could be added in the caption of figure 3.6) [Julain Florin VLADU, Germany]	Noted. The regional differences are discussed in the text (see also sections 3.3.2 and 3.3.3)
10013	20		20		Figure 3.5; figure headers are written in 2.0 °C. Correction1: 2.0°C should be corrected as 2 °C; Correction2: there is same thing in row 15 [Nazan AN, Turkey]	Editorial
431	20	1	20	10	It should be stressed in this paragraph that the region that experiences the highest level of warming whatever the emission scenario is the Arctic. This is clear from Fig. 3.4. [David Docquier, Belgium]	Noted. This is mentioned elsewhere. Will consider mentioning more regional details for FGD.
13338	20	12	20	19	Figure 3.5: Clarify in the figure that each row relates to daytime and nighttime, e.g. using row titles/headers. Currently could be confusing as reader has to think and carefully study the caption to work out what each row means. Row headers in the figure would therefore ease comprehension. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be fixed for FGD.
9709	20	12	20	19	As for Figure 3.5, I wonder why the annual maximum temperature is lower than the annual minimum temperature. If it is referring to temperature change, the caption should be altered to avoid confusion. [Kai Fang, China]	Noted. We believe the text is clear as is.
9983	20	12	20	13	The units of figures are wrong "C"; they must changed with "°C" [Mustafa Tufan Turp, Turkey]	Editorial

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13339	20	12	20	19	Figure 3.5: remove longitude and latitude tick marks and labels in the maps (as unnecessary visual clutter) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be fixed for FGD.
13340	20	12	20	19	Figure 3.5: temperature scale/legend may be more quickly understood if the legend is rotated to the vertical instead of horizontal. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be fixed for FGD.
11976	20	14	20	14	Why does Figure 3.5 not immediately follow Fig. 3.4 in text?? [Paul Doyle, Canada]	Editorial.
5866	20	14	20	15	Daytime and "nighttime" may not make sense with surface temperature in the plots. A larger description of the caption of figure 3.5 is required to clarify it. [Joan A. Lopez-Bustins, Spain]	Noted. Will improve clarity for FGD.
11697	20	24	20	25	"Compared to changes in temperature, changes in precipitation are not globally uniform and projections are more uncertain." Suggests that temperatures ARE globally uniform, which they obviously are not... [David Schoeman, Australia]	Noted. This was referring to the sign of change. Will clarify for the FGD.
2032	20	25			Can be better conceptually this Sentence: "However, some regions display substantial changes in mean precipitation -Under- between 1.5°C vs. 2°C global warming..." [Mohammad Ahmadi, Iran]	Editorial
6170	20	29	20	30	In the description of Figure 3.6, Southern Asia is mentioned as an example of region displaying "substantial increases". I wonder if the example was selected because of higher inter-model agreement, otherwise there are other regions with higher values of increase to be mentioned. [Vanessa Pántano, Argentina]	Noted. Too detailed for text.
3728	21				Regarding Figure 3.6: These figures need to be provided, as Figure SPM.8b in IPCC AR5 Summary for Policymakers, with hatching indicating regions where the multi-model mean is small compared to natural internal variability (i.e., less than one standard deviation of natural internal variability in 20-year means) and with stippling indicating regions where the multi-model mean is large compared to natural internal variability (i.e., greater than two standard deviations of natural internal variability in 20-year means) and where at least 90% of the models agree on the sign of change. Otherwise, the figures will give a false impression of a larger certainty in the direction and amplitude of precipitation change than actually exists. [Fredrik Charpentier Ljungqvist, Sweden]	Noted. Will be considered for FGD.
10703	21				Figure 3.7. Is there something backwards with the caption/description. Seems backwards that at any degree warming, you'd have a lower probability of crossing the 99th percentile (e.g. 5% at 2 deg C), than the 99.9 percentile (30%)...is this backwards? [Christopher Clark, United States of America]	Noted. Will need to clarify probability ratio in FGD.
4561	21				Fig 3.6 - One picture and four different legends for %. It is confusing. [Radim Tolasz, Czech Republic]	Noted. Will try to improve for FGD.
10014	21		21		Figure 3.6; figure headings are written in 2.0 °C and degrees are written in the form of °C in some maps in Figure 3.6 [Nazan AN, Turkey]	Editorial
9984	21	1	21	1	The units of figures are wrong "C"; they must changed with "°C" [Mustafa Tufan Turp, Turkey]	Accepted.
13341	21	1	21	8	Figure 3.6: Explain 'pmean' (projected mean?) in upper row of figure. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This stands for precipitation mean.
13342	21	1	21	8	Figure 3.6: remove longitude and latitude tick marks and labels in the maps (as unnecessary visual clutter) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be improved for FGD.
13343	21	1	21	8	Figure 3.6: High low temperature scale/legend may be more quickly understood if the legend is rotated to the vertical instead of horizontal. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be improved for FGD.
3540	21	3			delete duplicated word, "...and extreme (5-day maximum) precipitation ..." [Sylvia Sander, Monaco]	Editorial
5867	21	3	21	3	Please write "heavy precipitation" instead of "extreme precipitation" in order to be coherent with L22P20. [Joan A. Lopez-Bustins, Spain]	Noted. Will be fixed for FGD.
5868	21	3	21	3	Please substitute "5-day maximum precipitation" with "annual maximum 5-day precipitation". [Joan A. Lopez-Bustins, Spain]	Noted. Will be fixed for FGD.
3539	21	11			unclear what "threshold" means here. Is it the "maximum"? If so then you should exchange words to make the sentence clearer. [Sylvia Sander, Monaco]	Noted. No, "thresholds" refer to high values that are characteristic for extremes, not the maximum values.
6171	21	11	21	14	Figure 3.7 displays the probability of exceeding a certain threshold whereas in the description of the Figure in the text, it is mentioned as the risk of exceeding a certain threshold. Since the Figure was taken from Fisher and Knutti (2015), who show both probability ratio and fraction of attributable risk as different (but linked) concepts, I suggest mentioning as "probability of exceeding..." instead of "risk of exceeding...". [Vanessa Pántano, Argentina]	Noted. Will be fixed for FGD.
13344	21	16	21	21	Figure 3.7: Avoid unnecessary acronym in y-axis, can instead simply state 'Probability ratio'. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be fixed for FGD.
13345	21	16	21	21	Figure 3.7: Move panel headings (Hot extremes and Heavy precipitation) outside the plots. In their current location they could be confused as being part of the legend. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be fixed for FGD.
13346	21	16	21	21	Figure 3.7: Some additional explanation of how to interpret the probability ratio would be useful in relation to this figure - i.e. to help communicate a clear message. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be considered for FGD.
432	21	16	21	21	Fig. 3.7: Add unit to y axis (probably %). [David Docquier, Belgium]	Noted. Will be fixed for FGD.
6308	21	19	21	19	the (blue) 99th and (red) 99.9th percentile" -> "the 99th (blue) and 99.9th (red) percentile" [Dmitry L. Musolin, Russian Federation]	Editorial.
11698	21	19	21	21	The "probability ratio" requires a little explanation. It isn't currently clear to me what this refers to. Also, why is it more likely that the 99.9th percentiles are exceeded than the 99th percentiles? At least, this is the impression I get as a naive reader. Perhaps a brief elaboration is in order? [David Schoeman, Australia]	Noted. Will be considered for the FGD.
13873	22	1			Again, the focus should be on climate related hazards in relation to observed or projected impacts, in order not to bury that core information. [Elvira Poloczanska, Germany]	Reject. Background on changes in climate means and extremes is essential to understand the associated changes in risks and potential impacts.
5718	22	1	22	2	The title of this section is not clear. [Hong Yang, Switzerland]	The new title is: "Regional temperature means and extremes on land"
653	22	1	28	15	Suggestion is to provide more studies and references, such as Guo Xiaojun, Jianbin Huang, Yong Luo, Zongci Zhao and Ying Xu, 2016, Projection of heat waves over China for eight different global warming targets using 12 CMIP5 models, Theor. Appl. Climatol., doi: 10.1007/s00704-015-1718-1 [Zong-Ci Zhao, China]	Noted. Reference added
693	22	1	28	15	Suggestion is to provide more studies and references, such as Guo Xiaojun, Jianbin Huang, Yong Luo, Zongci Zhao and Ying Xu, 2016, Projection of heat waves over China for eight different global warming targets using 12 CMIP5 models, Theor. Appl. Climatol., doi: 10.1007/s00704-015-1718-1 [Zong-Ci Zhao, China]	Noted. Reference added
2477	22	6	22	7	Remove 'likely'; climate change a fact; climate change deniers use such hesitations/qualifiers against us [Lisa Lucero, United States of America]	done; Paragraph improved

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
988	22	8	22	14	How do the undersampling of mentioned regions affect the confidence? If undersampling can be reduced, relevant improvement of confidence can be realised, or the effect is marginal? [Attila Buzási, Hungary]	Noted. Despite the undersampling, there are enough data to support conclusion on long term changes of climate
13435	22	8	22	38	References cited are AR5 and SREX only. More recent studies need to be included in this review, particularly those on attribution of the long-term observed extreme temperatures. [Seung-Ki Min, Republic of Korea]	Recent literature added (Sylla et al., 2016; Abatzoglou and Williams 2016; Guo et al., 2017)
6172	22	16	22	16	The availability of data is sufficient is a very controversial phrase since coverage, quality, completeness, length of period, etc are needed to be improved in so many meteorological stations (specially in southern hemisphere) and meteorologists make great efforts to convince policy makers to invest with that aim. I suggest removing this assertiveness. [Vanesa Pántano, Argentina]	Done.
16238	22	17	22	17	The phrase "except Antarctica", as placed in the sentence, could give the impression that no warming has occurred on Antarctica, which is just not the case (not to mention what is happening in terms of mass loss). I would suggest redoing the sentence indicating that data make clear human induced warming is occurring on 6 continents and that for Antarctica, while changes are occurring, statistical assessment (presumably to 95% confidence) has not been achieved due primarily to the large natural variability in the weather that occurs there and the comparatively short observational record. [Michael MacCracken, United States of America]	Done. The paragraph has been reformulated
16239	22	19	22	20	Really, only "likely" for the Arctic? Is there any other possible explanation? This is another example of really not conveying findings in a way that is generally useful to decision makers, allowing statistical rigor to hide a clear finding as a result of limitations in data and the range in temperature that can occur in the thin atmospheric inversion layer making it mathematically challenging to get to two standard deviations. I would urge making a clearer statement here, or at least indicating that the key issue here is not doubt about a human influence but the limit of the statistical techniques due to the complications involved in considering the complex atmosphere-ocean-sea ice system, etc. [Michael MacCracken, United States of America]	Done. The paragraph has been reformulated
16240	22	20	22	21	This is also a misleading statement. Global warming has affected everywhere--all sub-continental regions. Whether one can detect this from analyzing temperatures from just within that region may be a question--basically with a much smaller data set and using in region statistical analyses, it can be hard to get statistical significance, but there is no question that human-influences are affecting everywhere. This sentence thus needs some reworking to indicate this, and then fine to add that only in some regions has this change become very clearly larger than the baseline conditions. In saying this, it does raise the point that it is essential to indicate what periods he was comparing--is it the most recent few decades to the 19th century baseline or, as seems possible given the preceding sentence, the change since the mid-20th century. If the latter, then one is really not doing an analysis of if there is a human influence, but if the human influence has grown by some amount over some period of time. The Hansen et al. PNAS paper on perceptions of change showed that summer land temperatures for the NH have changed substantially since mid-century--and in particular the fraction of time above what was two standard deviation warmth in the mid 20th century has gone up by a factor of something like 100. So, the statements made here really do not convey how much change has occurred due to how the analysis is done and a much more nuanced explanation is needed. [Michael MacCracken, United States of America]	Done. The paragraph has been reformulated
16241	22	23	22	38	As context for the statements regarding only likely and just medium confidence, it really needs to be said that the analysis framework is based on regional-scale statistical tests where one is seeking to evaluate standard deviations of confidence, etc. Given warming due to human activities is occurring virtually all over the world, warming has to be evident in the various regional and temporal records--after all, the global values are averages of local and high resolution data from weather observations and were suchwarming not occurring, we would not have a global signal. Somehow, this all needs to be explained--and rephrased--to make clear there is no question that the world is warming and this means warming is occurring virtually everywhere. [Michael MacCracken, United States of America]	Done. The paragraph has been reformulated
7244	22	26	22	26	remove 'so' [Butt Nathalie, Australia]	Done
433	22	30	22	31	Why do you use 'or' between 'length', 'number of warm spells' and 'heat waves'? [David Docquier, Belgium]	Done
434	22	38			Re-write: 'supplementary material of Schleussner et al. 2017'; [David Docquier, Belgium]	Done
18002	22	38	22	38	the format of reference, delete the left bracket in (Schleussner et al. 2014) [Wilfran Moufouma Okia, France]	Done
13711	22	38	22	38	Position of parenthesis needs revision [Elvira Poloczanska, Germany]	Done
5140	22	40	22	40	extreme heat events in cities. The term "cities" is perhaps too general for this case as it is not perceived the same by people of different cultural background. Therefore, it should be further defined or described as metropolitan areas. For instance, Shanghai in China cannot be compared to a much smaller city of the same country. Both are cities indeed; yet, the structure and population distribution differ, same as the perception of the term "city" in similar examples. [Spyros Schismenos, China]	Done. "Metropolitan areas" added
5465	22	40	22	47	Good attempt was made here. However, it is important consider global urban land teleconnections and global urban land use change in relation to climate change and emissions. May be a box is needed consiering the amount of data and literature on this. [Aliyu Barau, Nigeria]	There is a box on urban issues where change in land cover and land use have been handled

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7556	22	40	22	47	Here is my proposition for this paragraph : An area of particular concern is related to possible changes in extreme heat events in cities (e.g. Section 3.5.2. and cross-chapter Box 4.14 on cities). The climate in cities differs from surrounding regions due to the structures present and intensive human activity that occurs there. The surface geometry transformation and the alteration of energy and water exchanges between the atmosphere and the artificial soil is reflected in the urban space by a change in the wind regime, in moisture and in rainfall, and above all by an increase in temperature compared to what is observed in the surrounding rural area. This phenomenon is often referred to as the urban heat island (UHI) effect. The UHI shows cycles in time and space: at mid latitudes it is characterized by a daily cycle having its maximum intensity at night, a minimum of intensity generally before dawn, which may reach negative values (the town centre being colder than the environs) during the day, and a slow increase from sunrise onwards. Seasonal cycles also affect its frequency and intensity. Anticyclonic weather conditions with a lot of sunshine favour its formation, and rain, clouds and wind have the opposite effect. Spatially, the UHI has a horizontal structure characterized, particularly at night, by a sharp increase in temperature at the boundary between the rural surroundings and the built up area, and a region where the temperature increases gradually towards the town centre. The temperature reaches its maximum value in the central areas with the highest building density. The horizontal temperature distribution can show irregularities connected with topographical variability and differences in land use. In the vertical direction, the nocturnal UHI generally extends for a few hundred metres above the ground (between 150 and 300 m of altitude). During very sunny days with little wind, the height may reach 2000-2200 m (Arnfield 2003). There is growing evidence supporting the existence of phase and amplitude deviations in the UHI of tropical cities in comparison with the corresponding description in mid-latitude cities (Flores et al. 2017). Ref : Flores J. R., A. J. Pereira Filho, H. A. Karam, F. Vemado, V. Masson (2017): Effects of explicit urban-canopy representation on local circulations over a tropical mega-city, Boundary Layer Meteorology, accepted. [Julia Hidalgo, France]	Done. The paragraph has been updated and new reference added
9261	22	40	22	57	For urban heat island section, especially for use of satellite data add citation to Bader, D. A., Blake, R., Grimm, A., Hamdi, R., Kim, Y., and Horton, R. (2018). Urban climate science. In C. Rosenzweig, W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, and S. Ali Ibrahim (eds.), Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge University Press. In Press. [Cynthia Rosenzweig, United States of America]	Noted. Could not be implemented. Will be considered for the FGD.
9262	22	40	22	57	Clarify differences between surface and air temperature [Cynthia Rosenzweig, United States of America]	Noted. Could not be addressed due to time constraints. Will be considered for the FGD.
19010	22	40	23	2	The two (2) are quite good but it would be better to give more examples. In addition, what about Africa? [JACQUES-ANDRE NDIONE, Senegal]	Noted. An example could not be added at this stage, but this will be considered for the FGD.
7555	22	40	23	2	In my opinion there are two major weaknesses in the subsection 3.3.2.1 : - The definition of the urban climate complexity is reduced to the Urban Heat Island (UHI) phenomena description. I propose some modifications to the paragraph in this sense (see next comment). - The observed Urban Heat Island magnitude is described based on the surface UHI intensity (satellite based studies) while in Section 3.3.2.2 Projected changes from modelling give near-surface air UHI intensities. The physical basis of both phenomena are different. I think the focus should be changed to the air UHI or at least present content enriched with new information in this sense. I also propose two new bibliographic references (Stewart 2011, Tzavali et al. 2015) that are more specific than the proposed one (Mireaei and Haghighat 2010). If the author decides to change the focus to the near surface air temperature UHI, valuable information can be found for cities around the world on the Tzavali et al. Paper. [Julia Hidalgo, France]	Done. The paragraph has been improved and new references added. Please note that there is a box on urban issues
6540	22	40	42	22	I propose citation of Oke (1977) at first mention of UHI. Please confirm the year. [Victor Ongoma, Kenya]	Noted. Could not be implemented. Will be considered for the FGD.
435	22	43			Rephrase: 'summer and at night than nearby rural areas'. [David Docquier, Belgium]	The paragraph has been reformulated
3342	22	43	22	43	Generally, cities are warmer in summer.... Potentially an over-generalisation when stating 'in summer'. Cooler season examples include Coutts (2007). [Justin Oogjes, Australia]	The paragraph has been reformulated
13712	22	43	22	43	Punctuation needs revision [Elvira Poloczanska, Germany]	Done
6824	22	43	22	43	cities are not warmer only in summer [Rafiq Hamdi, Belgium]	The paragraph has been reformulated
989	22	43	22	45	Influencing factors of magnitude of UHI shall be completed by the followings: built-up areas, energy consumption, vegetation index, transportational issues, etc. [Attila Buzási, Hungary]	Done. List completed and paragraph improved
5141	22	43	22	47	A key factor for UHI causation is missing from the review: UHI warming also depends on waste (Anthropogenic) heat from building HVAC and vehicle emissions. The waste heat input can be considerable in flux e.g. see examples from Singapore (Quah and Roth 2012, Diurnal and weekly variation of anthropogenic heat emissions in a tropical city, Singapore. Atmospheric Environment 46, 92–103) and from Phoenix, AZ (Chow et al. 2014, "A multi-method and multi-scale approach for estimating city-wide anthropogenic heat fluxes" Atmospheric Environment. 99: 64-76. DOI:10.1016/j.atmosenv.2014.09.053.) [Winston Chow, Singapore]	Done. Issue updated in the text and reference added
5142	22	43	22	47	I suggest the following amendment: Generally, cities are warmer in summer; and at night, than nearby rural areas, though this warming depends on many factors including building density, waste heat from building heating/cooling systems and traffic, the geographical setting of the city, time of day, and season. In general, it has been found that the UHI effect is larger when there is: low wind speed; low cloud cover; large populations or city sizes; large waste heat (Arnfield 2003). Multiple mechanisms have been cited for causing the UHI (Rizwan et al. 2008; Zhao et al. 2014). [Winston Chow, Singapore]	Done, paragraph updated
20602	22	44	22	44	Among the reasons of the urban heat island, the rate of air conditioning equipment plays a role too in a negative feedback loop. (APUR, 2012) <a href="http://www.apur.org/sites/default/files/documents/ilot_chaleur_urbains_paris_cahier1.pdf">http://www.apur.org/sites/default/files/documents/ilot_chaleur_urbains_paris_cahier1.pdf</a> [Eric Vidalenc, France]	The paragraph has been reformulated
4784	22	44	22	45	Warming depends also on green areas around and between buildings. [Elena Georgopoulou, Greece]	Yes. The list has been updated
12475	22	44	22	46	per capita energy use must be included in factors controlling UHI. [Jinkyu Hong, Republic of Korea]	Agree. List updated
436	22	45	22	46	Rephrase: 'there is low wind speed, low cloud cover, large populations or city sizes (Arnfield 2003)'. [David Docquier, Belgium]	The paragraph has been reformulated
12478	22	45	22	46	UHI can be stronger in winter because of heating, not summer. Also, references should be included here. [Jinkyu Hong, Republic of Korea]	Yes. Paragraph updated
13443	22	45	22	47	Added to that Surface Urban Heat Island Effects are growing more in coastal cities of the world (Bahi et al 2016, case study of Morocco). Reference: Effects of Urbanization and Seasonal cycle on the surface urban heat island patterns in the coastal growing cities: a case study of Morocco, doi:10.3390/rs8100829. [Vidyunmala Veldore, Norway]	Noted. Not clear if study can be extrapolated to other regions. Will be considered for FGD.
2971	22	46	22	46	low cloud cover - does this mean "relatively clear skies" or "clouds that are low in the sky"? [Erica Head, Canada]	We meant low altitude in the sky

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11699	22	46	22	46	"Low cloud". Low in what sense? Low altitude? Small %cover. Avoid ambiguous adjectives. [David Schoeman, Australia]	Low altitude
2300	22	46	22	46	The Urban Heat Island is related to pollution among other multiple mechanisms (references in the text) , but also urban air pollution can be affected by this effect. There are clear feedbacks in this issue. [Begoña ARTIÑANO, Spain]	Yes agree
13713	22	46	22	47	Provide some examples for mechanisms causing UHI [Elvira Poloczanska, Germany]	Done. The paragraph has been updated
6825	22	47	22	47	a reference to Hamdi and Schayes 2008 could be added in the list. Hamdi Rafiq, G. Schayes. Sensitivity study of the urban heat island intensity to urban characteristics. International Journal of Climatology, 28, 973-982, 2008. [Rafiq Hamdi, Belgium]	Agree. Reference added
12476	22	47	22	47	Hong and Hong (2016) must be included because it explains mechanism of increases in UHI in one of Asian megacities. Also, it shows that urban redevelopment in Asian old cities makes impact on UHI increases. "Hong, J.-W. and J. Hong (2016) Changes in the Seoul metropolitan area urban heat environment with residential redevelopment, Journal of Applied Meteorology and Climatology, 55, 1091-1106" [Jinkyu Hong, Republic of Korea]	Agree. Reference added
6541	22	49	22	49	I suggest that at the end of the sentense, different studies can be given with the respective cities of where they were undertaken. [Victor Ongoma, Kenya]	There is a box on urban areas where these examples will be showed
18003	22	49	22	57	These statements don't seem to connect urban climate to 1.5 C warming. Further clarification is needed? [Wilfran Moufouma Okia, France]	Noted. This is related to a lack of publications specific to urban climate and 1.5. However, because the topic is relevant for impacts, and was not addressed in the AR5, it is considered relevant for the SR15. If additional literature can be found for specifically on this topic, this will be added for the FGD.
13874	22	49	23	2	This lengthy discussion on UHI strays away from 1.5C focus, could it be reduced by referencing IPCC reports and scientific papers? Further, to increase integration across WGs, rather than presenting information sequentially by WG, would this discussion on urban environment climate be better placed in 3.5.2????? [Elvira Poloczanska, Germany]	Noted. Revisions for FGD will aim to address more specifically aspects related to 1.5 if literature is available by then.
7557	22	49	23	2	Studies have been conducted to estimate the UHI intensity in many cities (Stewart 2011, Tzavali et al. 2015; Mirzaei and Haghghat 2010). Stewart, I.D. (2011) A Systematic Review and Scientific Critique of Methodology in Modern Urban Heat Island Literature. International Journal of Climatology, 31, 200-217. <a href="https://doi.org/10.1002/joc.2141">https://doi.org/10.1002/joc.2141</a> // Anna Tzavali John P. Paravantis, Giouli Mihalakakou, ?ngelik Fotiadi and Eleni Stigka, 2015 : URBAN HEAT ISLAND INTENSITY: A LITERATURE REVIEW Fresenius Environmental Bulletin, Volume 24 – No 12b, [Julia Hidalgo, France]	Agree. The paragraph has been updated and new references added
12479	22	50	22	50	We must concede that satellite estimation of urban temperature is theoretically difficult. [Jinkyu Hong, Republic of Korea]	Yes
12477	22	50	22	51	Hong and Hong (2016) showed that doubled population due to urban redevelopment made about 0.6oC daily minimum temperature in one of Asian cities. [Jinkyu Hong, Republic of Korea]	reference added
5143	22	57	23	1	The statement needs to be qualified as large tropical cities do have UHI intensities similar to temperate cities of similar size e.g. Singapore has a max UHI of 7 K (e.g. Roth & Chow 2012, "A historical review and assessment of urban heat island in Singapore." H45. 33(3): 381-397. DOI:10.1111/sjtg.12003.) [Winston Chow, Singapore]	The paragraph has been updated
5144	22	57	23	1	I suggest the following amendment: Tropical cities generally have UHI intensities lower than comparable temperate cities (Roth 2007), but large tropical cities can have UHI intensities similar to cities of similar size and population in mid-latitudes e.g. Singapore's maximum UHI is 7 °C (Roth and Chow 2012). [Winston Chow, Singapore]	Agree. The paragraph has been updated
437	23	1			Replace 'urban heat island' by 'UHI'. [David Docquier, Belgium]	Done
11977	23	1	23	1	REPLACE " urban heat island" with "UHI" [Paul Doyle, Canada]	Done
5869	23	1	23	1	Please use the acronym UHI. [Joan A. Lopez-Bustins, Spain]	Done
6826	23	2	23	2	a reference to Hamdi et al. 2016 could be added in the list. Hamdi, R., F. Duchêne, J. Berckmans, A. Delcloo, C. Vanpoucke, P. Termonia, Evolution of urban heat wave intensity for the Brussels Capital Region in the ARPEGE-Climat A1B scenario, Urban Climate, Volume 17, Septembmber 2016, Pages 176-195, ISSN 2212-0955, <a href="http://dx.doi.org/10.1016/j.uclim.2016.08.001">http://dx.doi.org/10.1016/j.uclim.2016.08.001</a> . [Rafiq Hamdi, Belgium]	Agree. Reference added
6827	23	2	23	2	A paragraph is missing on the estimation of the UHI on the warming rate, because for some cities the effect could be large if the meteorological station experienced historical urbanization like in China for example. [Rafiq Hamdi, Belgium]	Agree. The paragraph has been updated
16242	23	7	23	10	This is a very strange statement—the "likely" qualifier has to do with whether changes are detectable using some strict statistical test (a test that has virtually nothing to do with whether an average member of the public senses a change has occurred); how is regional detectability by a statistical test the point to be making (and this point with respect to further warming, so compared to present, or with respect to 19th century baseline)? The point to be straightforwardly made here is that: "A further increase of 0.5 C or 1 C will further increase both the average temperature and extremes in most, if possibly not all, regions." Under virtually all plausible types of responses (so recognizing how the global climate system is thermally and dynamically coupled), this has to be the case if the global average temperature is postulated as going up. Being mathematically obtuse is just not really helpful to the likely reader of this report. [Michael MacCracken, United States of America]	Noted. This comment could not be addressed due to time constraints but will be considered for the preparation of the FGD.
6230	23	9			The parenthesis before '2012' is suggested to be removed. [Muhammad Mohsin IQBAL, Pakistan]	Done
10469	23	9	23	9	"assessment" unnecessary [Jonathan Lynn, Switzerland]	Done
7245	23	10	23	10	remove "and so" [Butt Nathalie, Australia]	Done
2516	23	13	23	15	I suggest also considering the US-only findings of Hsiang et al. (2017). S. Hsiang, S., R. Kopp, A. Jina, J. Rising, M. Delgado, S. Mohan, D. J. Rasmussen, R. Muir-Wood, P. Wilson, M. Oppenheimer, K. Larsen, and T. Houser (2017). Estimating economic damage from climate change in the United States. Science 356(6345), 1362–1369. doi: 10.1126/science.aal4369. [Robert Koppu, United States of America]	Reference added
16243	23	15	23	15	for assessment of this chapter—not the right phrasing as sounds like evaluating this chapter. Perhaps say "for projecting the expected changes described in this chapter" [Michael MacCracken, United States of America]	Sentence updated
11978	23	15	23	15	ADD commas.....projects",etc." will.... [Paul Doyle, Canada]	Done

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13436	23	17	23	27	Figure 3.8 shows results on the intensity of extreme temperature only (same for Fig. 3.9). Responses of frequency and duration of temperature extremes as well as areal extent would be as important as those of intensity, to 1.5 and 2.0 degree warming, which might show non-linear response to the global mean temperature, differently from the intensity. Addressing this point would be helpful for related impact assessments. [Seung-Ki Min, Republic of Korea]	Noted. Results on frequency are provided in Fig. 3.7.
438	23	19			I do not think Section 3.2 provides an overview of IPCC SREX regions as mentioned in the text. You probably refer to another section of this report. [David Docquier, Belgium]	Agree. Was corrected.
439	23	19			Invert: 'displays changes in temperature hot extremes for the IPCC SREX regions'. [David Docquier, Belgium]	Agree. Will be corrected in FGD.
13714	23	20	23	23	This information should also be provided in the legend to Fig. 3.8 [Elvira Poloczanska, Germany]	Agree. Will be edited in the FGD.
11979	23	23	23	24	Wartenburger et al. ??? Maybe this paper will be published by the time this report is printed and ref can be unified?? [Paul Doyle, Canada]	Yes, reference will be updated
445	24				Fig. 3.8: This figure has a very poor quality: it is difficult to read without zooming. And even after zooming, you realize that the image resolution is low. Finally, the landscape format makes the readability even more difficult. My suggestion is to plot only some key regions. [David Docquier, Belgium]	Figure improved
3541	24				figure 3.8 labels and legends too small to read. [Sylvia Sander, Monaco]	Done. Figure and legend improved
656	24	1	24	4	Suggestion is to add "multi CMIP5 at RCP8.5 and RCP2.6" [Zong-Ci Zhao, China]	Legend updated
696	24	1	24	4	Suggestion is to add "multi CMIP5 at RCP8.5 and RCP2.6" [Zong-Ci Zhao, China]	Legend updated
13347	24	1	24	5	Figure 3.8: This is a very complex figure, packing in a lot of information, making it difficult to work out what the associated message is. It could benefit from separating out the global data from the regional data. Presenting global data in a plot alongside an explanation of the structure of the data and what it shows, would enable the reader to first grasp how to read the plot and its meaning. Regional data could then be presented as a separate figure. 'Chunking' information like this can aid reader comprehension. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Legend updated
13348	24	1	24	5	Figure 3.8: figure resolution is currently very poor. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure improved
5720	24	1	30	4	The quality of Figures 3.8, 3.9 and 3.11 is very poor. In general, the quality of Figures in this Chapter needs to be improved. [Hong Yang, Switzerland]	Agree. Figure improved
1421	24	2			this figure is really not easy to read [Philippe Roudier, France]	The figure was substantially revised and improved.
440	24	2			Add bracket: '(TXx)'. [David Docquier, Belgium]	Editorial
4562	24	2			Add "" [Radim Tolasz, Czech Republic]	Editorial
11980	24	2	24	2	Fig. 3.8 Good but very small font. [Paul Doyle, Canada]	The figure was substantially revised and improved.
5269	24	2	24	4	caption must give more information on the meaning of the different lines and shadings [Bart Van den Hurk, Netherlands]	The figure was substantially revised and improved, caption was updated.
441	24	3			Move bracket: 'and Wartenburger et al. (in review)'. [David Docquier, Belgium]	Editorial
11072	25	1	25	18	When assessing droughts and heat waves simulated by climate models, please note the recent studies by Tallaksen and Stahl (2014), De Kauwe et al. (2015) and Ukkola et al. (2016) that indicate that LSMs overestimate the frequency / severity of drought events. This could also have implications for surface temperature extremes through the coupling between latent and sensible heat fluxes: an underestimation of ET for periods of precipitation deficit would imply an overestimation of temperature. This should be considered both in studies on heat extremes and in studies on climate change since temperature increases in regions with drier future conditions could be overestimated by some models. Some mechanisms that can explain the underestimation of ET by LSMs during periods with dry precipitation anomalies are discussed by Ukkola et al. (2016).  De Kauwe M.G., S.-X. Zhou, B.E. Medlyn, A.J. Pitman, Y.P. Wang, R.A. Duursma and I.C. Prentice, 2015: Do land surface models need to include differential plant species responses to drought? Examining model predictions across a latitudinal gradient in Europe. Biogeosciences, 12, 12349–93.  Tallaksen L.M. and Stahl K., 2014: Spatial and temporal patterns of large-scale droughts in Europe: model dispersion and performance Geophys. Res. Lett. 41 429–34.  Ukkola, A. M., Pitman, A. J., Decker, M., De Kauwe, M. G., Abramowitz, G., Kala, J., and Wang, Y.-P., 2016: Modelling evapotranspiration during precipitation deficits: identifying critical processes in a land surface model, Hydrol. Earth Syst. Sci., 20, 2403-2419. [Anna Sörenaon, Argentina]	These references are more relevant for Section 3.3.4 on drought. They will be considered for the preparation of the FGD.
13437	25	1	25	18	Nothing is mentioned here about benefit from weaker warming of extreme temperature, assessed from differences between 1.5 and 2 degree warming?? [Seung-Ki Min, Republic of Korea]	Not sure to understand question. Benefits are addressed later in the chapter (in section 3.5), not in section 3.3.
444	25	1	25	18	This paragraph is difficult to understand, in large part due to the poor readability of Fig. 3.8. Consider simplifying. [David Docquier, Belgium]	The text was revised and clarified.
442	25	1	25	2	I do not understand this sentence. [David Docquier, Belgium]	This means that the anomalies in changes in hot extremes are stronger than for the global mean temperature.
6642	25	1	25	7	Of course there is an inevitable problem of scale here (real vs working scale), which may produce some undesirable ambiguities. For example, currently SW Europe/Mediterranean or W North America include areas with hipoceanic, humid, sub-humid, submediterranean, mediterranean and (almost) continental climates. Under the same global scenario, people living and ecosystems developing on each one may have their own risks/threats. [Castor Muñoz Sobrino, Spain]	Yes, this is correct. But too detailed to add text on this point.
6173	25	1	25	26	Regarding the regions of strong soil-atmosphere coupling, Seneviratne et al (2010) identifies the regions with transitional climate zones, as mentioned in lines 6 and 20 (page 3-25). However, specifically for soil moisture-temperature coupling, the authors identify the regions with higher coupling a those with moisture limited evapotranspiration regime (which include both dry climate regimes and transitional ones). I suggest specifying this because it would better introduce the findings of Huang et al. (2017) mentioned in line 24 (page 3-25), who identify "that warming is much larger in drylands". [Vanessa Pántano, Argentina]	The definition of "drylands" in Huang et al. (2017) is not standard, hence difficult to include here (and it is mentioned further down). But will consider this comment in the preparation of the FGD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4316	25	2	25	2	temperature warming... change in "temperature increase..." [teodoro georgiadis, Italy]	Both wording are used in the text "temperature warming" and "temperature increase". "Temperature warming" is considered easier to understand by general public.
443	25	2	25	4	Stronger contrast in what? Something is missing. [David Docquier, Belgium]	Stronger than "the mean global temperature warming in most land regions".
12073	25	4	25	14	Soil moisture temperature coupling and associated response in soil respiration is not included in recent climate models, which should be considered in next generation models. Best explanation on how soil moisture module temperature sensitivity of soil respiration can be found in Davidson etal-1998-Global Change Biology-4-217-227; Davidson etal-2006-Global Change Biology-12-154-164; Moyano etal-2013-Soil Biology and Biochemistry-59-72-85. [Debjani Sishi, United States of America]	Too detailed for the present text.
14359	25	6	25	6	soil moisture regime: as well as a transitional soil temperature regime as described by Grillakis et al, 2016. Grillakis MG, Koutroulis AG, Papadimitriou LV, Daliakopoulos IN, Tsanis IK (2016) Climate-induced shifts in global soil temperature regimes. Soil Sci 181(6):264–272 [Ioannis Daliakopoulos, Greece]	Probably too detailed for the present text. But will consider for the FGD.
9479	25	7			Replace "enhance" by "enhanceD" [David Wratt, New Zealand]	Editorial
7726	25	7	25	7	Due to "enhanced" rather than "enhance". [Hilary Inyang, Nigeria]	Editorial
7246	25	7	25	7	enhanced' [Butt Nathalie, Australia]	Editorial
18004	25	7	25	7	enhance drying -- enhanced drying [Wilfran Moufouma Okia, France]	Editorial
10384	25	7	25	7	"...due to enhanced drying..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Editorial
10470	25	7	25	7	"enhanced" [Jonathan Lynn, Switzerland]	Editorial
7247	25	13	25	13	alter to 'whereby feedbacks with clouds and surface radiation are also' [Butt Nathalie, Australia]	Editorial
7248	25	14	25	14	change to 'regions internal climate variability can also' [Butt Nathalie, Australia]	Editorial
10894	25	14	25	15	Instead of Dessler et al. 2012, it should be included a reference to a chapter of the AR5 or to an article published after it. [Carolina Vera, Argentina]	Noted. Deser et al. 2012 is a suitable reference, important to also list original material.
5870	25	18	25	18	0°C may be more suitable than "no warming". [Joan A. Lopez-Bustins, Spain]	Rejected. Consider "no warming" easier to read.
12788	25	18	25	18	One thing that should be mentioned is the the overall tendency of models to have a too strong temperature extreme response (Boberg and Christensen 2012, 2013) and in general a large spread in latent and sensible fluxes (Stegehuis et al., 2012, Clim. Dyn.). Thus the spread may to a certain extent be overestimated. [Robert Vautard, France]	Noted. Will be considered for the FGD.
2712	25	20	25	26	This is a key point - about drylands - and may highlight the need for advocacy on the part of the Chapter 3 team to ensure that drylands are adequately covered in chapters 4 and 5 as well - would it be useful for example, to have a case study of climate resilient development pathways focusing on drylands? [Penny Urquhart, South Africa]	Noted. Will clarify coordination with Chapters 4 and 5 on this point in preparation of FGD.
5270	25	25	25	25	What do you mean with "largely responsible"? Isn't this the antropogenic greenhouse gas emission? [Bart Van den Hurk, Netherlands]	Will remove this sentence in the FGD.
16244	25	25	25	26	This last phrase beginning at "although" needs to be dropped—even if someone picks up that this is an inference about developed vs. developing countries responsibility, it is not the case—witness most countries in the tropics being developed and their being low humidities in large parts of many developed nations. Just drop the phrase and let's keep inferences about responsibility to places where it can be more clearly laid out. [Michael MacCracken, United States of America]	Agreed. Will be removed in the FGD.
7249	25	28	25	28	change to 'for annual' [Butt Nathalie, Australia]	Editorial
6828	25	28	25	28	as in Figure 3.8 [Rafiq Hamdi, Belgium]	Editorial
8823	25	28	25	34	Typo"Figure 3.9 displays similar analyses as Figure 3.7". It should be Figure 3.9 and Figure 3.8 [Lubna Alam, Bangladesh]	Editorial
13715	25	28	25	34	shouldn't it say Figure 3.8 instead of 3.7? [Elvira Poloczanska, Germany]	Editorial
16245	25	31	25	32	It is also the case because when there is no sea ice insulating the air from the ocean beneath that the temperature change can be very large. This is possible because there is a thin inversion in which the air is very cold the presence of the ice, and loss or even thinning of the ice can greatly weaken the inversion--so it is the insulating feedback that Robock discussed several decades ago and might merit mention. [Michael MacCracken, United States of America]	Noted. Was not included in SOD but will be considered for FGD. Would be useful to have 1-2 references for this.
6829	25	34	25	34	Northern Europe, Figure 3.9 [Rafiq Hamdi, Belgium]	Editorial
446	26				Fig. 3.9: Same remarks as for Fig. 3.8. Furthermore, the discussion related to this figure is very limited. Is it worth producing a figure? I suggest either to remove this figure and only keep the associated text, or to highlight some key regions. A third option is to move this figure (and the previous one) to the annex. [David Docquier, Belgium]	The figure was substantially revised and improved.
13349	26	1	26	5	Figure 3.9: figure resolution is currently very poor. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure was substantially revised and improved.
13350	26	1	26	5	Figure 3.9: Chunking information could help make this complex figure more easy to understand (see related comment to Figure 3.8) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure was substantially revised and improved.
11981	26	2	26	2	Fig. 3.9 Good but very small font. [Paul Doyle, Canada]	The figure was substantially revised and improved.
4563	27				Fig 3.10 - One picture and four different legends for days. It is confusing. [Radim Tolasz, Czech Republic]	Noted. Will improve clarity for FGD.
447	27	2	27	11	Nothing is said about frost days (lower panels of Fig. 3.10). You can say the largest differences between 1.5 and 2°C warmings occur in the polar regions. [David Docquier, Belgium]	Noted. Will add text on the frost days in the FGD.
448	27	2	27	11	Nothing is said about the main results of Fig. 3.10, i.e. the number of hot days increases (highest increase along the equator) and the number of frost days decreases (largest decrease in the Arctic). [David Docquier, Belgium]	Noted. Will add text on this figure in the FGD.
657	27	2	27	18	Is Figure 3.10 calculated by multi CMIP5 with RCP8.5? [Zong-Ci Zhao, China]	Yes. Will provide this information for the FGD.
697	27	2	27	18	Is Figure 3.10 calculated by multi CMIP5 with RCP8.5? [Zong-Ci Zhao, China]	Yes. Will provide this information for the FGD.
13351	27	2	27	2	Remove acronym NHD, as I could not see further use of this acronym in the chapter text. (also remove acronym in Figure 3.10) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be updated in the FGD.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16246	27	2	27	2	There needs to be an explanation of how NHD is defined--hot with respect to what? Going to the figure showing the very large increase in NHD in the tropics, some would say that ever day there is presently hot, so what does the sharp increase mean. If it means a shift that is large in normalized temperature (i.e., with respect to standard deviation), the standard deviation in the tropics is so small that one can get a large change in exceedance of, say, number of days above two standard deviations with only a small change in temperature. That mid-latitude and high latitudes have lower numbers of hot days suggests that normalized values are not being used when perhaps that should be shown--basically the changes in mid- and high-latitudes are taking temperatures (as opposed to normalized temperatures) to much more unusual conditions. There just has to be some explanation of what NHD means and how it is calculated--right here where it is being used and not off in some reference. [Michael MacCracken, United States of America]	Noted. Will add information on this in the suppl. Information of the FGD.
11700	27	2	27	2	"Hot days" are not defined before this sentence (or did I miss it)? [David Schoeman, Australia]	Noted. Will add information on this in the suppl. Information of the FGD.
13352	27	3	27	3	Remove acronym NFD, as I could not see further use of this acronym in the chapter text. (also remove acronym in Figure 3.10) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will consider this change for FGD.
13716	27	3	27	4	use acronyms, GMST & NHD [Elvira Poloczanska, Germany]	Noted. Will consider whether to keep acronyms for the FGD.
11701	27	6	27	9	This sentence is confusing. What is meant by the last phrase ("which nearly doubles a 2°C warming")? [David Schoeman, Australia]	Typo. Should add "which nearly doubles in a 2°C warming". Will be fixed in the FGD.
18005	27	9	27	9	The following statement "which nearly doubles a 2°C warming" can be misleading. Shouldn't it be written "which nearly doubles in a 2°C warming"? [Wilfran Moufouma Okia, France]	Noted. Will be fixed for FGD.
13353	27	12	27	18	Figure 3.10: remove longitude and latitude tick marks and labels in the maps (as unnecessary visual clutter) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be fixed for FGD.
13354	27	12	27	18	Figure 3.10: Give each row a heading to a highlight to the reader each row relates to hot days and frost days. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be updated in the FGD.
13355	27	12	27	18	Figure 3.10: High low temperature scale/legend may be more quickly understood if the legend is rotated to the vertical instead of horizontal. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be updated in the FGD.
13356	27	12	27	18	Figure 3.10: Separate out the 'difference' panel, e.g. by give providing more white space or a vertical line between it and the other two panels. Will then be easier for people to compare the 1.5 and 2.0 panels. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be updated in the FGD.
449	27	12	27	18	Fig. 3.10: Highlight somewhere in the caption or in the figure that the change in the number of frost days (lower panels) is negative. [David Docquier, Belgium]	Noted. Will be updated in the FGD.
7629	27	15			Figure 3.10 the colour scale goes a bit too dark as it is not possible to see the country outlines at the high end of the scale [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be updated in the FGD.
5271	27	15	27	15	is this average nr of hot/frost days per year? [Bart Van den Hurk, Netherlands]	Yes, this is correct. Will be indicated in the FGD.
10471	27	16	27	16	in caption to 3.10 should be "... (left) and 2°C (middle) GMST warming..." (middle not right) [Jonathan Lynn, Switzerland]	Noted. Will be updated for the FGD.
13875	27	20	27	21	As the global average contains delayed ocean warming the message sent by this statement is weakened. [Elvira Poloczanska, Germany]	Yes, this is the point.
14922	27	20	27	21	Similar results were found for the contiguous US as well. From Karmalkar and Bradley, 2017: 'The regional warming rates differ considerably across the contiguous US, but all regions are projected to reach 2°C about 10-20 years before the global mean temperature.' Citation: Karmalkar, A.V. and Bradley, R.S., 2017. Consequences of Global Warming of 1.5 C and 2 C for Regional Temperature and Precipitation Changes in the Contiguous United States. PloS one, 12(1), p.e0168697. [Ambarish Karmalkar, United States of America]	Karmalkar and Bradley 2017 is now cited on page 31. Does not seem necessary to cite again here.
12789	27	21	27	21	Could be said that in this study there is a clear warming amplification in summer over Southern Europe and in Winter over Northern Europe, consistent with previous results. It was also found that latent heat fluxes were enhanced in spring, further drying soils and triggering summer feedbacks. [Robert Vautard, France]	Noted. Will be considered for the FGD.
13876	27	25	28	15	For a more integrated assessment across WGI and wGII these two paragraphs could be in the human systems section 3.5.2 as human modification of environment influencing temperatures and human health are discussed (see your impacts definitions earlier) alternatively implications for impacts could be bought into other climate sections [Elvira Poloczanska, Germany]	Noted. We consider it useful to have this information in the present section.
5273	27	25	28	15	In this section I miss the effect of elevated temperatures on the reduction of exposure to extreme cold conditions [Bart Van den Hurk, Netherlands]	Noted. Will be made clearer in the FGD (but can be seen in Fig. 3.11 from SOD).
7250	27	26	27	27	change to 'ran a global climate model at 300km resolution, and found [Butt Nathalie, Australia]	This sentence was removed.
11982	27	26	27	27	CHANGE ....(2010) "ran" a global. ....and "found" that UHI.... [Paul Doyle, Canada]	This sentence was removed.
10895	27	26	27	29	Considering the limitations associated with the results of McCarthy et al (2010), it should be better fundamented why it is included as a reference. [Carolina Vera, Argentina]	Agree. We have removed the mentioned reference.
990	27	26	27	29	The cited paper has too many limitations to be involved into the report. In my opinion it shall be ignored. [Attila Buzási, Hungary]	Agreed. We have removed the mentioned reference.
450	27	27			This is unclear: UHI intensity decreases by 6% but could increase by 30%. Please clarify. [David Docquier, Belgium]	This sentence was removed.
16247	27	27	27	28	I do not understand the phrasing here "could increase by as much as 30% but on average decreased by 6%"--a clearer summarization of results is needed. [Michael MacCracken, United States of America]	This sentence was removed.
5272	27	29	27	29	If this study contains many errors, why include it in this report? [Bart Van den Hurk, Netherlands]	Agree. We have removed the mentioned reference.
991	27	31	27	33	Increase of built-up areas and rising car usage due to population growth shall be taken into account regarding UHI intensity. [Attila Buzási, Hungary]	Too detailed for the present text.
451	27	31	27	35	I do not understand these two sentences. [David Docquier, Belgium]	Not clear what the problem is. Please clarify.
7558	27	34	27	34	I suggest to include the following reference, Lemonsu et al. 2015, to the sentence : The first studies to look explicitly at these effects (Argüeso et al. 2015; Lemonsu et al. 2015 ; Suzuki-Parker et al. 2015) suggest the possibility that future global warming and urban expansion could lead to more extremes in heat stress conditions. Lemonsu, A., Vigié, V., Daniel, M., Masson, V. (2015). Vulnerability to heat-waves: impact of urban expansion scenarios on urban heat island and heat stress in Paris (France). Urban Climate, 14 , 586-605 doi: 10.1016/j.uclim.2015.10.007 [Julia Hidalgo, France]	Noted. Will consider the provided references for the FGD.
452	28	1	28	15	Shouldn't this paragraph be moved to Section 3.5.2 about the impact on urban areas? [David Docquier, Belgium]	Noted. We think that it is important to address climatic aspects in the present section.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10896	28	1	28	3	Include the definition of deadly heatwaves [Carolina Vera, Argentina]	Noted. Will be updated in the FGD.
16248	28	3	28	6	First, I'd suggest changing "identify" to "find"--but second I want to praise the way the results are presented, making clear that there are serious impacts at 1.5 C and comparing to the present. This type of comparison should be done more consistently. Also on line 6, change "assess" to "find" (or perhaps should be in past tense, so "found") [Michael MacCracken, United States of America]	Editorial. Thank you for positive comment.
12369	28	5	28	6	Matthews et al (2017) report a very robust difference between 1.5 and 2. Quote: "The high sensitivity to global temperature rise translates into a further doubling of global heat stress moving from 1.5 °C to 2 °C above PI (5.7 and 12 times greater than 1979– 2005, respectively), which from a human health perspective, provides a strong incentive for limiting global warming to the lower of these targets." [Bill Hare, Germany]	This depends on which measure is considered. Will clarify this further for the FGD.
992	28	9	28	10	Is there any data about the number of fatalities regarding heatwaves in Karachi and Kolkata? The magnitude of heatwaves can be better explained by using this information. [Attila Buzási, Hungary]	This information is not available to our knowledge.
10897	28	14	28	15	It does not seem the right place to include adaptation options as it is the matter of other chapters [Carolina Vera, Argentina]	Noted. We consider it useful to have this information in the present section, because it is related to physical feedback processes.
6830	28	15	28	15	A reference could be added to a recent study by Hamdi et al. 2015 on the future climate of Paris and Brussels for the 2050 horizon. Rafiq Hamdi, O. Giot, R. De Troch, A. Deckmyn, P. Termonia: Future climate of Brussels and Paris for the 2050s under the A1B scenario. Urban Climate 04/2015; 12. DOI:10.1016/j.uclim.2015.03.003. [Rafiq Hamdi, Belgium]	Noted. Will consider for FGD.
12792	28	16	28	16	The above section and the ones after on precip, drought etc would benefit from a short concluding and summarizing paragraph relating clearly what one expects for 1.5°C. Currently it is difficult to have a clear idea, after reading, of the most salient conclusions. [Robert Vautard, France]	Agreed. We have included a new subsection with a summary paragraph, both in section 3.3.2 and in section 3.3.3.
13877	28	18			Integrate with impact sections and reduced general climate discussions [Elvira Poloczanska, Germany]	Reject. General background on changes in precipitation is relevant for the understanding of changes in impacts.
13878	28	18			There is a lot of repetition of text from AR5 in these sections..could these be summarized? [Elvira Poloczanska, Germany]	Noted. Material is relevant and was already summarized. If more SR15-specific material is available for the FGD, this will be considered.
5719	28	18	28	18	Monsoon is a climate type, not precipitation. [Hong Yang, Switzerland]	precipitation deleted. "monsoon precipitation" replaced by "monsoon features".
654	28	18	36	5	Suggestion is to provide more studies and references, such as Guo X.J., Huang J.B., Luo, Y., Zhao Z.C. and Xu, Y., 2016, Projection of precipitation extremes for eight global warming targets by 17 CMIP5 models, Nat Hazards, doi: 10.1007/s11069-016-2553-0 [Zong-Ci Zhao, China]	Rejected. There are enough references. This reference is not added because it is not specific to 1.5C and 2C.
694	28	18	36	5	Suggestion is to provide more studies and references, such as Guo X.J., Huang J.B., Luo, Y., Zhao Z.C. and Xu, Y., 2016, Projection of precipitation extremes for eight global warming targets by 17 CMIP5 models, Nat Hazards, doi: 10.1007/s11069-016-2553-0 [Zong-Ci Zhao, China]	Rejected. There are enough references. This reference is not added because it is not specific to 1.5C and 2C.
13438	28	25	28	49	As for temperatures, update this subsection with recent publications after AR5 and SREX would be needed for the observed trends in regional precipitation and their attribution. [Seung-Ki Min, Republic of Korea]	Done, later in the text
16249	28	27	28	27	Does "largest signal of differences" refer to absolute amounts or percentage changes--this needs to be stated explicitly. [Michael MacCracken, United States of America]	"amount" added. Sentence improved
5274	28	29	28	29	add "forced with elevated greenhouse gas levels" [Bart Van den Hurk, Netherlands]	Done, further in the text
6192	28	32	28	42	Main tags are: i) shift of the regional seasonal precipitation and temperature maximum, ii) increasing a repeatability of local extreme precipitation sum. For East Europe (including Ukraine) recent decades (after 1990) were characterized by the instability of atmospheric processes, which was lead to increasing the number of days with extreme rainfalls in warm season (Tymofeyev et al., 2013). But the total amount of precipitation was close to the climatic norm or had weak negative trend in most regions. The main decrease in seasonal (JJA) precipitation was due to a fall in norm of precipitation in August (Martaz?nova et al., 2016). Tymofeyev V.E., Scheglov A., Skurotyana Yu. (2013) On the extreme summer precipitation in Ukraine over the last decades. 7th European Conference on Severe Storms (ECSS2013), 3 - 7 June 2013, Helsinki, Finland. Martaz?nova V., ?vanova E., Shcheglov O. (2016) The trend of the modern temperature and humidity regime of Ukraine to abnormality due to atmospheric processes in the summer season. Proceedings of UkrHMI. V. 268. P. 15-26 (in Russian). [Inna Semenova, Ukraine]	Agree but these references are not focus on 1.5C and 2C
16250	28	34	28	35	Regarding saying "likely" when one has 95% statistical confidence, is that not a bit cautious? After all, 95% implies the equivalent of being provided a 20 to 1 payback ratio for betting on the only horse in a horse race--there being very little chance of any other possibility. This seems to me hardly the way to convey the significance of information for the public and decision makers. [Michael MacCracken, United States of America]	Agree. Paragraph improved
5275	28	34	28	35	the nr of events exceeding the 95 percentile is always 5%. This sentence is wrong [Bart Van den Hurk, Netherlands]	Reject. The 95th percentile events are defined in a reference period, while the changes are assessed in a different period. This method of assessment is well established (see previous IPCC reports).
17202	28	34	28	42	I would suggest to replace the sentence "The SREX assessed" by "The IPCC SREX (Seneviratne et al. 2012) assessed" (line 34) and, on the contrary, to replace "The IPCC SREX (Seneviratne et al. 2012)" by "The SREX" (line 39) [Maria-Carmen Llasat, Spain]	Done
16251	28	37	28	39	I think a bit of explanation is perhaps needed here. The results show shifting precipitation belts, for example, so the outcomes for particular places/small regions can be of any sign. This should not be taken to mean (and one should not leave the implication that) no changes means nothing is happening in a region. Also, the only variable being considered seems to be total seasonal precipitation and there could well be changes in numbers of rain days, intensities of rainfall, interannual variability, etc. The rather dismissive statement here really gives no sense that the locations of no change or even negative change could well be indications of very significant overall change occurring. I recall one climate denier saying something like that ENSO had no effect on US precipitation, ignoring that El Nino and La Nina conditions caused quite contrasting geographic patterns of precipitation. [Michael MacCracken, United States of America]	Noted. Not enough time to address this comment and may be too detail for the present report. Will consider in the FGD.
19011	28	44	28	49	Please, in order to improve the analysis, include some considerations on West Africa, one region dealing with monsoon also [JACQUES-ANDRE NDIONE, Senegal]	Done. Sylla et al., 2015, 2016 and Jacob et al, 2017 added

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2019	28	44	28	49	disagreement with the argument as "low confidence in trends because of insufficient evidence"...in 2017 we saw an intensified monsoon in entire South Asia, including Bangladesh, which suffered from a historically devastating flood. The nature of rainfall was clearly identified as strong localized convective cell with "cloudburst", i.e. concentrated high intensity rainfall at one particular place. The observations are recorded by Bangladesh meteorological Department. I think by this time there are some literature available as well. In recent past the same trend has been observed in the region too. [Md. Sirajul Islam, Bangladesh]	The paragraph has been updated
7251	28	46	28	46	precipitation' not 'precipitations' [Butt Nathalie, Australia]	Done
453	28	53			Rephrase this sentence by briefly summarizing the results of Section 3.3.1.2 and Fig. 3.6 and putting these references in brackets. [David Docquier, Belgium]	sentence updated
5466	28	53	43	31	Considering the role of urban age, it will be important to identify how cities would be affected under 2°C and 1.5°C scenarios. Ost of the issues raised in these subsections fall under planetary boundaries.Johan Rockstrom's works would be useful [Aliyu Barau, Nigeria]	There is a box on cities and urban areas
7252	28	57	28	57	rainy' not 'rain' [Butt Nathalie, Australia]	Done
2033	29				In summer seasons, Presumably, Persian trough that now generally is a thermal pattern, gradually will dynamic and Asia's SW Monsoon can extend Northwest ward or novel Persian Monsoon create and eventually Mideast especially The Zagros Mountain regions will be wetter (Based on My researches so far has not published). [Mohammad Ahmadi, Iran]	Agree. Thank you for this information.
2919	29	3	29	5	Which time span? Second half of 20th century? In addition this discussion based on a single study is somewhat daring. [Sabine Wurzler, Germany]	Noted. Sentence has been revised and another study (Jacob et al.) has been cited.
6231	29	4			The phrase 'while precipitation decrease in - - -' is suggested to be rewritten as 'while a decrease in precipitation in - - -'. [Muhammad Mohsin IQBAL, Pakistan]	Done
17203	29	4	29	18	Figure 3.11 shows a differential behaviour for Mediterranean Europe, with no trend in 5-day maximum precipitation. Attending that the summer contribution to total precipitation is very little in this region, and that summer is characterized by short convective events that last less than 5 days, I would propose: a) to include a sentence in the paragraph about this anomalous general behaviour in the Mediterranean; b) to substitute "except Southern Europe in summer" by "except Southern Europe" or , better, to eliminate the text and reference to Vautard et al (2014) in lines 17-18 because it is already cited in the lines 4-5 of the same page [Maria-Carmen Llasat, Spain]	The paragraph has been updated
7253	29	5	29	5	have been reported' [Butt Nathalie, Australia]	Done
13259	29	7	29	18	Wei Zhang, Gabriele Villarini, Heavy precipitation is highly sensitive to the magnitude of future warming, Climatic Change Letters, in press. This referece carefully examined the responses of heavy precipitation to 1.5 and 2°C warming using NCAR low-warming experiments. It indicates remarkable differences in the frequency of global heavy precipitation at the end of 21st century. [Wei Zhang, United States of America]	Noted. Could not find this study and could thus not be implemented.
5871	29	7	29	8	I'm not sure if Rx5day is strictly "heavy precipitation". I'd rather say that Rx5day is a heavy precipitation episode or heavy rain spell. Rx1day suits better in the definition of "heavy precipitation". [Joan A. Lopez-Bustins, Spain]	Agree
18006	29	8	29	8	Is it "as function" or "as a function"? [Wilfran Moufouma Okia, France]	as function
4317	29	8	29	8	...global temperature warming... change in "...global temperature increase..." [teodoro georgiadis, Italy]	Done
16252	29	10	29	10	Need to state what the "mean response" is. [Michael MacCracken, United States of America]	average
5276	29	14	29	14	you can add a reference to Lenderink and van Meijgaard, 2008 (doi:10.1038/ngco262) [Bart Van den Hurk, Netherlands]	Noted. Will be considered for the FGD.
11983	29	17	29	17	CHANGE...(2014) "found" a robust..... [Paul Doyle, Canada]	Done
11075	29	17	29	18	Phrase says "Vautard et al. (2014) find a robust increase in heavy precipitation everywhere and in all seasons,.....", instead of "everywhere" it should probably be "everywhere in Europe" [Anna Sörenaason, Argentina]	Done
17258	29	17	29	18	font size [Maria Jesus Iglesias Briones, Spain]	Done
1422	29	17	29	18	Which target: +2C? +1,5C?=> is it worth quoting this kind of result if this is 'only' for +2C? [Philippe Roudier, France]	Noted. Will be considered for the FGD.
12790	29	18	29	18	Can be mentioned that this result is completely consistent with the analysis of Jacob et al 2014, REC, which used more recent scenarios (EURO-CORDEX) and a higher resolution (12km) [Robert Vautard, France]	Done
19012	29	20	29	41	Please, in order to improve the analysis regarding this paragraph, include some considerations on West Africa, one region dealing with monsoon also [JACQUES-ANDRE NDIONE, Senegal]	Done
7001	29	20	29	41	While papers on projected changes in the strength of monsoon are limited, there are some papers discussing the changes in monsoon rainfall: 1. Sharmila et al (2015): Future Projection of Indian Summer Monsoon Variability Under Climate Change Scenario: An Assessment From CMIP5 Climate Models. Global and Planet. Chng.,124, 62-78 2. Li et al (2017): Projections of South Asian Summer Monsoon Precipitation Based on 12 CMIP5 Models. Int. J. Clim., 37, 94-108 [Sai Ming Lee, China]	There are enough references. This reference is not added because it is not specific to 1.5C and 2C.
2920	29	20	29	41	What you write here can be further supported by mentioning again the low confidence problems regarding the trend in the measurements. [Sabine Wurzler, Germany]	Noted. Low confidence is indicated in the text, this seems sufficient.
454	29	20	29	41	Is it necessary to have such a long paragraph for monsoons here? I ask this question in large part due to the first sentence of this paragraph. [David Docquier, Belgium]	Sentence improved
11702	29	26	29	26	"Little" is confusing here, pick another adjective that is less ambiguous... [David Schoeman, Australia]	changed by "weak"
5872	29	27	29	30	This sentence is too long and unclear. Please split it up into two or three sentences. Please rewrite it. [Joan A. Lopez-Bustins, Spain]	Done
6232	29	35			SAMS also stands for South Asian Monsoon System. Please check if this abbreviation is used both for South American Monsoon System and South Asian Monsoon System? [Muhammad Mohsin IQBAL, Pakistan]	Agree. But SAMS was clearly defined the first time it used
9480	29	35	29	36	Rather than use the words "decrease" and "increase" to describe changes in timing I suggest it would be clearer (and unambiguous) to use the words "earlier" and "later". i.e. " They also found that an ensemble mean onset date of the SAMS which was 17 days earlier, and a demise date 17 days later, by 2045-50". [David Wratt, New Zealand]	Done
10898	29	37	29	38	The rainfall over that particular region of southeastern South America is not considered as "monsoon- like". For a example lacks of wet/dry season. [Carolina Vera, Argentina]	Done. Sentence updated

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13439	29	38	29	41	This conclusion is made based on two studies only, which were published in 2013. Please add more recent studies including those cited in AR5 and revise this conclusion. There are many studies on changes in monsoon characteristics including onset, withdrawal, area, intensity, and extremes. [Seung-Ki Min, Republic of Korea]	Recent studies have been added in different part of the subsections
5108	29	54	30	1	Is there any means of discussing at further length changes in the nature of rainfall -- rather than solely mean precipitation -- given the impacts on natural and human ecosystems of changes in the nature (intensity, frequency, and timing) of rainfall, which can be masked by a focus on mean precipitation levels? [Tonya Rawe, United States of America]	Noted. This is a good comment, but there is not a lot of literature on this. Will consider this point again for the FGD.
455	30				Fig. 3.11: Same remarks as Fig. 3.8. [David Docquier, Belgium]	Agree. Figure improved
13357	30	1	30	4	Figure 3.11: figure resolution is currently very poor. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Agree. Figure improved
13358	30	1	30	4	Figure 3.11: Chunking information could help make this complex figure more easy to understand (see related comment to Figure 3.8) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Agree. Figure improved
11984	30	2	30	2	Fig. 3.11 Good but very small font. [Paul Doyle, Canada]	Editorial
10016	31		31		Figure 3.12; P-E is a good contribution to the report. It represents both the water loss and water availability. [Nazan AN, Turkey]	Thank you!
1424	31	1			please define which kind of drought: agricultural, meteorological, hydrological? It seems that you are mixing meteorological and agricultural droughts in this section, but you do not focus on hydrological ones [Philippe Roudier, France]	Noted. Will be better clarified for the FGD.
6174	31	1	31	39	Section 3.3.4.1 describes the findings of observational droughts and dryness without specifying what type of drought or the different indices, which are then mentioned in the consecutive section 3.3.4.2 (lines 32-39). I suggest introducing this enumeration of different indices in section 3.3.4.1, related to observational findings. [Vanessa Pántano, Argentina]	Noted. Will be better clarified for the FGD.
1425	31	1	32	23	if you also want to include hydrological droughts, please have a look at our IMPACT2C paper: Roudier et al (2015), Projections of future floods and hydrological droughts in Europe under a +2°C global warming, Climatic Change [Philippe Roudier, France]	Noted. Will be considered for the FGD.
17206	31	1	32	15	I have seen that chapter 3.3 do not include any reference to forest fires. In spite the human factor (like the floods case) they are mainly related with climate factors and climate change will impact on burned area. In case that not any new subchapter devoted to forest or wild fires could be introduced now, I would propose to include a reference to them in the chapter devoted to droughts. The last paper of Turco et al (2017) offers a relationship between forest fires and drought in Mediterranean Europe, the same author published a paper in 2016 about forest fires trends and another one on future scenarios. Complete references are:Turco, M., M.C. Llasat, J. von Hardenberg, A. Provenzale, 2014. Climate change impacts on wildfires in a Mediterranean environment. Climatic Change. Published on-line 02 July 2014. Climatic Change (2014) 125:369–380. DOI 10.1007/s10584-014-1183-3; Turco, M., J. Bedia, F. Di Liberto, P. Fiorucci, J.von Hardenberg, N. Koutsias, M. C. Llasat, F. Xystrakis, A.Provenzale, 2016. Decreasing Fires in Mediterranean Europe. PLoS ONE 11(3): e0150663. doi:10.1371/journal.pone.0150663; 88. Turco, M., J. von Hardenberg, A. AghaKouchak, M.C. Llasat, A.Provenzale, and R.M. Trigo, 2017. On the key role of droughts in the dynamics of summer fires in Mediterranean Europe. Scientific Reports-Nature. Scientific RepoRts [7:81]   DOI:10.1038/s41598-017-00116-9. Other relevant paper on this matter published after the AR5 is Urbiet, I. R. et al. Fire activity as a function of fire-weather seasonal severity and antecedent climate across spatial scales in southern europe and pacific western usa. Environmental Research Letters 10, 114013 (2015). [Maria-Carmen Llasat, Spain]	Noted. Not sure that this belongs in the scope of Section 3.3. Will be considered again for FGD.
16253	31	5	31	5	When text says "more intense and longer" is the conclusion for both conditions simultaneously? Due to the warmer conditions, one could imagine having more intense droughts (lower soil moisture) even if the length of the occurrence is shorter. [Michael MacCracken, United States of America]	The average tendency to drying leads both to more intense but also longer drought. Can try to better clarify for the FGD if literature is available then.
3871	31	14	31	14	Strong evidence for the attribution of drought to anthropogenic greenhouse gas emissions comes from North America. Therefore, it is recommended to add something like "In western North America, two droughts are attributable in part to the higher temperatures of human-caused climate change, which accounted for one-tenth to one-fifth of the soil dryness of the 2012-2016 California drought (Williams et al. 2015) and 17-50% of streamflow reductions in the 2000-2014 Colorado River Basin drought (Udall and Overpeck 2017)." Williams, A.P., R. Seager, J.T. Abatzoglou, B.I. Cook, J.E. Smerdon, and E.R. Cook. 2015. Contribution of anthropogenic warming to California drought during 2012–2014. Geophysical Research Letters 42: 6819-6828. Udall, B. and J. Overpeck. 2017. The twenty-first century Colorado River hot drought and implications for the future. Water Resources Research 53: 2404-2418. [Patrick Gonzalez, United States of America]	Will consider these publications for the FGD.
17349	31	16	31	22	the role of human emissions o subn stantially increasing the probability of drought years in the Middle East is proposed to be mentioned [Saviz Sehatkashani, Iran]	Please provide a suitable reference on this point.
6643	31	16	31	22	I presume that a noticeable part of this uncertainty comes from other intra-regional relevant factors that are not easy to modelled at this working scale, as the topography, hidden rainfall, distance to sea, rain- shadow effects, changes in SST, etc [Castor Muñoz Sobrino, Spain]	Yes, this is correct. But too detailed to add text on this point.
12791	31	18	31	18	The difficulty of detecting and attributing long-term precipitation low extremes in EuroMed region is shown in Hauser et al (2017, in press) [Robert Vautard, France]	Noted. Will be added for the FGD.
11073	31	25	32	15	idem comment No 1. [Anna Sörenaon, Argentina]	Note sure which comment this is referring to.
6233	31	32			Please add 'of in between 'evaluation' and 'differences'. [Muhammad Mohsin IQBAL, Pakistan]	Editorial
10388	31	32	39	39	It has to be mentioned that the study by Lehner et al. 2017 is based on a single realization instead of a multi-model ensemble. The results of this study are thus highly uncertain, which poses a limitation on the conclusions. [Stephan Thober, Germany]	This will be clarified in the FGD.
11985	31	34	31	34	Wartenburger et al. 2017 ??? Has this ref been published? (see double refs in References p. 161. Annoying.) [Paul Doyle, Canada]	Yes, it is published now. Editorial.
10472	31	34	31	36	are they different Wartenburger papers or should all be in review? [Jonathan Lynn, Switzerland]	Editorial
18007	31	35	31	36	Could you please clarify the reference "Wartenburger et al.?" What year? [Wilfran Moufouma Okia, France]	Editorial
13717	31	36	31	38	Punctuation needs revision [Elvira Poloczanska, Germany]	Editorial
6644	31	37	31	37	Runoff is other good example of intra-regional scale source of uncertainty. Worldwide, annual runoff typically depends on the basin orientation respect the humid winds, vegetation cover and other local factors. [Castor Muñoz Sobrino, Spain]	Agreed. Can you suggest a reference for this point? Will possibly consider for FGD.
5277	31	38	31	38	Are they overall consistent in showing low signal/noise ratios? [Bart Van den Hurk, Netherlands]	Yes, also. This can be seen in the new Fig. 3.16.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9246	31	41			Figure 3.12 from (Greve et al. 2017), derives... is an odd sentence construction. [Marie-Jeanne S. Royer, Canada]	Editorial
456	31	41			Rephrase: 'from Greve et al. (2017) derives'. [David Docquier, Belgium]	Editorial
457	31	41			The caption of Fig. 3.12 refers to Greve (submitted) and not Greve et al. (2017). [David Docquier, Belgium]	Editorial
13718	31	41	31	41	should say "Figure 3.12 from Greve et al. (2017), ..." [Elvira Poloczanska, Germany]	Editorial
10473	31	41	31	41	"(from Greve et al.)" not "from (Greve et al.)" from should be inside brackets right? [Jonathan Lynn, Switzerland]	Editorial
5873	31	41	31	41	Please substitute Greve et al. 2017 with Greve et al. submitted [Joan A. Lopez-Bustins, Spain]	Editorial
7254	31	50	31	50	shows' not 'show' [Butt Nathalie, Australia]	Editorial
10474	31	50	31	50	are the roman (i) and (ii) necessary [Jonathan Lynn, Switzerland]	Editorial
13719	31	54	31	54	should say "from Wartenburger et al. (in review)..." [Elvira Poloczanska, Germany]	Editorial
5874	31	54	31	57	This is such a long sentence. It is difficult to follow the content. Please rewrite it. [Joan A. Lopez-Bustins, Spain]	Editorial
11986	31	57	31	57	SHORTEN "We note that these two further"...to..."These two"..... [Paul Doyle, Canada]	Editorial
6175	32				Minor comment:The Caption of Figure 3.12 should specify what is the difference between light grey and dark grey [Vanessa Pántano, Argentina]	Noted. Will be improved for FGD.
20563	32				Figure 3.12. The definition of this figure needs to be increased, at this moment is hard to read. Also remember that all figures and tables should be able to be understood without having to read the accompanying text, they should be self-evident. To add: this occurs across other figures and I assume it will be corrected in a further draft of this document [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will be improved for FGD.
3542	32				figure 3.12 is too small and should have a full page, since figures should be self explaining, please defien wht P-E is [Sylvia Sander, Monaco]	Noted. Will be improved for FGD.
10475	32		32		not sure what this is showing me [Jonathan Lynn, Switzerland]	Size will be increased and caption improved for the FGD.
9985	32	1	32	37	It would be better to say "the Mediterranean Basin" instead of "the Mediterranean" while we are talking about this domain [Mustafa Tufan Turp, Turkey]	Editorial. We mean "Mediterranean region".
7255	32	2	32	2	risk' not 'risks' [Butt Nathalie, Australia]	Editorial
13879	32	3	32	3	Mediterranean region or sea? [Elvira Poloczanska, Germany]	Mediterranean region.
13720	32	5	32	5	highly uncertain should be in italics [Elvira Poloczanska, Germany]	Rejected. This is not a calibrated assessment.
6193	32	7	32	15	Main tag: redistribution of projected droughts within warm season. In south part of East Europe (including Ukraine) are no significant trends in projected droughts (up to 2050). But is expected a redistribution number of drought within the warm season. The increasing of the summer-autumn droughts (August-October) and reducing of summer droughts (June-August) are projected (Semenova, 2015 a, b). Semenova I.G. (2015 a). The spatial and temporal distribution of droughts in Ukraine under the future climate changes. Physical geography and geomorphology. V. 1 (77). P. 144-151 (in Ukrainian). Semenova I.G. (2015 b) The risk of drought in Ukraine under changing climate in the future medium term. International Scientific Conference: Our Common Future Under Climate Change. 7-10 July 2015, Paris, France. - Abstract Book. - P. 198. [Inna Semenova, Ukraine]	Too detailed for the present text.
17350	32	7	32	8	strong increases in dryness and decreases in water availability in the middle East when shifting from a 1.5°C to a 2°C global warming is proposed to be mentioned. [Saviz Sehatkashani, Iran]	Noted. Will be considered for FGD.
459	32	7	33	15	Make a link to Fig. 3.6 related to drying in the Mediterranean region. [David Docquier, Belgium]	Noted. Will be added for the FGD.
5875	32	9	32	11	The following paper also projected for the end of the century a major dryness in the Mediterranean catchments with major GHG emissions (A2) than B1 scenario: Lopez-Bustins et al. (2013) Future variability of droughts in three Mediterranean catchments. Natural Hazards 69: 1405-1421 [Joan A. Lopez-Bustins, Spain]	Noted. Will be considered for the FGD.
11987	32	9	32	21	Same problem with Greve et al. (2017 or 2014???) as for Wartenburger. [Paul Doyle, Canada]	Editorial
11703	32	12	32	12	"hot spot of dryness change" is a bit awkward...consider revising; also, "hotspot" is a single word...change throughout... [David Schoeman, Australia]	Editorial
8825	32	13	32	14	There is no section 3.3.1.13 [Lubna Alam, Bangladesh]	The sections were changed, not relevant anymore.
13721	32	14	32	14	shouldn't it say Section 3.3.13 (instead of 3.3.1.13) [Elvira Poloczanska, Germany]	Editorial
6309	32	14	32	14	) --> ) [Dmitry L. Musolin, Russian Federation]	Editorial
6646	32	15	32	20	Besides, runoff in a certain basins strongly depends of the degree of preservation of the vegetation cover and vegetation type. So, a particular basin may be disconnected from regional or global trends (as suggests the following paragraph). [Castor Muñoz Sobrino, Spain]	Noted. May provide more background on this point in the FGD.
7453	32	16	32	17	Please consider restructuring Figure 3.12 to improve readability and font size. [Øyvind Christophersen, Norway]	Noted. Will consider using a landscape format for FGD.
458	32	16	32	21	Fig. 3.12: Although I prefer the portrait format of this figure compared to Fig. 3.8, panel plots are very hard to read. Consider enlarging the text. Otherwise, there is no point to show the panels. [David Docquier, Belgium]	Noted. Will consider using a landscape format for FGD.
17662	32	16	32	23	Figure 3.12 is not clear, higher resolution image should be supplied [Perdinin Perdinin, Indonesia]	Noted. Will consider using a landscape format for FGD.
12885	32	18			In Figure 3.12 I don't see a graph pointing to west coast region of South America [Jorge Carrasco, Chile]	Noted. This indeed needs to be fixed. Will be done for the FGD.
5278	32	18	32	18	caption is incomplete; give info on lines and shading in the subpanels [Bart Van den Hurk, Netherlands]	Noted. Will be improved for FGD.
658	32	18	32	21	all climate models and all scenarios should give how many models and SRES or RCP scenarios or pathways. [Zong-Ci Zhao, China]	Noted. Will be considered for the FGD.
10899	32	18	32	21	Grey shading description should be included in the figure caption as well as the definitions of the likelihood categories. White areas are defined as "no change", but how are they distinguished from "uncertain change" regions? [Carolina Vera, Argentina]	Noted. Will be considered for FGD.
698	32	18	32	21	all climate models and all scenarios should give how many models and SRES or RCP scenarios or pathways. [Zong-Ci Zhao, China]	Noted. Will be considered for the FGD.
5876	32	21	32	21	Please substitute Greve submitted with Greve et al. submitted [Joan A. Lopez-Bustins, Spain]	Editorial
6800	32	24	33	44	The section on runoff and flooding addresses exclusively continental runoff and river flooding. Because flooding on coastal areas is major hazard, often associated with significant human losses and devastating socio-economic impacts, it would be appropriate here to clearly identify the type of flooding addressed, i.e. river flooding. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account -The section was renamed as 'Runoff and river flooding'
2020	32	24	33	44	Even though South Asia is considered as one of the most vulnerable parts in the world due to floding, not enough literature seems reviewed or less attention is paid on trends, observation and projection of flooding nature for the region. Request to go through more detail, especially for flooding issue in the region. [Md. Sirajul Islam, Bangladesh]	Taken into account - The subsection was rewritten. Regional details were added when possible according to availability of literature relevant to 1.5C global warming

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1423	32	25			whole section: what is the difference with section 3.4.4.1.2? [Philippe Roudier, France]	Taken into account - Some paragraphs of Section 3.4.4.1.1 and 3.4.4.1.2 were moved to Section 3.3.5
20564	32	26			There is a repetition of the word low. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Editorial – copyedit to be completed prior publication
460	32	26			Rephrase: 'low confidence for'. [David Docquier, Belgium]	Editorial – copyedit to be completed prior publication
7256	32	26	32	26	correct 'low confidence low' [Butt Nathalie, Australia]	Editorial – copyedit to be completed prior publication
13445	32	26	32	26	repeated "low confidence low" please change. [Vidyunmala Veldore, Norway]	Editorial – copyedit to be completed prior publication
10385	32	26	32	26	delete second "low" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Editorial – copyedit to be completed prior publication
13722	32	26	32	26	...low confidence for... [Elvira Poloczanska, Germany]	Editorial – copyedit to be completed prior publication
993	32	26	32	26	An erratum can be found: "low" has been mentioned twice in the sentence. [Attila Buzási, Hungary]	Editorial – copyedit to be completed prior publication
5877	32	26	32	26	Please delete one "low". [Joan A. Lopez-Bustins, Spain]	Editorial – copyedit to be completed prior publication
6176	32	26	32	30	This paragraph indicates low confidence regarding global behavior of precipitation and floods. Since both variables are characterized by great spatial variability, I consider there is no need to try to give global results. For example, the previous section (3.3.4.1) describes the findings regarding droughts at a regional scale without giving global synthesis. Then, I suggest removing this paragraph (lines 26-30, page 3-32). The rest of the section specifies regional findings, which is more appropriate for this type of variables. [Vanessa Pántano, Argentina]	Rejected - AR5 conclusions are the starting point for this Special Report. This paragraph summarizes the main conclusions of AR5 regarding river discharges and floods.
6645	32	26	32	30	Obviously rivers discharge has been (regulated and) modified by dams everywhere during the 20th century. Might be flooding of coastal areas promoted by storms, hurricanes, etc also included in this paragraph? [Castor Muñoz Sobrino, Spain]	Rejected – outside the scope of the section
11988	32	27	32	27	DELETE second "low" [Paul Doyle, Canada]	Editorial – copyedit to be completed prior publication
3654	32	32	33	13	Section 3.3.5 ("Runoff and flooding") contains some huge (and potentially embarrassing) errors that must be corrected. In particular, river flow has NOT decreased in the northwestern US and western Canada, nor is it expected to in the future. In fact, a large number of studies, by many authors, using both statistical analysis of observational datasets and model-based projections of future streamflows under climate change, have clearly found that mean annual flow (and total annual flow volume) for most rivers in this region have either been stationary or have increased slightly, and will be expected to continue that behavior into the future. Flow regimes and timing have been changing, due mainly to a higher proportion of winter precipitation falling as rain instead of snow. So summer flows have been declining, but winter flows have been increasing. Possible exceptions are the Saskatchewan Basin, and a small area on the western flanks of the Cascade Range in Washington State. In Canada west of the Rockies - a massive region that covers more than 4x the area of Great Britain - see (and cite) the work of Schnorbus et al. (2014, Hydrological Processes, 28: 1170-1189), Fleming and Barton (2015, Journal of the American Water Resources Association, 51: 833-841), and Fleming and Weber (2012, Journal of Hydrology, 470-471: 36-54). For western Canada east of the Rockies - that is, the prairie provinces, which appear to have a different climate change response - see (and cite) St. Jacques et al. (2010, Geophysical Research Letters, 37, doi:10.1029/2009GL042045). For the northern 1/2 to 2/3 or so of the western US, see (and cite) the comprehensive US Bureau of Reclamation study of climate change in the US west, which in turn cites many other relevant studies: Reclamation, SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water, Report to Congress, 2011. [Sean Fleming, United States of America]	Taken into account - The subsection was rewritten. Regional details were added when possible according to availability of literature relevant to 1.5C global warming
10900	32	36	33	7	The assessment made here of both precipitation and runoff observed changes should be coherent with the observed precipitation changes assessed in 3.3.3.1 [Carolina Vera, Argentina]	Taken into account - The subsection was rewritten
13880	33	1			I cannot discern what the focus of box 3.2 is from this placeholder. Most of these variables have been discussed in detail above so do not need duplicated focus [Elvira Poloczanska, Germany]	Taken into account - Box 3.2 has been removed.
16254	33	3	33	5	It somehow needs to be indicated that there are uncertainties associated with these oscillations and variations, including whether they are really purely internal or perhaps excited by natural or even human-induced factors. Given there is no real mechanism for these that we are near to as confident of as GHGs, and that these features could also be being influenced by human-induced climate change, I'd suggest some sort of greater caveat here than "probably resulted from". [Michael MacCracken, United States of America]	Taken into account – text revised. "probably resulted from" was changed to "could have resulted from"
1426	33	7			This is about projections while the previous sentence is about observation analysis. This is a bit confusing. [Philippe Roudier, France]	Taken into account – text revised
1427	33	7	33	13	Is it not more relevant to detail impacts in terms of temperature change, for ex: "under a +2C warming, they found" instead of RCPs? [Philippe Roudier, France]	Taken into account – The paragraph was removed
1428	33	7	33	13	Please have a look at: Roudier et al (2015), Projections of future floods and hydrological droughts in Europe under a +2°C global warming, Climatic Change [Philippe Roudier, France]	Taken into account -Reference added
1429	33	7	33	13	Please have a look at: Roudier et al (2014), Climate change impacts on runoff in West Africa: a review, HESS [Philippe Roudier, France]	Taken into account -Reference added
10389	33	7	33	13	Studies presenting results for different emission scenarios (e.g., RCP4.5 and RCP8.5) provide no information with respect to a 1.5 and 2 degree global warming because different emission scenarios exhibit a wide range of model-dependent temperature increases. These studies (i.e., Alkama et al. 2013 and Koirala et al. 2014) should not presented in this detail. Instead, the text on studies investigating the difference between 1.5 and 2 degree should be expanded. [Stephan Thober, Germany]	Accepted – text revised. As new literature was available for the SOD, the text was revised and these references were omitted
5878	33	8	33	8	I'd recommend to have a look at the following paper where a significant decrease in runoff is projected for the end of the century over the western Mediterranean basin: Pascual et al. (2015) Impacts of climate change on water resources in the Mediterranean Basin: A case study in Catalonia, Spain. Hydrological Sciences Journal, doi:10.1080/02626667.2014.947290 [Joan A. Lopez-Bustins, Spain]	Accepted-text revised. The Pascual et al (2015) reference was not included instead other references relevant to the 1.5C world were added
7727	33	9	33	10	It is herein stated "additionally over South American and Africa, there is no consensus on the sign of change" that statement is referring to runoff and flooding. This statement is not entirely correct. Most rivers in West Africa are now brown from silting. Cultural factors (deforestation and poor management of scraped terrain) have combined with increased rainfall intensity to erode and move more debris to streams, rivers and lakes. This is very well documented in literature. [Hilary Inyang, Nigeria]	Taken into account – text revised
7257	33	15	33	15	land-use/land-cover change' not 'changes' [Butt Nathalie, Australia]	Editorial – copyedit to be completed prior publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3655	33	15	33	20	The hydrologic impacts of forest and grassland fires are probably worth mentioning here - certainly an increasing issue in western North America [Sean Fleming, United States of America]	Taken into account - text revised. A new sentence and references were added accordingly.
17204	33	15	33	35	I would recommend to read the paper from Hall et al (2014) that offers a complete state of the art to better understanding of flood regime changes and their drivers as well as the trends found in Europe. It will be useful to complete the paragraph about human influences as well as the following one about trends. Particularly, the text "In Europe, flood peaks with return periods above 100 years are projected to double in frequency during the next three decades (Alfieri et al. 2015)" can drive to a wrong idea about the present and future situation in Europe, where a no common trend is found. The complete reference (open access) is: Hall, J., B. Arheimer, M. Borga, R. Brázdil, P. Claps, A. Kiss, T. R. Kjeldsen, J. Kriau?i?nien?, Z. W. Kundzewicz, M. Lang, M. C. Llasat, N. Macdonald, N. McIntyre, L. Mediero, B. Merz, R. Merz, P. Molnar, A. Montanari, C. Neuhold, J. Parajka, R. A. P. Perdigão, L. Plavcová, M. Rogger, J. L. Salinas, E. Sauquet, C. Schär, J. Szolgay, A. Viglione and G. Blöschl, 2014: Understanding Flood Regime Changes in Europe: A state of the art assessment. Hydrol. Earth Syst. Sci., 18, 2735-2772, 2013, www.hydrolog-earth-syst-sci.net/18/2735/2014/doi:10.5194/hess-18-2735-2014A. [Maria-Carmen Llasat, Spain]	Taken into account - text revised. The reference was added.
1	33	22	33	25	Alfieri et al. (2015) is a continental assessment over most of Europe, hence the text should read: "Most recent analyses of trends and projections in flooding and extreme runoff are limited to basin or country scales (Camilloni et al. 2013; Huang et al. 2015b; Mallakpour and Villarini 2015; Aich et al. 2016; Stevens et al. 2016) with few at global or continental scales (Hirabayashi et al. 2013; Dankers et al. 2014; Asadieh et al. 2016; Dai 2016; Alfieri et al. 2015a, 2015b, 2017)." [Lorenzo Alfieri, Italy]	Taken into account – text revised
17205	33	22	33	44	I would suggest the paper from Kundzewicz et al, 2017 that offers a good and deep approach about the different flood hazard projections in Europe, supported by a robust bibliography. The complete reference is: Z. W. Kundzewicz, V. Krysanova, R. Dankers, Y. Hirabayashi, S. Kanae, F. F. Hattermann, S. Huang, P. C. D. Milly, M. Stoffel, P. P. J. Driessen, P. Matczak, P. Quevauviller & H.-J. Schellnhuber (2017) Differences in flood hazard projections in Europe – their causes and consequences for decision making, Hydrological Sciences Journal, 62:1, 1-14, DOI: 10.1080/02626667.2016.1241398 [Maria-Carmen Llasat, Spain]	Taken into account -Reference added
10386	33	22	33	44	A study on European high flows and floods has been conducted: Thober S, Kumar R, Wanders N, Marx A , Pan M , Rakovec O, Samaniego L, Sheffield J, Wood EF, Zink M, "Multi-model ensemble projections of European river floods and high flows at 1.5, 2, and 3 degree global warming", submitted to Env. Research Letters (July 2017). This study evaluated a multi-model ensemble of 5 Global Climate Models (GCMs) and 3 Hydrologic Models (HMs) at a 5 km resolution over entire Europe. Overall, changes in high flows (Q10) and floods (median of 30-year annual maximum daily streamflow) are increasing with the magnitude of global warming. The Mediterranean is identified as a hotspot of decreases in high flows and floods from -10.6% at 1.5, -12% at 2, to -30% at 3 degree global warming. Small changes (< ±10%) are observed for river basins in Central Europe and the British Isles under different levels of warming. Projected higher annual precipitation increases high flows in Scandinavia, but reduced snow water equivalent decreases flood events in this region. In general, changes between present-day conditions and a 1.5 degree global warming are larger and statistically more robust than changes between 1.5 and 2 degree global warming. The contribution by the GCMs to the overall uncertainties of the ensemble is in general higher than that by the HMs. The latter, however, exceed GCM uncertainty in the Mediterranean and Scandinavia, where the results are sensitive to the representation of hydrologic processes such soil water redistribution and snow melt. [Stephan Thober, Germany]	Taken into account -Reference added
1430	33	24			Please have a look at: Roudier et al (2015), Projections of future floods and hydrological droughts in Europe under a +2°C global warming, Climatic Change [Philippe Roudier, France]	Taken into account -Reference added
2	33	25	33	25	Just a clarification related to the comment #1 above, the references by Alfieri et al (2015a) and (2015b) are: Alfieri, L., Burek, P., Feyen, L. and Forzieri, G.: Global warming increases the frequency of river floods in Europe, Hydrol Earth Syst Sci Discuss, 12(1), 1119–1152, doi:10.5194/hessd-12-1119-2015, 2015a. Alfieri, L., Feyen, L., Dottori, F. and Bianchi, A.: Ensemble flood risk assessment in Europe under high end climate scenarios, Global Environmental Change, 35, 199–212, doi:10.1016/j.gloenvcha.2015.09.004, 2015b. In details, Alfieri et al. (2015a) is an assessment focused on flood hazard (i.e., discharge) while Alfieri et al. (2015b) includes an impact assessment by combining the hazard with a high resolution inundation model, and with information on exposure and vulnerability to assess the flood risk. [Lorenzo Alfieri, Italy]	Taken into account -Reference added/corrected
3	33	30	33	30	Adding some information from Alfieri et al (2015b), the text here should read: "[...] decades under RCP 8.5 (Alfieri et al., 2015a). Consequent estimates of population affected and direct flood damages indicate that by the end of the century the socio-economic impact of river floods in Europe is projected to increase by an average 220% due to climate change only (Alfieri et al., 2015b)." [Lorenzo Alfieri, Italy]	Taken into account - Socioeconomic impacts of floods are included

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4	33	30	33	30	Following from the previous comment #3, here a suggested addition relevant to impact assessments at 1.5C in Europe: "Projected flood risk were then analyzed to assess the socio-economic impacts of river floods in Europe at different levels of global warming (Alfieri et al., 2017b). In the reference scenario (1976-2005) about 220,000 people are affected annually by river floods in Europe, which rises to 480,000 at 1.5°C global warming. With 2°C warming this amount is slightly higher to equal 510,000, whereas under 3°C warming more than 600,000 people will be annually under risk of flooding. Direct economic losses from flooding show a similar trend, with expected annual damages projected to rise from €5.3 billion/year in the reference scenario to €11 billion/year, €12 billion/year and €14.5 billion/year respectively under 1.5, 2, and 3°C warming compared to pre-industrial levels." The reference for Alfieri et al. (2017b) is Alfieri L, Dottori F, and Feyen L.: Flood impact assessment for Europe in view of climate change, Deliverable 7 of the project PESETA3: Final report for DG CLIMA, JRC Technical Reports, 2017 (in review). [Lorenzo Alfieri, Italy]	in Section 3.4
7728	33	30	33	35	There is inconsistency in the statements tied to findings about flood patterns observed/expected in Africa here. There is reference to expected high frequency of floods in eastern Africa (Hirabayashi, et al., 2013) but at the same time there is an attribution of a contracting finding in the same paper authored by the same researchers as stated in lines 34-35. This needs to be corrected or put in a clearer context. [Hilary Inyang, Nigeria]	Taken into account - text revised. The paragraph was rewritten
11704	33	31	33	39	There is repetition of text here; resolve [David Schoeman, Australia]	Taken into account - text revised. The paragraph was rewritten
1431	33	32	33	32	what does this mean? Everywhere in the world there will be x2 flood risk? This does not make sense [Philippe Roudier, France]	Taken into account - text revised. The paragraph was rewritten
17259	33	32	33	39	L32-34 and L37-39 almost repeat the same words [Maria Jesus Iglesias Briones, Spain]	Taken into account - text revised. The paragraph was rewritten
20565	33	34		35	The last sentence of this paragraph is hard to understand. It happens in other instances. I assume there will be occasions for proof reading of the whole document. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - text revised. The paragraph was rewritten
9247	33	34	33	35	Sentence construction makes the intended meaning unclear. Do you mean to say that no statistically significant changes are expected in Africa and the northern half of the Andes? [Marie-Jeanne S. Royer, Canada]	Taken into account - text revised. The paragraph was rewritten
6177	33	34	33	35	Minor comment: The sentence is not clear, it seems something is missing [Vanessa Pántano, Argentina]	Taken into account - text revised. The paragraph was rewritten
7258	33	34	33	35	revise last sentence of the para for sense [Butt Nathalie, Australia]	Taken into account - text revised. The paragraph was rewritten
5279	33	34	33	35	unclear sentence [Bart Van den Hurk, Netherlands]	Taken into account - text revised. The paragraph was rewritten
6624	33	34	33	35	The sentence is unclear. [Barros Nieves, Spain]	Taken into account - text revised. The paragraph was rewritten
6626	33	34	33	35	The sentence is unclear. [Barros Nieves, Spain]	Taken into account - text revised. The paragraph was rewritten
1432	33	37			Please have a look at: Donnelly et al (2017) Impacts of climate change on European hydrology at 1.5, 2 and 3 degrees mean global warming above preindustrial level, Climatic change [Philippe Roudier, France]	Taken into account - Reference added
10390	33	37	33	44	The section on 1.5 has to be expanded by studies conducted within the IMPACT2C, ISIMIP, and HapPI-MIP projects, but also other projects such as HOKLIM ( <a href="http://www.ufz.de/hoklim">http://www.ufz.de/hoklim</a> ). [Stephan Thober, Germany]	Taken into account - text revised. The paragraph was rewritten
5750	33	37	33	47	Study on low flows under 1.5, 2 and 3 degree warming covering Europe: Marx, A., Kumar, R., Thober, S., Zink, M., Wanders, N., Wood, E. F., Ming, P., Sheffield, J., and Samaniego, L.: Climate change alters low flows in Europe under a 1.5, 2, and 3 degree global warming, Hydrol. Earth Syst. Sci. Discuss., <a href="https://doi.org/10.5194/hess-2017-485">https://doi.org/10.5194/hess-2017-485</a> , in review, 2017. The results (available for the IPCC Europe regions) show that the change signal amplifies with increasing warming levels. Low flows decrease in the Mediterranean, while they increase in the Alpine and Northern regions. In the Mediterranean, the level of warming amplifies the signal from -12% under 1.5 K to -35% under 3 K global warming largely due to the projected decreases in annual precipitation. In contrast, the signal is amplified from +22% (1.5 K) to +45% (3 K) in the Alpine region because of the reduced snow melt contribution. The changes in low flows are significant for regions with relatively large change signals and under higher levels of warming. Nevertheless, it is not possible to distinguish climate induced differences in low flows between 1.5 and 2 K warming because of the large variability inherent in the multi-model ensemble. [Andreas Marx, Germany]	Taken into account - Reference added
5280	33	38	33	38	how can a doubling of flood risk be found when changes in runoff are largely non-significant? [Bart Van den Hurk, Netherlands]	Taken into account - text revised. The paragraph was rewritten
4318	33	41	33	41	4" the C is missing [teodoro georgiadis, Italy]	Editorial – copyedit to be completed prior publication
5281	33	46	33	47	are this indications of new material to appear in the SOD consistent with the publication cut-off deadlines that were agreed? [Bart Van den Hurk, Netherlands]	Accepted – text revised. As new literature was available for the SOD, the text was revised and new references were added
20566	34				Figure 2 seems too simplistic. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Take into account Box no longer exists
10017	34		34		Row 29: RCP7.5 should be checked. [Nazan AN, Turkey]	Take into account Box no longer exists
11989	34	1	34	1	No reference to Box 3.2 in text. (Obviously, Box 3.2 still being developed.) [Paul Doyle, Canada]	Taken into account Box no longer in draft
19013	34	1	34	19	Don't forget to improve this box 3.2 for the second draft of this chapter [JACQUES-ANDRE NDIONE, Senegal]	Taken into account Box no longer in draft
3656	34	1	34	19	Box 3.2. "Variables that should be discussed". Variables that should be discussed in the context of what? Runoff and flooding? In that case, several additional key variables need to be added, including vegetation cover, mountain glaciers and icefields, seasonal snowpack, and urbanization and other LULC changes. [Sean Fleming, United States of America]	Taken into account Box no longer in draft
4564	34	4			Change ordering of precipitation and evaporation - "Precipitation minus Evaporation" [Radim Tolasz, Czech Republic]	Taken into account Box no longer in draft



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11076	34	7	34	7	<p>The idea of Box 3.2 is not yet clear yet, but I would like to suggest a few points to bring up concerning groundwater. Groundwater is the lower boundary of drainage, a boundary that we know is very different among regions since its depth can differ from less than a meter to several tens of meters (Fan et al. 2013). However, groundwater is not yet taken into account in most Earth System Models and this is a source of uncertainty in the land surface – atmosphere interaction and its influence on climate / climate extremes on regional scales.</p> <p>Groundwater can be an important water source for plants during rainless periods (Fan 2015). Therefore, groundwater might be important for mitigating temperature extremes on regional scales. Also, consequently, since groundwater is not included in ESMs, this could imply overestimation of temperature extremes.</p> <p>In particular, including groundwater in climate models has been shown to increase the evapotranspiration and decrease temperature in regions with high groundwater levels such as the La Plata Basin in Southeastern South America (Martinez et al. 2016).</p> <p>Fan 2015: <a href="http://onlinelibrary.wiley.com/doi/10.1002/2015WR017037/abstract">http://onlinelibrary.wiley.com/doi/10.1002/2015WR017037/abstract</a>                      Fan et al. 2013: <a href="http://science.sciencemag.org/content/339/6122/940">http://science.sciencemag.org/content/339/6122/940</a>                      Martinez et al. 2016: <a href="http://journals.ametsoc.org/doi/abs/10.1175/JHM-D-16-0052.1">http://journals.ametsoc.org/doi/abs/10.1175/JHM-D-16-0052.1</a> [Anna Sörenaon, Argentina]</p>	Taken into account Box no longer in draft
17260	34	7	34	7	I think water table levels should be added to "groundwater" [Maria Jesus Iglesias Briones, Spain]	Taken into account Box no longer in draft
17663	34	16	34	19	Box 3.2 Figure 2, numbers for stocks and flows may help readers to understand the impacts of Warming 1.5 degree C [Perdina Perdina, Indonesia]	Taken into account Box no longer in draft
5284	34	22	35	22	No assessment of observed trends in snow and permafrost? [Bart Van den Hurk, Netherlands]	Rejected Space constraints require focus on 1.5/2.0C projections
461	34	24			The bit 'extent of seasonal snow cover' is redundant. Rephrase: 'seasonal snow cover'. [David Docquier, Belgium]	Accepted
12886	34	24	35	22	What about in the Southern Hemisphere? [Jorge Carrasco, Chile]	Rejected Main changes are in the NH; Antarctic snowfall covered in 3.3.9
9710	34	26	34	26	As declared in the manuscript, the exact reference time period and the time frame are vital for assessment, while in various cases these are evidently not identical. I wonder if this will influence the reliability of the estimation. [Kai Fang, China]	Taken into account References periods are those given in AR5 very hard to redefine
5491	34	28	34	29	For context sounds weird for me, perhaps "for comparison"? [Ismael Nunez-Riboni, Germany]	Accepted
5492	34	28	34	29	RCP7.5 should be RCP8.5. [Ismael Nunez-Riboni, Germany]	Accepted
462	34	29			You probably talk about RCP8.5 (and not RCP7.5). [David Docquier, Belgium]	Accepted
7002	34	29	34	29	Typo: RCP7.5 should read RCP8.5 [Sai Ming Lee, China]	Accepted
13444	34	29	34	29	misspelt "RCP7.5" [Vidyunmala Veldore, Norway]	Accepted
5283	34	29	34	29	RCP8.5? [Bart Van den Hurk, Netherlands]	Accepted
10667	34	29	34	29	Typo - RCP7.5...should be RCP8.5? [Kristin Campbell, United States of America]	Accepted
2517	34	29	34	29	RCP 8.5? [Robert Koppu, United States of America]	Accepted
11990	34	32	34	33	What latitude defines "northern high latitudes"? [Paul Doyle, Canada]	Take into account this is statement of process and so therefore not explicitly linked to specific latitudes
4177	35	2		3	Projected warming which, as previously noted, will lead to more precipitation falling as rain could also play an important role in the amount of snow cover as the heat (temperature) of the rain and precipitation rate is transferred to the snow pack as it falls. A positive heat exchange could then result in snow melt meaning more rainfall versus snowfall events brought about by higher air temperatures. This could further help to change the amount and structure of snow cover. [Michelle Leslie, Canada]	Take into account This is mentioned in previous paragraph
2320	35	3	35	3	shrinking near-surface permafrost - This is unclear and incorrect terminology. Do you mean a reduction in the area of underlain by permafrost or increases in thaw depth or complete loss of thin permafrost? [Sharon Smith, Canada]	Accepted have added extent
13881	35	3	35	3	Shrinking in extent and/or depth of frozen layer? Be clear in this section [Elvira Poloczanska, Germany]	Accepted have added extent
5879	35	3	35	3	Please substitute "these process" with "this process". [Joan A. Lopez-Bustins, Spain]	Take into account sentence no longer in draft
12072	35	3	35	5	This area needs further consideration. See Todd-Brown et al-2013-Biogeosciences-10, 1717-1736, which indicted that incorporation of soil microbial/biogeochemical/biophysical processes are necessary (which is already demonstrated by Wieder et al-2013-Nature Climate Change-3-909-912) to reduce uncertainty of CMIP5 model projections. This is an active area of development in earth system modeling research. Thus, I would emphasize little more on soil C cycle processes here. E.g. See papers on soil microbial decomposition models that proved to be parsimonious, yet mechanistic, to be incorporated in earth system models/climate models (Abramoff et al-2017-JGR Biogeosciences-doi:10.1002/2017JG003796, Allison et al-2010-Nature Geoscience-3-336-340, Davidson et al-2012-Global Change Biology-18-371-384, and Sihii et al-2016-Biogeosciences-13-1733-1752 etc). [Debjani Siihi, United States of America]	Take into account biogeochemistry is discussed in more detail in new paragraphs discussing the new literature (Burke et al, Comyn-Platt)
2321	35	5	35	6	You need to be careful with the way you are presenting results from these models as they only consider permafrost in the upper 3m. This use of the term "near-surface permafrost extent" by the modelling community is unfortunate and not really correct (would you say reduction in near-surface glacier extent?), especially when permafrost can be 10s to 100s of metres thick. Also it is a bit meaningless when you don't define near-surface. What these model results really mean is that over a given area the thaw depth will increase to greater than 3 m. [Sharon Smith, Canada]	Accepted have added extent
2322	35	6	35	12	The frost index approach used by Guo and Wang is an equilibrium model and ignores the fact that permafrost evolution is transient (also ignores the fact that the distribution of permafrost we see today is a product of past climates). The timing aspect here is incorrect as changes in permafrost will lag behind changes in air temperature. [Sharon Smith, Canada]	Take into account Reference no longer part of draft
11991	35	12	35	12	Why would that be? [Paul Doyle, Canada]	Take into account Reference no longer part of draft
2323	35	14	35	22	Recent paper by Cooper et al. (2017, Nature Climate Change 7(7):507-511), may be relevant here as it considers methane loss from thawing of permafrost peatlands (concludes this may be limited contribution) [Sharon Smith, Canada]	Take into account the new Comyn-Platt paper is more relevant to 1.5C
13882	35	14	35	22	Permafrost feedbacks are discussed on chapter 2, please consider where this discussion is best placed [Elvira Poloczanska, Germany]	Take into account We suggest that the biogeochemical aspects of the subsection are moved to Chapter 2

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2713	35	14	35	22	These points about permafrost and its contribution to CO2 store are really critical and should be taken further - e.g. how does this link with potential tipping points? [Penny Urquhart, South Africa]	Take into account discussed in section 3.6
9771	35	25	35	25	3.3.7 Storms, tropical cyclones and wind. Hurricanes are not mentioned in this section and it would be useful for the general reader to state that these fall under the general category of 'tropical cyclones'. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9772	35	25	35	25	3.3.7 Storms, tropical cyclones and wind. I understand that some cyclones form slightly outside the tropics, so is it worth including some discussion on the potential for extra-tropical cyclones? [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9773	35	25	35	25	3.3.7 Storms, tropical cyclones and wind. Clearly the ongoing 2017 Atlantic hurricane season is of major interest given the landfall of 2 category 5 hurricanes. So some discussion of this season, perhaps in a separate box would be of widespread interest. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17261	35	25	35	25	Hurricanes also added here? [Maria Jesus Iglesias Briones, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6801	35	25	36	35	Sub-section 3.3.7 on Storms, tropical cyclones and wind is, in reality, a section dedicated to tropical cyclones and winds. Mentions to storms are scattered and unstructured. Considering that section 3.3 explores Global and regional climate changes and associated hazards a more consistent organization should consider tropical cyclones and extratropical storms, followed by analysis of winds over land and over sea, linking the later to changes in wave climate. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1468	35	25	36	35	3.3.7 Storms, tropical cyclones and wind This section begins with a general theory "There is increasing evidence that the number of very intense tropical cyclones have increased in recent decades across most ocean basins, with associated decreases in the overall number of tropical cyclones" This general theory may be valid in the context of a relatively long-term climatic change. However, randomness of TC formation should also be explained particularly from the statistical point of view. e.g.: In general, the relationship between TCs and climate can be subtle, whereas differences in the spatial and temporal scales are large (Elsner and Jagger 2013). The analysis by Weinkle et al. (2012) does not indicate significant long period global or individual basin trends in the frequency or intensity of landfalling TCs. Significant increase in TC landfall frequency in recent decades was also not confirmed in the most cyclone prone country, Philippines, between 1945 and 2013, except for the latitude zone between 10N and 12N, which shows a linear increase at 0.02 times per year (Takagi and Esteban, 2016). References: Elsner JB, Jagger TH (2013) Hurricane climatology: a modern statistical guide using R. Oxford University Press, New York Weinkle J, Maue R, Pielke R Jr (2012) Historical global tropical cyclone landfalls. J Clim 25:4729-4735. doi:10.1175/JCLI-D-11-00719.1 Takagi H., Esteban M. (2016) Statistics of Tropical Cyclone Landfalls in the Philippines -Unusual Characteristics of 2013 Typhoon Haiyan, Natural Hazards, Vol. 80, Issue 1, pp. 211–222, DOI: 10.1007/s11069-015-1965-6 [Hiroshi Takagi, Japan]	We are grateful for your suggestion, and will be including consideration of it in the next draft
464	35	27			What is a 'very intense tropical cyclone'? I would add the category in bracket to be a bit more precise. According to Christensen et al. (2013), climate projections (scenario A1B) indicate an increase in the frequency of categories 4 and 5 storms by 0-25% between 2081-2100 and 2000-2019, with large inter-basin variations. [David Docquier, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10476	35	27	35	27	the number... has not the number... have [Jonathan Lynn, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12793	35	27	35	29	This is not what AR5 concludes. AR5 is extremely prudent on such a sensitive issue. In particular over the N Atlantic, it is clearly stated that one cannot conclude of a climate change effect. If new studies may tend to strengthen such a statement, then AR5 statements should be recalled and progresses since then mentioned separately. [Robert Vautard, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6992	35	27	35	38	This paragraph should also mention the observed global-average migration of tropical cyclone activity (Kossin et al., 2014) and the observed changes in prevailing tracks in WNP over the past 30 years as well as the associated changes to the exposure of tropical cyclone risk in different regions (Park et al., 2013; Park et al., 2014; Wu et al., 2015; Kossin et al., 2016; Li et al., 2017; Zhan and Wang, 2017). Relevant references: 1. Kossin, J. P., K. A. Emanuel & Gabriel A. Vecchi, 2014 : The poleward migration of the location of tropical cyclone maximum intensity, Nature 509, 349–352 2. Kossin, J. P., K. A. Emanuel, and S. J. Camargo, 2016: Past and projected changes in western North Pacific tropical cyclone exposure. Journal of Climate, 29, 5725-5739 3. Li, C.Y., W. Zhou, C.M. Shun and T.C. Lee, 2017 : Change in Destructiveness of Landfalling Tropical Cyclones over China in Recent Decades, Journal of Climate, published online. http://dx.doi.org/10.1175/JCLI-D-16-0258.1. 4. Park, D.S.R., J.H. Kim, and H.S. Kim, 2013 : Spatially inhomogeneous trends of tropical cyclone intensity over the western North Pacific for 1977-2010, Journal of Climate, 26, 5088-5101. 5. Park, D.S.R., C.H. Ho, and J.H. Kim, 2014 : Growing threat of intense tropical cyclones to East Asia over the period 1977-2010, Environmental Research Letter, 9, 014008. 6. Wu, Liguang, C.Wang, and B. Wang, 2015 : Westward shift of western North Pacific tropical cyclogenesis, Geophysical Research Letters, 42, 1537-1542. 7. Zhan R.F. and Y.Q. Wang, 2017 : Weak tropical cyclones dominate the poleward migration of the annual mean location of lifetime maximum intensity of Northwest Pacific tropical cyclones since 1980, J. of Climate. [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13260	35	27	35	38	Zhang, W., and Coauthors, 2016: Influences of Natural Variability and Anthropogenic Forcing on the Extreme 2015 Accumulated Cyclone Energy in the Western North Pacific. Bulletin of the American Meteorological Society, 97, S131-S135. This reference for the first time detected the anthropogenic forcing signal in the record 2015 typhoon activity represented by accumulated cyclone energy in the western North Pacific, using 25-km spatial resolution fully-coupled climate model. [Wei Zhang, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14341	35	27	36	35	Besides changes in storms, tropical cyclones and wind, it would be worth mentioning the expected impact that climate change may have on the resulting storm surge levels. Recent research show that, depending on the location, this impact is non negligible and may exceed 30% of the relative sea level rise (see e.g. "Voudoukas et al., 2016. Projections of extreme storm surge levels along Europe. Journal of Climate Dynamics"). [Alessio Giardino, Netherlands]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9315	35	27	35	54	The references that are given to support the statement "There is increasing evidence that the number of very intense tropical cyclones have increased in recent decades across most ocean basins, with associated decreases in the overall number of tropical cyclones (Elsner et al. 2008; Holland and Bruyère 2014)" and "A general theory explaining these findings, and thereby strengthening confidence in the projections, has recently been proposed" may include even earlier references from the year 2005 in Nature based on "Kerry Emanuel, Increasing destructiveness of tropical cyclones over the past 30 years. Nature 436, 686-688 (4 August 2005) <doi:10.1038/nature03906>." An additional reference is "Thomas R. Knutson, John L. McBride, Johnny Chan, Kerry Emanuel, Greg Holland, Chris Landsea, Isaac Held, James P. Kossin, A. K. Srivastava & Masato Sugi, Tropical cyclones and climate change, Nature Geoscience 3, 157 - 163 (2010) doi:10.1038/ngeo779." Based on these references, an additional statement may be evaluated for insertion as "For example, hurricanes are thermodynamic heat engines the strength of which may be explained by the temperature difference between a warmer sea surface temperature and constant stratosphere temperature." [Siir KILKIS, Turkey]	We are grateful for your suggestion, and will be including consideration of it in the next draft
463	35	28			Typo: 'decrease' instead of 'deceases'. [David Docquier, Belgium]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13723	35	28	35	28	It should say "decreases" (instead of deceases) [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6991	35	29	35	33	In the western North Pacific (WNP), there were research progress in improving the consensus between best track datasets in this basin, especially for trends of intense tropical cyclones since late 1970s. Amid a general decrease in overall TC frequency, an increase in the number and intensification rate for intense tropical cyclones in WNP since mid-1980s was observed by a number of studies using various statistical methods to reduce the uncertainty in intensity assessment among datasets (Kang and Elsner, 2012; Kishtawal et al., 2012; Kossin et al., 2013; Zhao and Wu, 2014). Moreover, spatial and cluster analysis of tropical cyclone intensity depicted inhomogeneous trends in different regions of the WNP with an observed intensification of landfalling typhoons since late 1970s (Park et al., 2013; Cha et al., 2014; Mei and Xie, 2016). Relevant references: 1. Kang, N. Y. and J.B. Elsner, 2012 : Consensus on climate trends in western North Pacific tropical cyclones. Journal of Climate, 25, 7564-7573. 2. Kossin, J.P., T. L. Olander, and K.R. Knapp, 2013 : Trend analysis with a new global record of tropical cyclone intensity, Journal of Climate, 26, 9960-9976. 3. Kishtawal, C.M., N. Jaiswal, R. Singh, and D. Niyogi, 2012 : Tropical cyclone intensification trends during satellite era (1986-2010), Geophysical Research Letters, 39, L10810. 4. Zhao, H.K. and Liguang Wu, 2014 : Inter-decadal shift of the prevailing tropical cyclone tracks over the western North Pacific and its mechanism study, Meteorol. Atmos. Phys. 125, 89-101. 5. Cha, Yumi, K.S. Choi, K.H. Chang, J.Y. Lee, and D.S. Shin, 2014: Characteristics of the changes in tropical cyclones influencing the South Korean region over the recent 10 years (2001-2010), Natural Hazards, 74, 1729-1741. 6. Mei, W. and S.P. Xie, 2016 : Intensification of landfalling typhoons over the northwest Pacific since the late 1970s, Nature Geoscience, 9, 753-757. 7. Park, D.S.R., J.H. Kim, and H.S. Kim, 2013 : Spatially inhomogeneous trends of tropical cyclone intensity over the western North Pacific for 1977-2010, Journal of Climate, 26, 5088-5101. [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6993	35	33	35	38	Suggest also including more recent publications on tropical cyclone projections (e.g. Tory et al., 2013; Kunston et al., 2015; Wang and Wu, 2015; Sugi et al., 2016). Besides projected increase in the intense tropical cyclones, most model projections also predict an increase in tropical cyclones related rainfall in a warmer climate. Related references: 1. Knutson et al. 2015 : Global Projections of Intense Tropical Cyclone Activity for the Late Twenty-First Century from Dynamical Downscaling of CMIP5/RCP4.5 Scenarios, J of Climate, 28, 7203-7223 2. Sugi et al., 2016 : Projection of future changes in the frequency of intense tropical cyclones, Clim Dyn. 3. Tory et al., 2013 : Projected Changes in Late-Twenty-First-Century Tropical Cyclone Frequency in 13 Coupled Climate Models from Phase 5 of the Coupled Model Intercomparison Project, J of Climate, 26, 9946-9959 4. Wang and Wu, 2015 : Influence of Future Tropical Cyclone Track Changes on Their Basin-Wide Intensity over the Western North Pacific: Downscaled CMIP5 Projections, Advances in Atmospheric Sciences, 32, 613-623 [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6994	35	33	35	38	The combined effect of future sea level rise and more intense tropical cyclones will likely contribute toward increased storm surge risk to coastal cities in the future. This issue should be mentioned and discussed in this section and other relevant sections of this document, including 3.4.2. Some relevant references: 1. Gao, Y., H. Wang, G. M. Liu, X. Y. Sun, X. Y. Fei, P. T. Wang, T. T. Lv, Z. S. Xue, and Y. W. He, 2014 : Risk assessment of tropical storm surges for coastal regions of China, J. Geophys. Res. Atmos., 119, 5364-5374. 2. Neumann, J.E., et al., 2015 : Risks of Coastal Storm Surge and the Effect of Sea Level Rise in the Red River Delta, Vietnam, Sustainability, 7, 6553-6572 3. Oey, L.-Y., and S. Chou, 2016 : Evidence of rising and poleward shift of storm surge in western North Pacific in recent decades, J. Geophys. Res. Oceans, 121. 4. Resio, D.T., and J. I. Irish, 2015 : Tropical cyclone storm surge risk, Current Climate Change Reports, 1, 74-84. 5. Vitousek et al., 2017 : Doubling of coastal flooding frequency within decades due to sea-level rise, Scientific Reports 7, Article number: 1399 6. Yasuda et al., 2014 : Evaluation of future storm surge risk in East Asia based on state-of-the-art climate change projection, Coastal Engineering, 83, 65-71. [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13446	35	38	35	38	Increase in cyclone damage potential for Gulf of Mexico storms has been highlighted in the recent work by Bruyere et al 2017: Impact of Climate Change on Gulf of Mexico Hurricanes. NCAR Technical Note NCAR/TN-535+STR, 165 pp, doi:10.5065/D6RN36J3. [Vidyunmala Veldore, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4178	35	40		54	Recent findings by NOAA have indicated that due to warmer SST, future tropical cyclones that do develop will have the ability to maintain their intensity as they move further north in previously cooler ocean waters. Findings have also indicated that due to warmer air temps and the ability of warmer air to hold more moisture, that storms that do develop could be subject to higher rainfall rates. [Michelle Leslie, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13883	35	56	35	57	Hence shouldn't some of the climate assessment in this chapter be distributed with assessments for natural and human systems? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13724	35	56	36	2	Punctuation needs revision [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12794	35	57	35	57	I would suggest to add also McVicar et al., 2012, which is a broad assessment of wind trends [Robert Vautard, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6802	36	8	36	18	This analysis of wind is exclusively dedicated to wind over the oceans and no consideration is given to studies over land. Also, the links to ocean waves are not consistently presented in terms of a global picture. Hemer et al., 2013 provide relevant details for wave climate changes on a global scale and recent research by Mentaschi et al., 2017, Geoph. Res. Lett. 44(5), explores the CIMP5 forced wave energy fluxes along the world's coastlines, providing a suitable indication of potential impacts/hazards related to extreme wave changes. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5880	36	8	36	18	There's no mention to global stilling. Please review Azorin-Molina et al. (2014) Homogenization and assessment of observed near-surface wind speed trends over Spain and Portugal, 1961-2011. Journal of Climate 27: 3692-3712 [Joan A. Lopez-Bustins, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13884	36	8	36	8	Wind speed? strength? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10477	36	8	36	8	"10 m" what is the "m"? speed? Height? [Jonathan Lynn, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9774	36	10	36	10	Should CIMP3 be CIMP5? [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11992	36	13	36	13	ADD a comma.... For example," O'Grady et al. .... [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6647	36	13	36	16	Changes in rainfall, storm frequency, runoff, vegetation cover, etc., may have similar potential consequences in many coastal areas. [Castor Muñoz Sobrino, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17262	36	20	36	35	Although studies addressing the difference between 1.5°C and 2°C does not exist, could you make a suggestion of the impacts based on accumulated evidence? [Maria Jesus Iglesias Briones, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6803	36	20	36	35	While I agree that there are no studies addressing the potential differences in wind and wave climate for a 1.5° C and 2.0° C, this paragraph only presents results for the late 80's to 2016. It can and should be complemented with wave reanalysis studies that extend the record significantly (e.g. Stopa et al., 2013. Ocean Modelling, 70: DOI: 10.1016/j.ocemod.2012.10.005). Also, the connections between past and future changes in the winds and waves are not explicitly made, preventing a meaningful understanding of likely changes due to a 1.5.° C and 2.°C change. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
4565	36	21			The unit cm.s-1 is not usual for wind speed. [Radim Tolasz, Czech Republic]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9775	36	21	36	21	overall rate of 3.35 cm s <sup>-1</sup> yr <sup>-1</sup> . Need to state the uncertainty of this trend. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9776	36	25	36	26	This is confirmed by Ma et al. (2016) who showed that the surface wind speed has not decreased in the averaged tropical oceans.' Need to clarify what is confirmed here. The previous sentence talks about regional variations whereas the current one notes 'averaged tropical oceans'. So, what is being confirmed? [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9777	36	25	36	26	This is confirmed by Ma et al. (2016) who showed that the surface wind speed has not decreased in the averaged tropical oceans.' Presumably this means either that the surface wind speed has either increased or not changed significantly. Please clarify which of these applies rather than using the ambiguous term 'not decreased'. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9778	36	25	36	26	This is confirmed by Ma et al. (2016) who showed that the surface wind speed has not decreased in the averaged tropical oceans.' What period is being referred to here and is it the same as the 1988-2011 period cited for the Zheng study? [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9780	36	26	36	26	Liu et '16 in refs refers to Tibetan phenology so the wind reference is missing. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11993	36	30	36	30	CHANGE ....(near the northern Alaska)...to...."(off the north coast of Alaska)".... [Paul Doyle, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10478	36	30	36	30	"near northern Alaska" drop "the" (or add missing words) [Jonathan Lynn, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
8826	36	34	36	35	Better use DO NOT instead of don't [Lubna Alam, Bangladesh]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9779	36	35	36	35	The Southern Oceans are an obvious omission from the discussion in this section. So, an extra couple of sentences are needed on S Ocean wind trends. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2773	36	36			in some areas of the Mediterranean and the center of the Iberian peninsula, we have seen convective episodes increase in summer and autumn [Jonathan Gómez Cantero, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12795	36	36	36	36	A suggestion is also to add new results on "stagnations" which have impacts on wind energy and air pollution. A paper from Horton et al. (2014, Nature CC) assesses indicators of stagnations in climate projections; an attribution paper from Vautard et al. (2017, BAMS supplement, in press) shows that monthly winds low extremes may have an increased likelihood in Europe. [Robert Vautard, France]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9794	36	36	41	41	1950-2016? The literature such as AR5 chapter 30 was published in 2014. [Rongshuo Cai, China]	The AR5 statistics are indeed for the period 1950-2009, whilst we refer here to the corresponding analysis of the latest HadISST data.
7454	36	38	37	21	Please consider stating clearly what is new since AR5 regarding ocean circulation and temperature. [Øyvind Christophersen, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9781	36	40	36	41	at a rate just behind that of the warming trend for the planet.' Quantitative detail needed, please state the 0-700 m ocean warming trend and the warming trend for the planet. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3961	36	40	36	41	Is this warming trend "for the planet" ocean only, or GMST? [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3962	36	40	37	21	This section needs to have references added. Too many assertions without supporting literature cited. In particular, lines p36, 50-52 and p37, lines 20-21 [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7280	36	45	36	52	The first paper adds some clarification MARQUES, S.C., PARDAL, M.A., PRIMO, A.L., MARTINHO, F., FALCÃO, J., AZEITEIRO, U.M., MOLINERO, J.C., (2017). Evidence for changes in estuarine zooplankton fostered by increased climate variance. Ecosystems IF 4.198 (2016) Q1 <a href="http://dx.doi.org/10.1007/s10021-017-0134-z">http://dx.doi.org/10.1007/s10021-017-0134-z</a> D'AMBROSIO, M., MOLINERO, J.C., AZEITEIRO, U.M., PARDAL, M.A., PRIMO, A.L., NYITRAI, D., MARQUES, S.C., 2016. Interannual abundance changes of gelatinous carnivore zooplankton unveil climate-driven hydrographic variations in the Iberian Peninsula, Portugal. Marine Environmental Research 120: 103 – 110. IF 3,101 (2016) Q1 <a href="http://dx.doi.org/10.1016/j.marenvres.2016.07.012">http://dx.doi.org/10.1016/j.marenvres.2016.07.012</a> PRIMO, A.L., KIMMEL, D.G., MARQUES, S.C., MARTINHO, F., AZEITEIRO, U.M., PARDAL, M.A., 2015. Zooplankton community responses to regional scale weather variability using a synoptic climatology approach. Climate Research 62: 189 – 198. IF 2,496 /1,690(2014/15, 2015) Q1 <a href="http://dx.doi.org/10.3354/cr01275">http://dx.doi.org/10.3354/cr01275</a> MARQUES, S.C., PRIMO, A.L., MARTINHO, F., AZEITEIRO, U.M., PARDAL, M.A., 2014. Shifts in estuarine zooplankton variability following extreme climate events: a comparison between drought and regular years. Marine Ecology Progress Series 499: 65 – 76. IF 2,619 (2014/15) Q1 <a href="http://dx.doi.org/10.3354/meps10635">http://dx.doi.org/10.3354/meps10635</a> PRIMO, A.L., MARQUES, S.C., FALCÃO, J., CRESPO, D., PARDAL, M.A., AZEITEIRO, U.M., 2012. Environmental forcing on jellyfish communities in a small temperate estuary. Marine Environmental Research 79: 152 – 159. IF 2,337 (2012) Q2 <a href="http://dx.doi.org/10.1016/j.marenvres.2012.06.009">http://dx.doi.org/10.1016/j.marenvres.2012.06.009</a> [Ulisses Azeiteiro, Portugal]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11705	36	46	36	46	I think the Garcia Molinos paper was published in 2016, not 2015... [David Schoeman, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13885	36	48	36	48	Add citation for chp 30 AR5 WGII [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7003	36	48	36	50	IPCC AR5 WGI TS stated that the projected change in El Nino amplitude is small for both RCP4.5 and RCP8.5 compared to the spread of the change among models. As such, more evidence is needed for the claim that climate extremes in the ocean are associated with "the climate change intensification of ENSO". [Sai Ming Lee, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9782	36	49	36	52	References needed to support these two sentences. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9481	36	50	36	52	Please provide some literature references to back up the statements made in this sentence about increased heat in the upper layers of the ocean also driving more intense storms and greater rates of inundation, which ...are already driving significant impacts to sensitive coastal and low-lying areas. [David Wratt, New Zealand]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11706	37	3	37	3	Here, and in many other places, upwelling is a single word...it is not hyphenated. [David Schoeman, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6648	37	4	37	8	This may be linked to the decreasing of seasonal coastal upwelling (wind-promoted), and also with lower total precipitations in most of these mid-, low latitude areas. Both two have effects on coastal productivity. [Castor Muñoz Sobrino, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
11708	37	5	37	6	Perhaps pick better verbs here? Strengthen/weaken are more specific than increase/decrease, which could refer to changes in any number of properties. If strengthen/weaken is not what is meant, perhaps a little more information is required? [David Schoeman, Australia]	We are grateful for your suggestion, and will be including consideration of it in the next draft
5881	37	5	37	6	Please substitute "long-shore" with "longshore". [Joan A. Lopez-Bustins, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19087	37	7	37	7	This should be Christensen et al., 2007 (please correct reference list as well). Also, this is a reference to AR4, is this information not present in AR5? [Wim Thiery, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9783	37	13	37	15	References needed to support this sentence. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13886	37	13	37	15	Is this conclusion based on a single study or multiple studies? Apply uncertainty language [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2714	37	13	37	16	Should this not be discussed further under tipping points? [Penny Urquhart, South Africa]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6649	37	13	37	16	This may be a quite similar scenario to that during the Holocene 8.2 ka event (a cold relapse promoted by a feedback mechanism that modified the Gulf Stream). Then, most of the western Europe façade might be affected, specially many sites (peats, lakes, ponds) in SW Europe, which during almost three centuries experienced the most intense effects (usually becoming colder and drier): e.g. Muñoz Sobrino et al., (2005); Iriarte-Chiapusso et al. (2016) Muñoz Sobrino, C, Ramil-Rego, P, Gómez-Orellana, L, Díaz Varela, RA (2005) Palynological data on major Holocene climatic events in NW Iberia. Boreas 34: 381–400 Iriarte-Chiapusso, MJ, Munoz Sobrino, C, Gomez-Orellana, L, Hernandez-Beloqui, B, Garcia-Moreiras, I, Fernandez Rodriguez, C, Heiri, O, Lotter, AF, Ramil-Rego, P (2016) Reviewing the Lateglacial-Holocene transition in NW Iberia: A palaeoecological approach based on the comparison between dissimilar regions. Quat Int 403: 211–236 <a href="http://dx.doi.org/10.1016/j.quaint.2015.09.029">http://dx.doi.org/10.1016/j.quaint.2015.09.029</a> [Castor Muñoz Sobrino, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3543	37	14			add comma after Atlantic [Sylvia Sander, Monaco]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3544	37	16			add blank space "... (Kelly et al. 2016; Rahmstorf et al. 2015...)" [Sylvia Sander, Monaco]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3545	37	17		21	multiple use of word increase in different meanings, very confusing, please change [Sylvia Sander, Monaco]	We are grateful for your suggestion, and will be including consideration of it in the next draft
9784	37	18	37	21	References needed to support these three sentences. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
7455	37	20	37	21	Please specify what "ocean conditions" that eventually will reach stability around mid-century. Is it surface temperature, ocean acidification, deep water temperature or ocean circulation changes? [Øyvind Christophersen, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
3963	37	20	37	21	Will all ocean conditions stabilise? Or just referring to circulation or temperature? What about biology/biogeochemistry which are likely to have overshoot effects even if temperature stabilises? [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12370	37	24			Please include reference to Notz & Stroeve (2016). Their findings tend to confirm the 1.5°C threshold identified in Screen and Williamson [Bill Hare, Germany]	Accepted text revised

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16255	37	26	37	30	It would seem imporant here to also give the observed changes here (that was done for snow cover, etc.). My understanding is that the observed retreat is a good bit greater than what is being modeled and this point needs to be made and faced (both due to the point itself and to make clear that in at least this way the models are not overpredicting change, as deniers like to charge with respect to temperature change). [Michael MacCracken, United States of America]	Accepted text revised
465	37	26	37	30	Before talking about climate projections in Arctic sea ice loss, I think it would be necessary to have a small paragraph about recent observations in both the Arctic and Antarctic regions, as in the previous sub-sections. A summary of observed sea ice changes can be found in Vaughan et al. (2013, IPCC AR5 WG1 Chapter 4) and an excellent summary of the Arctic sea ice can also be found in Döscher et al. (2014, see complete reference below). [David Docquier, Belgium]	Accepted text revised to include brief summary of obs
466	37	26	37	30	Döscher R., T. Vihma, and E. Maksimovich (2014). Recent advances in understanding the Arctic climate system state and change from a sea ice perspective: a review. Atmos. Chem. Phys., 14, 13571–13600, doi: 10.5194/acp-14-13571-2014. [David Docquier, Belgium]	Taken into account although Serreze & Stroeve more relevant
5493	37	27	37	28	Again, I would suggest to change "for context" by "for comparison" [Ismael Nunez-Riboni, Germany]	Accepted text revised
7456	37	32	37	33	Please consider describing the strong positive relationship in easier terms and what it implies. [Øyvind Christophersen, Norway]	Taken into account this section of text substantially revised and sentence no longer exists
467	37	32	37	34	Put reference (Massonnet et al. 2012) at the end of the sentence. [David Docquier, Belgium]	Accepted
468	37	34			Rephrase: 'Given the biases' instead of 'Given these biases'. [David Docquier, Belgium]	Taken into account this section of text substantially revised and sentence no longer exists
7457	37	34	37	34	Please consider to explain what biases it is referred to in the CMIP5 ensemble. [Øyvind Christophersen, Norway]	Taken into account this section of text substantially revised and sentence no longer exists
16256	37	34	37	34	What "biases" are being referred to—they do not seem to be mentioned here. [Michael MacCracken, United States of America]	Taken into account this section of text substantially revised and sentence no longer exists
469	37	36			Provide reference for faster ice loss with recalibration compared to the full CMIP5 ensemble. [David Docquier, Belgium]	Taken into account this section of text substantially revised and sentence no longer exists
470	37	36			Which CMIP5 subset are you talking about? [David Docquier, Belgium]	Taken into account this section of text substantially revised and sentence no longer exists
10479	37	37	37	37	preceding [Jonathan Lynn, Switzerland]	Accepted
19056	37	42	37	42	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Editorial copyedit to be completed
18008	37	43	37	45	Contrasting results about ice-free September could be found in a new paper by Sanderson et al. 2017 "Community Climate Simulations to assess avoided impacts in 1.5 C and 2 C futures" better to be mentioned [Wilfran Moufouma Okia, France]	Accepted Sanderson now discussed
16257	37	44	37	46	Given that the models are biased, not showing enough ice meltback, how is it that a study based on model result showing a vanishingly small chance of September sea ice going to zero is credible and given so much attention without criticism here? On what basis should anyone be betting on this—I'd sure take a bet against their result given how the sea ice has been thinning so much. Perhaps the issue is what the definition of ice free in September is? More explanation is needed. [Michael MacCracken, United States of America]	Accepted revised text now assesses a greater range of literature
21144	37	50	37	52	Gagne et al. 2017 (Aerosol-driven increase in Arctic sea ice over the middle of the twentieth century, Geophysical Research Letters, doi:10.1002/2016GL071941) critiqued that while the CO2-based calculations in the Notz and Stroeve study are useful, aerosols and other factors may impact exactly when the Arctic is ice-free. [Nathan Borgford-Parnell, Switzerland]	Accepted Gagne et al now discussed
21145	37	50	37	52	Overland and Wang 2013 (When will the summer Arctic be nearly sea ice free?, Geophysical Research Letters, doi:10.1002/grl.50316) demonstrated the range of years at which the Arctic would be ice-free in the summer depending on whether studies used trends, stochastic analysis, or modeling. Further, natural variability may also play a part in when the Arctic is ice-free (Jahn et al 2016, How predictable is the timing of a summer ice-free Arctic?, Geophysical Research Letters, doi/10.1002/2016GL070067). [Nathan Borgford-Parnell, Switzerland]	Accepted substantially revised text now reflects this point
10668	37	50	37	52	Gagne et al 2017 (Aerosol-driven increase in Arctic sea ice over the middle of the twentieth century, Geophysical Research Letters, doi:10.1002/2016GL071941) critiqued that while the CO2-based calculations in the Notz and Stroeve study are useful for quantifying CO2 and its impact on Arctic sea ice, aerosols and other factors effect this relationship and could contribute to the timing of when the Arctic is ice-free. [Kristin Campbell, United States of America]	Accepted Gagne et al now discussed
10669	37	50	37	52	Overland and Wang 2013 (When will the summer Arctic be nearly sea ice free?, Geophysical Research Letters, doi:10.1002/grl.50316) demonstrated the range of years at which the Arctic would be ice-free in the summer depending on whether studies used trends, stochastic analysis, or modeling. [Kristin Campbell, United States of America]	Accepted substantially revised text now reflects this point
10670	37	50	37	52	Natural variability may also play a part in when the Arctic is ice-free, altering the timing of an ice-free summer by as much as two decades (Jahn et al 2016, How predictable is the timing of a summer ice-free Arctic?, Geophysical Research Letters, doi/10.1002/2016GL070067). [Kristin Campbell, United States of America]	Accepted substantially revised text now reflects this point. Jahn now discussed
16258	37	52	37	54	Indeed!! This sentence needs a lot more attention and emphasis. [Michael MacCracken, United States of America]	Taken into account the revise text expands on this discussion
471	38	13			Add 'as' between 'such' and 'the'. [David Docquier, Belgium]	Accepted text revised
9316	38	13	38	13	The phrase "reproduce observations such the seasonal cycle" is missing "as" between the words "such" and "the." [Sirir KILKIS, Turkey]	Accepted text revised
11994	38	13	38	13	ADD .... such "as" the seasonal.... [Paul Doyle, Canada]	Accepted text revised
472	38	14			Add 'sea ice' between 'extents' and 'of'. [David Docquier, Belgium]	Accepted text revised
11995	38	14	38	14	ADD ...extent of "ice" over recent decades. Something does not make sense here. Ice increasing in recent decades?? [Paul Doyle, Canada]	Accepted text revised
13887	38	16			I hope this will be developed into an integrated view with an emphasis on impacts on natural and managed ecosystems and human systems [Elvira Poloczanska, Germany]	taken into account Box no longer exists
12887	38	16			Box 3.3 Cold Regions, Is Antarctica not included in the discussion in this Box? [Jorge Carrasco, Chile]	taken into account Box no longer exists
13888	38	16	38	16	I suggest using the term cryosphere to establish a direct link to the SR on ocean and cryosphere to a changing climate [Elvira Poloczanska, Germany]	taken into account Box no longer exists
11996	38	16	38	16	Box 3.3 A work in progress as stated. [Paul Doyle, Canada]	taken into account Box no longer exists
7564	38	16	39	17	Should look at recent paper by Matthias Huss and Regine Hock on predicting global glacier mass balance and contributions to sea level rise under various climate scenarios. It was published 30 September, 2015 in the Frontiers in Earth Science, title "A new model for global glacier change and sea level rise" [William Kochlitzky, United States of America]	taken into account Box no longer exists
473	38	16	39	17	It is not clear at this stage what is the aim of Box 3.3. Is it really necessary? [David Docquier, Belgium]	taken into account Box no longer exists
8007	38	17	38	17	Artic text should be Arctic [Robert Shapiro, United States of America]	taken into account Box no longer exists
14342	38	25	38	25	...that has undergone major "CHANGES".... [Alessio Giardino, Netherlands]	taken into account Box no longer exists

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8008	38	25	38	25	cahniges should be changes [Robert Shapiro, United States of America]	taken into account Box no longer exists
7561	38	25	38	25	cahniges is a typographic error, should read "changes" [William Kochtitzky, United States of America]	taken into account Box no longer exists
6291	38	25	38	25	cahniges -> "changes" [Nathanael Melia, New Zealand]	taken into account Box no longer exists
1952	38	25	38	25	Cahniges should read changes [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	taken into account Box no longer exists
11709	38	25	38	25	"Changes" misspelled [David Schoeman, Australia]	taken into account Box no longer exists
16259	38	25	38	28	This seems to have changed from an ice free Arctic in September to one presumably for the whole summer. While this may be what makes the statement plausible, there needs to be more discussion that considers what the summer minimum will be, which it is increasingly likely seeming, from observational trends, to be an ice free state (< 1M km2) in September in the not too distant future (of course, given the pace of global warming 1.5 C may occur soon too). This notion, however, of making such a statement based on model simulations when the melting of sea ice in models lags observations would seem to make for a rather tenuous conclusion, yet this statement says "virtually certain"--it is quite hard to understand the basis for this given the volume and area losses of the past couple of decades. [Michael MacCracken, United States of America]	taken into account Box no longer exists
6804	38	29	29	43	Predicted intensification of extreme winds on higher latitudes, with concurrent increases in extreme wave heights, are likely to have impacts in sea ice extension, particularly in the Antarctic. This may be a relevant topic for discussion in this box. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16260	38	30	38	34	The information given here is rather useless unless more context is given about seasonal ranges, etc. And what does "coldest night-time temperature" mean--one night over whole Arctic in winter or what, and why is this the most relevant number for understanding potential impacts? It is not warming the coldest conditions that would seem likely to cause the largest impacts; it would be thinning of ice, duration of ice, summertime temperatures affecting permafrost, etc.--the section needs to provide useful information. [Michael MacCracken, United States of America]	taken into account Box no longer exists
2324	38	36	38	40	Box 3.3 "permafrost covered land" is incorrect terminology as permafrost does not cover the land but is a condition of the ground itself, i.e. below the ground surface. We refer to areas underlain by permafrost (perhaps you are referring to the area covered by the permafrost regions which is a completely different thing). It is important to be clear that Chaburn et al. (2017) model is an equilibrium model and the actual change in permafrost distribution they predict will occur beyond 2100 which is when 1.5 or 2°C increase in air temperature. They also do not take into account that the distribution on the current (1997) permafrost map (Brown et al) is a result of past climates and not air temperature in 1961-1990. Also they only consider the relationship between air temperatures and the boundaries of permafrost zones on the Brown et al. map and then project into future based on air temperature change. However, it is a little more complicated than that and other factors that influence permafrost conditions are not really considered in this approach. [Sharon Smith, Canada]	taken into account Box no longer exists
16261	38	37	38	40	Given how area shrinks moving north, I would think that there would be a larger percentage variation, but I guess also as one goes further to the south, the area that is permafrost goes down. Is it really linear in temperature change? [Michael MacCracken, United States of America]	taken into account Box no longer exists
11997	38	38	38	39	Why put 2°C before 1.5°C? Reverse to maintain normal order. [Paul Doyle, Canada]	taken into account Box no longer exists
7562	38	46	38	46	should change altitude to elevation; altitude would imply all of these things are above the land surface [William Kochtitzky, United States of America]	taken into account Box no longer exists
17713	38	48	38	48	Worth adding mid-latitude effects of arctic warming, e.g. in crop yield (Kim et al., 2017 Nature Geoscience) [Ana Bastos, France]	taken into account Box no longer exists
7563	38	52	38	52	There are no ice sheets in high elevation environments, talking about glacier melt and runoff alone should suffice [William Kochtitzky, United States of America]	taken into account Box no longer exists
2325	38	54	38	54	Box 3.3 "Permafrost melt" is incorrect. Use "permafrost thaw" (only the ice in the ground changes phase and therefore melts, while the soil or rock stays solid), [Sharon Smith, Canada]	taken into account Box no longer exists
8009	38	56	38	56	montains should be mountains [Robert Shapiro, United States of America]	taken into account Box no longer exists
5882	38	56	38	56	Please substitute "mountain" with "mountain". [Joan A. Lopez-Bustins, Spain]	taken into account Box no longer exists
499	39		41		The contribution from water storage to sea level rise is mentioned in the first sentence of Section 3.3.10 but not discussed in the text. [David Docquier, Belgium]	Taken into account could not find any relevant material
5883	39	9	39	9	I'd rather say "plus snow depth, area and duration" [Joan A. Lopez-Bustins, Spain]	taken into account Box no longer exists
8010	39	10	39	10	what is sfc ?? [Robert Shapiro, United States of America]	taken into account Box no longer exists

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12371	39	20			<p>[1/3] This section needs to be improved considerably. It misses key references and falls short both from providing an analysis of future SLR under 1.5°C and 2°C by 2100 or beyond. Our understanding of the risk of ice sheet instability has improved considerably and needs to be captured here.</p> <p># Missing update on observational evidence from Antarctica: A lot of highly relevant papers for marine ice sheet instability probably already under way have been published. As this is key for potential future SLR, these need to be covered here. Several of them also include modelling of a partially or full collapse of the West Antarctic ice sheet. An incomplete list:</p> <p>Scambos, T. A. et al. (2017), How much, how fast?: A science review and outlook for research on the instability of Antarctica's Thwaites Glacier in the 21st century, <i>Glob. Planet. Change</i>, 153(April), 16–34, doi:10.1016/j.gloplacha.2017.04.008.</p> <p>Feldmann, J., and A. Levermann (2015), Collapse of the West Antarctic Ice Sheet after local destabilization of the Amundsen Basin, <i>Proc. Natl. Acad. Sci.</i>, 112(46), 14191–14196, doi:10.1073/pnas.1512482112.</p> <p>Favier, L., G. Durand, S. L. Cornford, G. H. Gudmundsson, O. Gagliardini, F. Gillet-Chaulet, T. Zwinger, a. J. Payne, and a. M. Le Brocq (2014), Retreat of Pine Island Glacier controlled by marine ice-sheet instability, <i>Nat. Clim. Chang.</i>, 4(2), 117–121, doi:10.1038/nclimate2094.</p> <p>Joughin, I., B. E. Smith, and B. Medley (2014), Marine Ice Sheet Collapse Potentially Underway for the Thwaites Glacier Basin, West Antarctica, <i>Science</i>, 344(6185), 735–738, doi:10.1126/science.1249055. [Bill Hare, Germany]</p>	taken into account section has been considerably revised. The suggested references are not incorporated because they are not particularly relevant to 1.5C
7568	39	20	41	19	<p>Consider citing a recent study by Huss and Hock on global glacier mass balance and contribution to sea level rise. They estimate future contributions under various emissions scenarios. It was published 30 September, 2015 in the <i>Frontiers in Earth Science</i>, title "A new model for global glacier change and sea-level rise" [William Kochlitzky, United States of America]</p>	taken into account more relevant is the paper by Marzeion which is assessed in the revised text
482	39	20	41	19	<p>Section 3.3.10: I am wondering if it is really necessary to talk about projections beyond 2100 since the topic of this chapter is 'Impacts of 1.5°C global warming ...'. While this information is interesting for IPCC AR reports, it is not really relevant for this special report. I suggest removing information related to 'beyond 2100' as it is probably beyond the scope of this report. [David Docquier, Belgium]</p>	Rejected the long-term consequences of SLR important because stabilised temperature at 1.5C does not imply stabilized SLR
2021	39	20	41	19	<p>Once again inadequate literature on South Asia. Request to review a literature as " R. Shaw et al. (eds.), <i>Disaster Risk Reduction Approaches in Bangladesh</i>, 217 <i>Disaster Risk Reduction</i>, DOI 10.1007/978-4-431-54252-0_10, © Springer Japan 2013, pp 217-231 [Md. Sirajul Islam, Bangladesh]</p>	taken into account this section focusses on the physical system, See 3.4 for impacts
12372	39	20			<p>[2/3] # Missing update Greenland: The same problem. Literature:</p> <p>Morlighem, M., E. Rignot, J. Mouginot, H. Seroussi, and E. Larour (2014), Deeply incised submarine glacial valleys beneath the Greenland ice sheet, <i>Nat. Geosci.</i>, 7(6), 18–22, doi:10.1038/NGEO2167.</p> <p>Mouginot, J., E. Rignot, B. Scheuchl, I. Fenty, A. Khazendar, M. Morlighem, A. Buzzi, and J. Paden (2015), Fast retreat of Zachari(æ) Isstr(ø)m, northeast Greenland, <i>Science</i>, (November), aac7111.</p> <p># Improved semi-empirical models. There has been considerable improvement for probabilistic SLR models (e.g. Kopp et al. 2014) and model validated semi-empirical approaches (Mengel et al. 2016). These provide component-based estimates and introduce new concepts like 'deep uncertainty' related to WAIS contributions that should be introduced.</p> <p>Kopp, R. E., R. M. Horton, C. M. Little, J. X. Mitrovica, M. Oppenheimer, D. J. Rasmussen, B. H. Strauss, and C. Tebaldi (2014), Earth ' s Future Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites Earth ' s Future, , 1–24, doi:10.1002/2014EF000239. Abstract.</p> <p>Mengel, M., A. Levermann, K. Frieler, A. Robinson, B. Marzeion, and R. Winkelmann (2016), Future sea level rise constrained by observations and long-term commitment, <i>Proc. Natl. Acad. Sci.</i>, 113(10), 201500515, doi:10.1073/pnas.1500515113.</p> <p>Bakker, A. M. R., T. E. Wong, K. L. Ruckert, and K. Keller (2017), Sea-level projections representing the deeply uncertain contribution of the West Antarctic ice sheet, <i>Sci. Rep.</i>, 7(1), 3880, doi:10.1038/s41598-017-04134-5.</p> <p>R. E. Kopp, R. M. DeConto, D. A. Bader, R. M. Horton, C. C. Hay, S. Kulp, M. Oppenheimer, D. Pollard, and B. H. Strauss (2017). Implications of Antarctic ice-cliff collapse and ice-shelf hydrofracturing mechanisms for sea-level projections. <i>ArXiv e-prints</i>. eprint: 1704.05597. [Bill Hare, Germany]</p>	Noted section has been considerably revised. The suggested references are not incorporated because they are not particularly relevant to 1.5C



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12373	39	20			[3/3] # Global SLR projections exist for 1.5 and 2 scenarios (Schleussner et al. 2016)  # More in-depth discussion of regional SLR is required including a figure illustrating the differences. This is highly relevant also in the context of component-wise impacts.  # Extreme sea-level: It is very disappointing to see that this is not included at all. Despite the clear impact relevance. This needs to be addressed. References should include:  M. K. Buchanan, M. Oppenheimer, and R. E. Kopp (2017). Amplification of flood frequencies with local sea level rise and emerging flood regimes. Environmental Research Letters 12, 064009. doi: 10.1088/1748-9326/aa6cb3.  Vitousek, S., P. L. Barnard, C. H. Fletcher, N. Frazer, L. Erikson, and C. D. Storlazzi (2017). Doubling of coastal flooding frequency within decades due to sea-level rise, Sci. Rep., 7(1), 1399, doi:10.1038/s41598-017-01362-7.  Albert, S., J. X. Leon, A. R. Grinham, J. A. Church, B. R. Gibbes, and C. D. Woodroffe (2016). Interactions between sea-level rise and wave exposure on reef island dynamics in the Solomon Islands, Environ. Res. Lett., 11(5), 54011, doi:10.1088/1748-9326/11/5/054011. [Bill Hare, Germany]	Accepted text now reflects new papers. Some of the suggested were not relevant to 1.5C and so were not used
5494	39	22	39	23	I find the semicolons (;) confusing, I suggest to rewrite without them: "...contributions from ocean heat uptake and thermal expansion, glacier and ice-sheet mass loss, as well as anthropogenic intervention in water storage on land". [Ismael Nunez-Riboni, Germany]	accepted semicolons removed
2518	39	22	39	27	Update this discussion with results from Kopp et al 2016, Hay et al 2015, Dangendorf et al 2017.  R. E. Kopp, A. C. Kemp, K. Bittermann, B. P. Horton, J. P. Donnelly, W. R. Gehrels, C. C. Hay, J. X. Mitrovica, E. D. Morrow, and S. Rahmstorf (2016). Temperature-driven global sea-level variability in the Common Era. Proceedings of the National Academy of Sciences 113, E1434-E1441. doi:10.1073/pnas.1517056113.  C. C. Hay, E. D. Morrow, R. E. Kopp, and J. X. Mitrovica (2015). Probabilistic reanalysis of 20th century sea-level rise. Nature 517, 481–484. doi:10.1038/nature14093.  Dangendorf, S., Marcos, M., Wöppelmann, G., Conrad, C. P., Frederikse, T., & Riva, R. (2017). Reassessment of 20th century global mean sea level rise. Proceedings of the National Academy of Sciences, 201616007. [Robert Kopp, United States of America]	Accepted these and several other SEM papers are now assessed
481	39	22	39	27	I find it more logical to start by the second and third sentences (sea level rise observations) and then to end with the first sentence (contributions to sea level rise). [David Docquier, Belgium]	taken into account this paragraph has been divided into two. The first covers timescales and components. The second observations.
13725	39	22	41	8	GMSL rise = "GMSLR"? Consistency needed [Elvira Poloczanska, Germany]	accepted now use GMSL rise consistently
7004	39	22	41	19	There is a need to reflect the latest studies in sea-level rise projections that the AR5 assessments could be underestimated and their implications for this report should be fully reflected. References: 1. Rignot, E., J. Mouginot, M. Morlighem, H. Seroussi, and B. Scheuchl (2014). Widespread, rapid grounding line retreat of Pine Island, Thwaites, Smith, and Kohler glaciers, West Antarctica, from 1992 to 2011. Geophys. Res. Lett., 41, 3502–3509. 2. DeConto, R. M., and D. Pollard, 2016: Contribution of Antarctica to past and future sea-level rise. Nature, 531, 591-597, doi:10.1038/nature17145 3. Snow, Water, Ice and Permafrost. Summary for Policy-makers ( <a href="http://www.amap.no/documents/doc/Snow-Water-Ice-and-Permafrost.-Summary-for-Policy-makers/1532">http://www.amap.no/documents/doc/Snow-Water-Ice-and-Permafrost.-Summary-for-Policy-makers/1532</a> ) [Sai Ming Lee, China]	taken into account The first paper is not within the scope of 1.5C. The second is assessed already. The third is grey literature.
16262	39	24	39	24	The way this is phrased, it says that only during the period from late 19th to early 20th century was sea level rising. I would think the intent would say that since that time the sea level has been rising. [Michael MacCracken, United States of America]	taken into account this text has been removed as part of reorganization
474	39	24	39	25	Delete ", and that low rates of rise characterized the previous two millennia". This is confusing since the point is to say that sea level has risen in the century. [David Docquier, Belgium]	taken into account this text has been removed as part of reorganization
475	39	26			Replace '0.17 and 0.21' by '0.17 to 0.21'. [David Docquier, Belgium]	taken into account this text has been removed as part of reorganization
1950	39	26	39	26	by should read "by between" [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	taken into account this text has been removed as part of reorganization
476	39	26	39	27	Rephrase: 'from 1901 to 2010 at a rate of 1.7 mm per year (3.2 mm per year from 1993 to 2010)'. [David Docquier, Belgium]	taken into account this text has been removed as part of reorganization
16263	39	28	39	28	Where is the paragraph on projections for the 21st century? Next sentence jumps to after 2100. [Michael MacCracken, United States of America]	taken into account this text has been removed as part of reorganization
477	39	29	39	31	It is strange to talk about 'beyond 2100' before talking about projections up to 2100. I would re-organize this paragraph to first talk about projections up to 2100, and then about 'beyond 2100'. [David Docquier, Belgium]	taken into account this text has been removed as part of reorganization
19701	39	30	39	33	Overall comment that this chapter should look at the impacts of climate change on the full range of human rights. Look at the reports and briefings of OHCHR on climate change and human rights for guidance. See also this report by the Special Mandate holders of the Human Rights Council. OHCHR (2015) The Effects of Climate Change on the Full Enjoyment of Human Rights. [Tara Shine, Ireland]	taken into account this comment is out of scope for the present section, which focusses on the physical system
19702	39	30	39	33	See also A/HRC/10/61 15 January 2009: Report of the Office of the United Nations High Commissioner for Human Rights on the relationship between climate change and human rights. Online at <a href="https://documents-dds-ny.un.org/doc/UNDOC/GEN/G09/103/44/PDF/G0910344.pdf?OpenElement">https://documents-dds-ny.un.org/doc/UNDOC/GEN/G09/103/44/PDF/G0910344.pdf?OpenElement</a> [Tara Shine, Ireland]	taken into account this comment is out of scope for the present section, which focusses on the physical system
16264	39	31	39	31	by the end of what century—the 22nd? [Michael MacCracken, United States of America]	taken into account this text has been removed as part of reorganization
745	39	32	39	32	It reads 'present day sea level' it should read 'sea level' [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	taken into account this text has been removed as part of reorganization

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
478	39	32	39	33	I do not understand this sentence. [David Docquier, Belgium]	taken into account this text has been removed as part of reorganization
7565	39	33	39	33	should change "ice sheet outflow" to "ice sheet and glacier ablation"; mountain glaciers were also included in AR5 and outflow is not the best description of ice mass loss [William Kochtitzky, United States of America]	Accepted paragraph reworded so that it is clear SMB and outflow refer to both ice sheets and glaciers
7566	39	33	39	33	should change "ice sheet outflow" to "ice sheet and glacier ablation" or "ice mass loss"; mountain glaciers were also included in AR5 and outflow is not the best description of global ice mass loss [William Kochtitzky, United States of America]	Rejected outflow is used for comparability with AR5
11998	39	33	39	33	DELETE "it" leaving "...inundated" is" shifted.... [Paul Doyle, Canada]	taken into account this text has been removed as part of reorganization
11999	39	33	39	33	Assume that GMSLR means GMSL rise but do not see acronym explained in text. [Paul Doyle, Canada]	accepted now use GMSL rise consistently
10480	39	33	39	33	"...inundated is shifted further..." (dropping "..., it...") [Jonathan Lynn, Switzerland]	taken into account this text has been removed as part of reorganization
5884	39	33	39	36	Please substitute "GMSLR" with "GMSL rise". [Joan A. Lopez-Bustins, Spain]	accepted now use GMSL rise consistently
479	39	40			Delete 'of' after 'assessment'. [David Docquier, Belgium]	taken into account this text has been removed as part of reorganization
480	39	40			In the AR5 report, this contribution is called 'thermal expansion' and not 'ocean heat uptake and thermal expansion'. The former terminology is simpler. I think an explanation is needed at the beginning of this sub-section if you decide to keep the latter terminology. [David Docquier, Belgium]	Accepted text revised accordingly
10481	39	40	39	40	"...in the AR5 assessment (Church et al. 2013)... dropping "of" [Jonathan Lynn, Switzerland]	editorial issues with mendeley
5495	39	40	39	41	...dominant component in the AR5 assessment of (Church et al...): Delete the parenthesis? [Ismael Nunez-Riboni, Germany]	editorial issues with mendeley
16265	39	41	39	42	Why is the baseline period 1986-2005? Many cities and ecosystem edges were established based on the preindustrial baseline--why is that not used? [Michael MacCracken, United States of America]	taken into account we use AR5 baseline here for comparability
21146	39	44	39	45	SLCPs also contribute to long-term sea-level rise through thermal expansion despite their short lifetimes in the atmosphere (Zickfeld et al 2017, Centuries of thermal sea-level rise due to anthropogenic emissions of short-lived greenhouse gases, PNAS, doi/10.1073/pnas.1612066114). [Nathan Borgford-Parnell, Switzerland]	taken into account reference to GHG removed
10671	39	44	39	45	SLCPs also contribute to long-term sea-level rise through thermal expansion despite their short lifetimes in the atmosphere (Zickfeld et al 2017, Centuries of thermal sea-level rise due to anthropogenic emissions of short-lived greenhouse gases, PNAS, doi/10.1073/pnas.1612066114). [Kristin Campbell, United States of America]	taken into account reference to GHG removed
16266	39	45	39	45	I think using "mitigates" here will add to the confusion of the use of the word. Virtually everywhere else it means reducing emissions, but not here? Just say "reduces the rate of rise of GMSL" [Michael MacCracken, United States of America]	Accepted text revised accordingly
12000	39	45	39	45	GMSLR returns to GMSL rise here and there in remainder of setion 3.3.10. Choose one or the other. [Paul Doyle, Canada]	accepted now use GMSL rise consistently
8011	40	1	40	2	balance between increased warming towards the end of the century and the depletion of low-elevation ice. [Robert Shapiro, United States of America]	Accepted. Text reworded
5285	40	1	40	2	complex sentence. What do you imply? [Bart Van den Hurk, Netherlands]	Accepted. Text reworded
16267	40	2	40	2	Change to "century and the depletion" [Michael MacCracken, United States of America]	Accepted. Text reworded
12001	40	2	40	2	ADD "and"...to.... the century "and" the depletion.... [Paul Doyle, Canada]	Accepted. Text reworded
10482	40	7	40	13	iceberg/icebergs not ice berg / ice bergs [Jonathan Lynn, Switzerland]	Taken into account icebergs spelling changed throughout
5885	40	7	40	13	Please substitute "ice berg" with "iceberg". [Joan A. Lopez-Bustins, Spain]	Taken into account icebergs spelling changed throughout
8012	40	7	40	7	ice berg should be iceberg [Robert Shapiro, United States of America]	Taken into account icebergs spelling changed throughout
5496	40	7	40	7	ice berg should be "iceberg"? [Ismael Nunez-Riboni, Germany]	Taken into account icebergs spelling changed throughout
18009	40	10	40	10	HAPPIMIP project, other places such as Page 34 Line 34 use "HAPPI project" or "HappiMIP in Page 43 Line 43 should keep consistent through the draft? [Wilfran Moufouma Okia, France]	Accepted new literature now available
5286	40	10	40	10	including mechanistic studies on calving processes? [Bart Van den Hurk, Netherlands]	Taken into account. This sentence has been dropped.
16272	40	12	40	14	Is it not the case that the loss of mass from Greenland and isostatic rebound can lead to changes in the shape of the ocean basin and distribution of water mass that lead to SL rise? Yes, mostly expressed regionally, but given shape of Earth, etc., might there also be a global net? In any case that such changes can cause changes in how the global rise in sea level is distributed needs to be at least mentioned. [Michael MacCracken, United States of America]	Taken into account. This is a factor and would be incorporated models looking at the gravitational response to this change in load.
483	40	12	40	15	Rephrase: 'The Greenland ice sheet contributes to GMSL rise by increases in ice surface melt and increases in ice outflow (e.g. iceberg calving of and melt at the termini of marine outlet glaciers). While projections of the former process are routinely made, process-based modelling of the latter is in its infancy.' [David Docquier, Belgium]	Taken into account. This paragraph has been revised and this text removed.
485	40	12	40	21	I suggest re-writing this paragraph as it does not read very well. [David Docquier, Belgium]	Taken into account. This paragraph has been revised and this text removed.
7567	40	13	40	13	ice bergs should be changed to "icebergs" [William Kochtitzky, United States of America]	Taken into account icebergs spelling changed throughout
484	40	16			Rephrase: 'Fuerst et al. (2015)' instead of 'Subsequently, Fuerst et al. (2015)'. [David Docquier, Belgium]	Accepted
487	40	23	40	34	While these results are very interesting, I am wondering if they fit into this report aiming at assessing the impacts at 1.5°C. Anyway, this paragraph seems to be a bit too technical for the purpose of this report. [David Docquier, Belgium]	Rejected long-term commitment to SLR is crucial to the report
16268	40	24	40	24	Irreversible loss of the ice sheet--by when, during the 21st century which is the period being talked about? Please clarify. [Michael MacCracken, United States of America]	Taken into account. The timescale is made clear in the remainder of the paragraph.
486	40	26	40	27	SMB = difference between mass gain and mass loss at the ice surface. Rephrase: 'net surface mass balance (SMB, the difference between mass gain at the ice surface, mostly snowfall, and mass loss at the surface, mostly surface melt and subsequent runoff) first becomes'. [David Docquier, Belgium]	Accepted. This wording is better. Sentence itself has been moved to earlier in the subsection.
16269	40	28	40	28	Is the 2 C number given for the temperature of the ice sheet or for the change in global average temperature? Given that the GIS is losing mass now at 1 C global warming, how is the 2 C figure justified? Clarification is needed. [Michael MacCracken, United States of America]	Rejected. This is a direct link to the AR5 assessment, unclear why that would need to be justified.
12002	40	29	40	29	..... "dynamic".....instead of.... "dynamical"..... [Paul Doyle, Canada]	Taken into account. Sentence has been reworded.
16270	40	31	40	31	can be tens of millennia--is this an upper limit? If so, please also give the lower limit (for say half or more to be lost--so 10 feet/3 meters of SL rise). As is, the statement is just not helpful. [Michael MacCracken, United States of America]	Accepted have revised the wording to give a range.
8013	40	32	40	32	Where should be Were [Robert Shapiro, United States of America]	Accepted this correction
11710	40	32	40	32	"Were", not "where" [David Schoeman, Australia]	Accepted this correction

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16271	40	32	40	34	First, change "Where" to "were". Second--cool by how much? Greenland is losing mass when the increase in global average temperature is 1 C and this volume apparently does not envision going back below 1.5 C (a level too high in my opinion, but seemingly built into the analysis). So, if this is the case, then suggesting there might be regrowth is simply not consistent with what the is being discussed and is misleadingly optimistic. I am all for going back to below 0.5 C and statement might be possible in that case, although I recall an early Wigley paper suggesting one would have to go back below 300 ppm (even well below) to really stop the loss of mass from ice sheets and ongoing sea level rise. [Michael MacCracken, United States of America]	Accepted/rejected. Where replaced. Clearly, if temperatures were to return to preindustrial regrowth could well occur.
10483	40	36	40	40	long sentence with parentheses and hard to follow could possibly be simplified e.g. recasting as two sentences [Jonathan Lynn, Switzerland]	Taken into account. This paragraph has been simplified in the SOD.
488	40	38			Add 'of between 'retreat' and 'an'. [David Docquier, Belgium]	Accepted. This sentence has been rewritten and moved elsewhere.
8014	40	38	40	38	retreat an ice sheet' should be 'retreat of an ice sheet' [Robert Shapiro, United States of America]	Accepted. This sentence has been rewritten and moved elsewhere.
16274	40	39	40	40	This seems too easy a way to get around discussion of potential for collapse (MISI). Are the models really complete enough and verified in some way that their mechanistic approach is clearly superior? Can these models simulate a collapse (DeConto and Pollard I think perhaps do, but it seems to me too early to give up the earlier types of analyses. Lines 5-8 on page 41 seem to suggest it could be used, but then don't seem to carry through the discussion with respect to the rise in the global average sea level, as lines 10 and following seem to focus on regional aspects. [Michael MacCracken, United States of America]	Taken into account. Revised draft includes reference to SEMs etc.
489	40	42			It does not really make sense to divide 3 papers into 2 groups. I would delete the first sentence of this paragraph. Furthermore, the 2 groups are not really compared since an estimate is given for the first group (below 1m) and a comparison between 2 emission scenarios is provided for the second group (A1B vs. E1). A last study is mentioned at the end of the paragraph (Levermann et al. 2014), which is not included in the 2 groups. I would rethink the structure of this paragraph. [David Docquier, Belgium]	Taken into account. This paragraph has been substantially revised and this confusion has been revised.
3842	40	42	41	3	The paragraph starts with "three main papers". However, it is not clear what exactly they are, since there are a lot more references in the paragraph. I think two of them are DeConto and Pollard (2016) and Golledge et al (2015). It is difficult to figure out what the third one is. [Woonsup Choi, United States of America]	Taken into account. This paragraph has been substantially revised and this confusion has been revised.
5287	40	44	40	44	contributions of what? Antarctic ice sheets? [Bart Van den Hurk, Netherlands]	Rejected. The sentence makes it clear that the contributions are to sea level.
12003	40	48	40	48	CHANGE.... "outflow, however increases" ....to..... "outflow; however, increases"..... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
12004	40	49	40	49	CHANGE.... "compensates" ..to.... "moderates" ..:..... [Paul Doyle, Canada]	Rejected. These are two different mass fluxes. They cannot therefore moderate each other.
490	40	52			Re-write: 'employed. Cornford et al. (2015) used'. [David Docquier, Belgium]	Taken into account. This sentence has been revised.
16273	40	53	40	56	My understanding that a key part of the DeConto and Pollard effort has been validating the model against a quite long history of Antarctic ice sheet behavior, finding that only with this calving mechanism can the past history be credibly simulated. I would think that mention of their validation needs to be mentioned--it really does seem to give their approach with this "new" mechanism provides more credibility than for other models that generally cannot reproduce the history of ice on Antarctica. I would note also that their mechanism leads to some thinning of ice shelves, etc. [Michael MacCracken, United States of America]	Taken into account. This is a very complex topic and difficult to treat adequately given the context of this report. Added references and stressed uncertainty associated with this process, in particular Edwards et al (sub) suggest that claims made by deC&P about paleo evidence may be misleading.
12005	40	54	40	54	CHANGE.... "collapse), however the" ...to..... "collapse); however, the".... [Paul Doyle, Canada]	Taken into account. This paragraph has been substantially rewritten.
5288	40	54	40	55	however the amount of surface warming required to initiate this process seems very unlikely...: I don't understand this "however": isn't this the reason why DeConto and Pollard consider RCP2.6 the only one that can limit Antarctic contributions to GMSL rise? [Bart Van den Hurk, Netherlands]	Taken into account this section replaced by assessment of more recent literature
10018	41		41		Row 47 and 52: 1.5 vs 2 should be written 1.5 vs 2 °C [Nazan AN, Turkey]	Editorial - copy-editing for consistency to be completed prior to publication
12006	41	1	41	3	Trouble understanding this sentence. "committed?", "present?" ??? [Paul Doyle, Canada]	Rejected present in the sense of may exist, long-term committed because the SLR will happen even with stabilised global temperatures
7621	41	3			RC2.6 should be revised to "RCP2.6". [Keiko Udo, Japan]	Accepted text revised
18010	41	3	41	3	is this "RC2.6" or "RCP 2.6"? [Wilfran Moufouma Okia, France]	Accepted text revised
3964	41	5	41	5	The methodology used by Church should be briefly outlined. Currently there is an expectation that the reader will know what this method is (and this one didn't!) [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account this section replaced by assessment of more recent literature
10484	41	5	41	5	drop comma after projections [Jonathan Lynn, Switzerland]	Taken into account this section replaced by assessment of more recent literature
491	41	5	41	8	If there is potential, it would be very useful to use it in the present report. Otherwise, do not mention it. [David Docquier, Belgium]	Taken into account this section replaced by assessment of more recent literature
11711	41	11	41	12	"it is also very likely that over about 95% of the world's ocean will experience sea level rise" the "over about" here introduces a bit of confusion to the sentence. [David Schoeman, Australia]	Taken into account this section replaced by assessment of more recent literature
16275	41	15	41	15	This focus about the rise in sea level by 2100 needs to be augmented by the point that sea level will continue to rise thereafter. I'd also like to suggest another way to present the projections of sea level, and that is to give a range of years for when some level will be reached, for example, a 1 m rise will likely be reached between 2060 and 2120 or something and a 1.5 m rise between 2090 and 2150, a 2 m rise between 2110 and 2160, etc. With respect to sea level, how much the rise will be is, for many potential decisions, more important than exactly when it will occur (i.e., would policymakers really make a different decision about sea level rise if it were a level to be reached in their child's versus their grandchild's lifetime?). So, I think it would be useful to give an indication of how high the suggested equilibrium value will be and time spans for when increments of that amount are likely to occur. [Michael MacCracken, United States of America]	Taken into account. This discussion has been revised. We are now clearer on timescales.
6805	41	15	41	16	Recent investigations highlight an expected increase in flooding frequency due to extreme water levels enhanced by wave action, particularly in the Tropics (Vitousek et al., 2017, Scientific Reports, 7: 1399). This aspect of coastal flooding should be highlighted, as such compound dynamics are likely to be the most relevant and impactful changes. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Accepted more recent literature allows a fuller assessment than was possible for the FOD
6806	41	17	41	17	The assumption that increased mean sea level is the main driver of extreme sea levels is perhaps incorrect, and relying exclusively on tide gauges to assess differences in return periods for extreme water levels is likely to grossly underestimate the compound nature of extreme sea level events. Extreme sea level events are often dependent more on atmospheric/oceanographic components leading to storm surge (reduced atmospheric pressure and wave/wind-induced water piling against the coast) than on the changes in RSL. Moreover, for several major global cities, extreme sea levels result from combination of coastal and river flooding (e.g. Mofakkhari et al., 2017, PNAS, 114, 37). [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. While this is true, we could not have literature in the context of 1.5C

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11712	41	19	41	22	This looks more like dot-point notes that a considered paragraph... [David Schoeman, Australia]	Accepted - The previous version which consisted of a bulleted outline only has now been replaced with text.
13889	41	21			I hope this box will also integrate across WGI and WGII rather than a separation discussion [Elvira Poloczanska, Germany]	The Box is still divided in 2 main sections devoted to WGI and WGII. However within each an attempt has now been made to integrate across the issues of each WG.
6234	41	21			Small Island Developing States (not Small Developing States). [Muhammad Mohsin IQBAL, Pakistan]	Accepted. The word 'island' is now included in the title.
7622	41	21			Small Developing States should be revised to "Small Island Developing States". [Keiko Udo, Japan]	Accepted. The word 'island' is now included in the title.
3546	41	21			SIDS stands for Small Island Developing States [Sylvia Sander, Monaco]	Accepted. The word 'island' is now included in the title.
13726	41	21	41	21	should say "Small Island Developing States" [Elvira Poloczanska, Germany]	Accepted. The word 'island' is now included in the title.
2022	41	21	41	21	SIDS mean "Small Island Developing States"...."Island" is missing. [Md. Sirajul Islam, Bangladesh]	Accepted. The word 'island' is now included in the title.
12007	41	21	41	21	Box 3.4: Small "Island" Developing States (SIDS)? Box 3.4 long way to go and not yet referenced in text. [Paul Doyle, Canada]	Accepted - The previous version which consisted of a bulleted outline only has now been replaced with text.
19014	41	21	42	16	In order to improve this Box 3.4, please visit this reference "GEO SIDS, Small Island Developing States Outlook", published by UNEP in 2014. [JACQUES-ANDRE NDIONE, Senegal]	The reference was consulted as suggested for guidance.
14343	41	21	42	16	Box 3.4 (and in particular point 2.) should be extended and elaborated. The following points should be added: (a) Impacts on groundwater resources and salinization due to sea level rise and more frequent flooding events. (b) Flooding due to sea level rise, increase in the number of extreme events, increase in wave height at the shoreline due to higher water depth as a result of sea level rise, possible increase in wave height due to a reduction in bottom friction as a result of corals deterioration (c) Land loss due to sea level rise [Alessio Giardino, Netherlands]	Accepted - The previous version which consisted of a bulleted outline only has now been replaced with text. In the revision the impacts on freshwater resources, flooding, sea level rise and land loss are now considered.
2715	41	21	42	16	It would be good to include poverty and inequality impacts in this box - perhaps Chapter 5 could help. [Penny Urquhart, South Africa]	The issues are not mentioned in the Box due to unavailability of literature specific to 1.5. However a reference has been made to the Box in Chapter 5, which examines some of these issues for SIDS.
17263	41	21	42	17	I do not think this box 3.4 is justified: "what is a small developing state", when would stop from being small and become "medium or big"? Should it not be mentioned here all those possible small islands that could disappear with sea level increase? [Maria Jesus Iglesias Briones, Spain]	The previous version omitted the word 'island' from the title. This version is specific to Small Island Developing States.
2034	41	33			In summer seasons, probably, at least Iran STHP will somehow wetter (Based on My researches so far has not published). [Mohammad Ahmadi, Iran]	Accepted. The original text was indicative only. The revised text uses available literature specific to 1.5 to assess changes in rainfall regimes. It is also specific to SIDS.
4319	41	38	41	38	1.5" the C is missing [teodoro georgiadis, Italy]	Editorial - copy-editing for consistency to be completed prior to publication
14360	41	48	41	49	These impacts are generally magnified on small islands due to limited areas, isolation and high levels of endemic species: an example of this is given in Daliakopoulos et al. (2017)	The reference provided has been reviewed. Ecosystem impacts are however largely treated as a gap given the absence of literature specific to SIDS and 1.5.
10243	41	50	41	52	Daliakopoulos, I.N., Katsanevakis, S., Moustakas, A., 2017. Spatial Downscaling of Alien Species Presences using Machine Learning. <i>Frontiers in Earth Science</i> 5:60. doi: 10.3389/feart.2017.00060 [Ioannis Daliakopoulos, Greece]	Ecosystem response is now acknowledged in the text and also noted as a gap due to the lack of literature specific to 1.5.
4320	41	52	41	52	One needs to include estuaries as a part of coastal ecosystems. They are invaluable for providing nutrition to local species. They also form a natural barrier in case of flooding as they absorb extra sea water. When temperature rises they may act as a buffer when sea temperature rises by allowing for a gradual adaptation of the local biodiversity. (e.g. for classification see <a href="http://spo.nwr.noaa.gov/tm/tm43.pdf">http://spo.nwr.noaa.gov/tm/tm43.pdf</a> ) [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copy-editing for consistency to be completed prior to publication
2621	42	1	42	17	in both 1.5 and 2 the °C are missing [teodoro georgiadis, Italy]	In the framing for the revised text, explicit mention is made of some of the unique challenge posed by climate change in terms of ability to adapt. The Box now also refers to other sections of the report which examine adaptation abilities and constraints specific to SIDS.
9482	42	1	42	4	make a clearer reference to adaptive capacity? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Salinization is now acknowledged in the text. Literature specific to food production for SIDS at 1.5 or 2.0 is also noted as a gap.
5107	42	1	42	4	Regarding impacts on food production and livelihoods in SIDS: I recall that a further potential impact is reduction of land-based food production in some island areas due to salination resulting from sea level rise. As I am writing these comments in transit at an airport I'm unable to follow up with specific references for this - but you may like to consider it. [David Wratt, New Zealand]	Salinization is now acknowledged in the text. Literature specific to food production for SIDS at 1.5 or 2.0 is also noted as a gap.
13890	42	3	42	4	regarding food production impacts in SIDS – w/ SLR, salinization may also be an issue for any land-based food production. [Tonya Rawe, United States of America]	Accepted. The impacts on fisheries are better articulated in the expanded text with literature specific to 1.5 used to support the conclusions drawn.
3547	42	8			Only for some islands, negative for others see WGII AR5 30.6.2.1.1 [Elvira Poloczanska, Germany]	Accepted. Hurricanes are now discussed in text as well as increased exposure of coastal assets.
17383	42	9	42	12	content of box: add higher likelihood of hurricanes to list of potential effects for tourism. [Sylvia Sander, Monaco]	The revised text includes references to studies focused on internal migration, freshwater stress and transportation (mainly impact on infrastructure) with a specific 1.5 focus. Space constraints however limit the extent to which each is developed. The Box also refers to other sections of the report which include assessment of some of these issues in relation to SIDS. The two references provided were read though not explicitly referenced in the text..
2301	42	13	42	14	Effect of internal migration on the main islands in many SIDS island groups is a key effect, with outlying islands often increasingly vulnerable, especially in atoll clusters, with ground water stress being exacerbated. This migration from smaller islands can also lead to reductions in inter-island shipping services impacting the investment in infrastructure etc. Newell, A. & Bola, A. 2014. Solodamu: A Survey of Fuel and Transport Use in a Coastal Village on Kadavu, Fiji. <i>Journal of Pacific Studies</i> . Nuttall, P.R., Newell, A., Bola, A., Kaitu'u, J. & Prasad, B. 2014. "Policy and financing - why is sea transport currently invisible in the search for a low carbon future for Pacific Island Countries?", <i>Frontiers in Marine Science</i> , [Online], vol. 1, , pp. <a href="http://journal.frontiersin.org/Journal/10.3389/fmars.2014.00020/abstract">http://journal.frontiersin.org/Journal/10.3389/fmars.2014.00020/abstract</a> . Moon, J.R., 2013, Strengthening Inter-Island Shipping in Pacific Island Countries and Territories, Economic and Social Commission for Asia and the Pacific (ESCAP). [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	The indicative bullet points have now been replaced by text. The material is focused on the issue of 1.5oC and although the issue is mentioned in the context of SIDS, it is largely treated as a gap in the existing literature.
					The text is: "Public health. SIDS suffer from climate sensitive health problems, including morbidity and mortality from extreme weather events and certain vector, food and water-borne diseases" and should be: "Public health. SIDS suffer from climate sensitive health problems, including morbidity and mortality from extreme weather events and certain vector, air quality, food and water-borne diseases" [Begoña ARTIÑANO, Spain]	

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13891	42	18			Connection to degree of climate change needed for this and other sections of the chapters. [Elvira Poloczanska, Germany]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
746	42	18	42	18	Section 3 should be in Box 3.4 [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
10485	42	18	42	18	is the sub-heading correct especially the numbering 3.? [Jonathan Lynn, Switzerland]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
5497	42	18	42	22	This subsection, "3. Updated Key risks" seems to be some kind of "internal note" that should not be in the report, the text is some kind of "to do list" or so... The numbering (3) does not match what the reader would expect (it is between 3.3.10 and 3.3.11). Delete? [Ismael Nunez-Riboni, Germany]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
13727	42	18	42	22	Where does this section belong to???? [Elvira Poloczanska, Germany]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
5289	42	18	42	22	must be part of the box I guess [Bart Van den Hurk, Netherlands]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
492	42	18	42	22	Is it at the right place? [David Docquier, Belgium]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
3965	42	19	42	22	The "updated key risks" section seems to be out of place, perhaps it's supposed to be in box 3.4? [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	The text being referenced was not appropriately placed and was not a part of the SIDS Box.
3550	42	25		31	entire paragraph 3.3.11 Ocean chemistry: This paragraph is very weak and does not represent the importance the chemistry of the ocean has on the Earth's wellbeing. E.g. there are many predictions on how the increased aerosol depositing due to the expansion of arid areas will impact the primary productivity which in turn can have strong feedback mechanisms on climate change. Several good modelling papers have had this as their topic. There also have been numerous papers on the effect of temperature alone, and multiple stressors added to a temperature increase, such as pH, O <sub>2</sub> , toxic trace metals, etc. on single species or ecosystems. This topic has been omitted entirely here. I am more than happy to make a larger contribution for this paragraph. [Sylvia Sander, Monaco]	Taking into account - have strengthened the message and included more examples of the impacts. Note that this section is focused on describing the chemical and physical changes while later sections focus on biological and human related responses - including impacts of cumulative stress. Also, we are not comprehensively reviewing ocean chemistry but our setting up the later discussions with respect to 1.5 versus 2°C.
13728	42	25	43	31	Be more specific. What are the projected risks? What are the avoided risks at 1.5°C? [Elvira Poloczanska, Germany]	Noted.
7458	42	27	42	31	It is unclear in this paragraph whether "inundation" refers to flooding of coastal areas or freshwater input from land [Øyvind Christophersen, Norway]	Accepted: we have added '(e.g. rainfall)' after inundation to be clear that we mean precipitation and run-off.
13398	42	27	42	31	Ocean chemistry is also influenced by river runoff. This should be mentioned here. [Helene Muri, Norway]	Accepted: we have added 'river run-off,' as one of the factors affecting ocean chemistry.
13892	42	33	42	39	Is this detail necessary? Repeats AR5 [Elvira Poloczanska, Germany]	There are significant risks involved and hence we believe this level of detail is important. That said, we have tightened up the text and have shortened it to a small extent.
3548	42	35			... which dissociates [Sylvia Sander, Monaco]	Accepted - word changed to 'dissociates'
7460	42	35	42	37	Is it a word missing in this sentence describing what is happening with the concentration of key ions? [Øyvind Christophersen, Norway]	Accepted: missing words added
7459	42	35	42	38	For quite many years now, the value 0.1 have been used as the global average pH reduction in the ocean surface since Preindustrial Period. This corresponds to a 26% increase in H <sup>+</sup> ions. Taking into account the fast ongoing decrease in pH, it should be considered to update this value. Chapter 3.8.2 in the AR 5 WG 1 report gives a global mean decrease in surface water pH of 0.08 from 1765 to 1994. This, combined with the information about rate of pH change given in the same chapter indicates that the global mean decrease in surface water pH at present could be about 0.12 units, corresponding to approx. 30% increase in H <sup>+</sup> ions since preindustrial time. It should be checked if it is possible to update the value for pH lowering based on the latest scientific literature. [Øyvind Christophersen, Norway]	To reflect this common, have used 30%. Exact value is complicated by structure of the surface layers of the ocean and the degree to which CO <sub>2</sub> is penetrated.
19057	42	36	42	36	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Accepted - usage now uniform
16276	42	41	42	41	It would be useful to the reader to mention why 65Ma is considered a potential boundary—namely a major asteroid impact. [Michael MacCracken, United States of America]	Taken into account - text not changed as the text in question is a quote from AR5.
7461	42	41	42	44	Please consider including this in the executive summary [Øyvind Christophersen, Norway]	Taken into account
13893	42	43	42	43	Confidence for this may no longer be as high as stated, see papers by Wolfgang Kiessling GeoZentrum Nordbayern [Elvira Poloczanska, Germany]	Rejected - Kemp et al 2012 previous rates of change in temperature in the geological record.
10486	42	44	42	44	what is 65 Ma? Million years? [Jonathan Lynn, Switzerland]	Correct. Left as is because it is a quote from a paper by Honisch et al. 2012.
2519	42	47	42	47	Check your source for the age of the PETM. Storey et al (2007) had this at 55.6 ka. [Robert Koppu, United States of America]	Accepted: using updated age of PETM of 55.5 million years ago - added reference: McNerney, F. A. & Wing, S. L. The Paleocene–Eocene thermal maximum: A perturbation of carbon cycle, climate, and biosphere with implications for the future. Annu. Rev. Earth Planet. Sci. 39, 489–516 (2011).
12008	42	47	42	47	Don't understand meaning of " (PETM, 55.3 Ma" as a reference? [Paul Doyle, Canada]	Paleocene–Eocene Thermal Maximum (PETM) - used as period in which a rapid change in carbon dioxide, temperature and hence ocean acidification.
3549	42	49			you just said that it takes thousands of years to reverse ocean acidification, so it is not irreversible. It may be irreversible in human timescales. [Sylvia Sander, Monaco]	Accepted: have added '(on human timescales)
9483	42	52	43	1	Consider adding something here about the vulnerability of deep water corals? As per my comments on Page 8 Line 33, I understand they are particularly vulnerable to the effects of ocean acidification. (Sorry no references from me - writing this in transit at an Airport). [David Wratt, New Zealand]	The relative sensitivity of deep water corals is covered by Kroecker et al. 2013 - which is referred to.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12374	43	3			Table 3.1: Please revisit tropical cyclones attribution in the light of table SPM1s footnote on Atlantic cyclones. Runoff and flooding: It is unclear why multi-model intercomparisons results from ISIMP are insufficient to increase confidence here. There are clear changes in runoff projected and it is very confusing why heavy precip and drought get higher confidence levels.  Furthermore, the column 'detected observed changes' column could be put in perspective of the warming over the observed period that underlies this statement. In particular, it should be considered how statements on attribution can be linked to observed 0.5°C warming increments. [Bill Hare, Germany]	Accepted: text modified, tables are not being used in latest version.
12009	43	3	43	3	ADD....yet "they" amplify..... [Paul Doyle, Canada]	Accepted.
12010	43	8	43	8	ADD.... by "the" end of "the" century. [Paul Doyle, Canada]	Accepted and text modified.
3551	43	12			sentence has problem with singular/plural. Exchange has with have [Sylvia Sander, Monaco]	Accepted and text modified.
10487	43	12	43	12	"increasing temperatures ... have led..." not "has led" [Jonathan Lynn, Switzerland]	Accepted and text modified.
3552	43	13			same as above plural ! Must be ...' have increased'... same sentence exchange 'frequency of areas' with 'number of areas', frequency is a kinetic expression. [Sylvia Sander, Monaco]	Accepted.
11713	43	13	43	13	2% per what? Year? Decade? Century? [David Schoeman, Australia]	Accepted - have modified text to 'by 2% since 1960 '
22	43	15	43	16	About the risks of broadening of the "dead zones" in the tropics Altieri et al. 2017 study is strictly limited to the specific coral reefs environment and should not be extrapolated to the tropics sensu lato. [Paul TREGUER, France]	Accepted - text modified to 'Changes in ocean mixing together with increased metabolic rates in the deep ocean has increased the frequency of areas (dead zones) which are areas where oxygen has fallen below levels that fail to sustain oxygenic life, with increasing risks (doubling every decade, INSERT Diaz and Rosenberg 2008). Drivers are complex and include both climate change and other factors (Altieri and Gedan 2015). Recent studies have identified risks for tropical regions as well (Altieri et al. 2017). '
12011	43	16	43	16	CHANGE..... "for broader regional impacts such as in the tropics".... [Paul Doyle, Canada]	Accepted - see previous comment response
3553	43	20			what about the antarctic, i.e. southern ocean. [Sylvia Sander, Monaco]	Accepted - mention of polar regions now added. Reference to increasing acidification , oxygen with latitude, and to the impacts on key organisms such as pteropods.
13729	43	22	43	26	Please clarify that here you are referring to Ocean Acidification in particular (and not "ocean chemistry" in general ); all publications given as reference are about Ocean Acidification [Elvira Poloczanska, Germany]	Accepted - have changed 'ocean chemistry' to 'ocean acidification'.
16277	43	22	43	31	Given the seriousness of this issue, I would think that a fuller explanation would be appropriate. [Michael MacCracken, United States of America]	The material is focused on the issue of 1.5oC and hence this issue is given some treatment (which is important) but space precludes us from doing more.
13894	43	27	43	31	please consider the structure of the chapter, this climate section brings in ecosystems which is not the case in previous sections [Elvira Poloczanska, Germany]	Rejected - Broad biological responses are to be discussed here prior to discussing impacts on ecosystem services and sectors.
12012	43	29	43	29	ADD....the "same" sensitivity.... [Paul Doyle, Canada]	Accepted
8015	43	29	43	31	The sentence that starts with 'Given' and ends with 'early stage' does not make sense! [Robert Shapiro, United States of America]	Accepted - While many aspects of changes to ocean chemistry are not understood, numerous risks from rapid changes to ocean acidification to biological systems have been identified (Albright et al., 2016; Dove et al., 2013; Gattuso et al., 2015; Kroeker et al., 2013; Pörtner et al., 2014).
12013	43	31	43	31	ADD.... chemistry "are" at.... [Paul Doyle, Canada]	Accepted
13895	43	34			how does this differ from 3.3.1 Global changes in climate???? [Elvira Poloczanska, Germany]	Taken into account. Subsections 12 and 13 combined and completely rewritten
7462	43	34	46	1	Please consider highlighting this important part of the chapter in some way, i.e. as a part of the executive summary or by placing it right after the executive summary [Øyvind Christophersen, Norway]	Taken into account. Subsections 12 and 13 combined and completely rewritten
493	43	36			What is the point of having only one sub-section (3.3.12.1) within Section 3.3.12? [David Docquier, Belgium]	Taken into account. Subsections 12 and 13 combined and completely rewritten
9795	43	43	17	20	Durack et al. (2012) pointed out that fresh regions in the ocean become fresher and salty regions become saltier in response to observed warming, which is attributed to a water cycle intensification due to global warming and cited by AR5 chapter 30. The last sentence "Some regions....." is not their key point. Please check that. In addition, the word "inundation" used over the ocean will seem not so reasonable. [Rongshuo Cai, China]	Taken into account. Subsections 12 and 13 combined and completely rewritten
19015	43	43	43	43	Instead of writing of "(Mitchell et al. (2017) [...])", please write "(Mitchell et al. 2017) [...]" [JACQUES-ANDRE NDIONE, Senegal]	Taken into account but already mentioned under biomes towards end of box.
5886	43	43	43	43	HappiMIP or HAPPIIP? A bracket is missing after "(2017)". [Joan A. Lopez-Bustins, Spain]	Taken into account. Subsections 12 and 13 combined and completely rewritten
12014	43	46	43	46	Table 3.1: Caption should mention the reference period when quantifying changes. E.g., the mean temp cell for attributed changes uses base period of 1951-2010 perhaps throwing doubt on consistency of analyses. Table needs detailed review when in final draft [Paul Doyle, Canada]	Taken into account. Table 3.1 deleted.
1155	43	46	43	51	The table provides a better reflecting of confidence related to global floods than do other aspects of the chapter. [Seth Westra, Australia]	Taken into account. Table 3.1 deleted.
2023	43	46	44	52	Please review some studies by Prof. Taikan Oki from the University of Tokyo. There are quite a good number of studies on future projection of precipitation by his group for 1.5 and 2 degree C temp rises. [Md. Sirajul Islam, Bangladesh]	Noted.
13896	43	46	46	1	This table offers an opportunity to reduce/remove much of the text in the sections above, and is a reader-friendly presentation of information. [Elvira Poloczanska, Germany]	Taken into account. Table 3.1 deleted.
6186	43	46	46	3	Table 3.1: The lack of information about projected changes at equilibrium is quite stark, and is unlikely to change much. I do not think that the HappiMIP experiments will tell us everything. This table would be a good point to indicate somehow if transient changes are likely to be significantly different from equilibrium however. [Mat Collins, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account but already mentioned under biomes towards end of box.
659	43	46	46	3	It is better to add a map to show the observed present climate and projections of 1.5 global warming. Readers can see both Table and Figure. [Zong-Ci Zhao, China]	Taken into account. Table 3.1 deleted.
699	43	46	46	3	It is better to add a map to show the observed present climate and projections of 1.5 global warming. Readers can see both Table and Figure. [Zong-Ci Zhao, China]	Taken into account. Table 3.1 deleted.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5887	43	46	46	3	This table should specify more region names at regional scale. On the other hand, in "Droughts and dryness" row, those region names as "West Africa", "Southern Africa" or "Mediterranean region" should be located at a "Regionally " section, not in "Globally". Please homogenize criteria when displaying results along the table. [Joan A. Lopez-Bustins, Spain]	Taken into account. Table 3.1 deleted.
4566	44				Tab 3.1 - Change the row "Mean precipitation" and "Temperature extremes" to have rows with temperatures first and with precipitations second. [Radim Tolasz, Czech Republic]	Taken into account. Table 3.1 deleted.
17264	44			46	I am not sure whether this table will improve in the second draft, but as it stands it is meaningless due to the lack of data. The last two columns read the same across the 3 pages. [María Jesus Iglesias Briones, Spain]	Noted. Revised.
3554	44			46	Table 3.1: columns 'Projected changes at equilibrium at 1.5 and 2 deg' seems obsolete as it has only contains a 'Not yet available' which could also be mentioned in caption or text. [Sylvia Sander, Monaco]	Noted. Revised.
10019	44		44		Table 3.1: 1.5° and 2° under projected changes at equilibrium must be 1.5°C and 2°C [Nazan AN, Turkey]	Taken into account. Table 3.1 deleted.
5498	44		44		I guess it is clear that the table is missing 4 references (marked as [REFS?]) [Ismael Nunez-Riboni, Germany]	Taken into account. Table 3.1 deleted.
494	44		46		Table 3.1: This is an important table. I would make much more reference to it throughout the whole Chapter 3. [David Docquier, Belgium]	Taken into account. Table 3.1 deleted.
495	44		46		Table 3.1: I would use exactly the same order as in the text (i.e. temperature on land, precipitation, drought and dryness, runoff and flooding, etc.). This is not currently the case. It would be much easier for the reader. [David Docquier, Belgium]	Taken into account. Table 3.1 deleted.
496	44		46		Table 3.1: I would separate qualitative and quantitative results with colour backgrounds, e.g. light blue background for qualitative results and light red background for quantitative results. [David Docquier, Belgium]	Taken into account. Table 3.1 deleted.
498	44		46		While it is interesting to have an assessment for 1.5°C and another assessment for 2°C, the table is less easy to read if there are too many columns. I suggest only including the 1.5°C column, especially when considering the title of this report. [David Docquier, Belgium]	Taken into account. Table 3.1 deleted.
4321	44	2	44	2	last columns C are missing [teodoro georgiadis, Italy]	Noted.
17714	44	40	44	40	Global temperature records: Mann et al. 2016 Sci. Rep. [Ana Bastos, France]	Not able to identify sentence or paragraph
3872	45	1	45	1	In the row "Droughts and Dryness," column "Detected Observed Changes," add western North America so that it reads "...southern Europe, West Africa, and western North America..." This refers to droughts in California and the Colorado River basin attributable in part to human-caused climate change. Williams, A.P., R. Seager, J.T. Abatzoglou, B.I. Cook, J.E. Smerdon, and E.R. Cook. 2015. Contribution of anthropogenic warming to California drought during 2012–2014. Geophysical Research Letters 42: 6819-6828. Udall, B. and J. Overpeck. 2017. The twenty-first century Colorado River hot drought and implications for the future. Water Resources Research 53: 2404-2418. [Patrick Gonzalez, United States of America]	Taken into account. Table 3.1 deleted.
3657	45	1	45	1	Table 3.1's "Runoff and flooding" section needs some work. Currently, the content is solely about flooding (short-lived flow maxima), not runoff as a whole, and it therefore omits the entire applied and theoretical literature on the effects of climate change on water resources (tying into water scarcity), as well as water-cooled thermoelectric and hydroelectric power generation capacity (the so-called climate-water-energy nexus). [Sean Fleming, United States of America]	Taken into account. Table 3.1 deleted.
3658	45	1	45	1	Table 3.1's "Snow, glaciers and permafrost" doesn't include anything about either snow or glaciers. I see a note in the table indicating that the assessment for snow still needs to be added, but it also needs an assessment for glaciers. As noted in my foregoing comments, and as widely understood by the water resources community, glaciers form the core of continental-scale "water towers" in the Himalayas, Alps, Andes, and Northern Rockies. Just the icefields in the mountains around the Tibetan Plateau alone are headwaters to the Indus, Ganges, Brahmaputra, and Yangtze, helping provide water to a few billion people - a significant fraction of the global population. Changes in these glaciers, reflecting slow dynamical responses to long-term natural climate shifts, and deeply exacerbated now by global anthropogenic climate change, have major water resource implications. For a synopsis, see (and cite) Chapter 8 of Fleming (2017, Where the River Flows: Scientific Reflections on Earth's Waterways, Princeton University Press, Princeton, NJ). Glaciers and glacier change also have significant implications to both freshwater and marine ecosystems; the Gulf of Alaska is a great example - see (and cite) the recent high-profile review article by O'Neel et al. (2015, Bioscience, 65: 499-512). [Sean Fleming, United States of America]	Taken into account. Table 3.1 deleted.
4322	45	2	45	2	the same [teodoro georgiadis, Italy]	Noted.
3555	46				Table 3.1: last line: why are the predictions for Ocean chemistry not coloured and titled in this line? [Sylvia Sander, Monaco]	Taken into account. Table 3.1 deleted.
497	46				Sea ice and Sea level: I guess there is sufficient material in the text to make such an assessment by extending the methodology of Church et al. (2013) with updated process-based modelling. [David Docquier, Belgium]	Taken into account. Table 3.1 deleted.
6998	46		46		In Table 3.1, regarding the "Storm, tropical cyclones, and wind", the projected transient changes should also include the assessment of the increase in intense tropical cyclones and related rainfall as well as storm surge risk based on available research findings. [Sai Ming Lee, China]	Taken into account. Table 3.1 deleted.
17715	46	1	46	1	I propose adding one section on atmospheric circulation / climate variability (e.g. ENSO, jet stream, NAO) [Ana Bastos, France]	Taken into account. Table 3.1 deleted.
4323	46	2	46	2	the same [teodoro georgiadis, Italy]	Taken into account. Table 3.1 deleted.
1194	47				Box 3.5: what about social tipping points here? Could be linked to adaptation pathways and intangible losses.... [Petra Tschakert, Australia]	Rejected. The aim of this box is to summarise tipping points in physical system. Title of box revised to make this clearer.
3556	47				Box 3.5: this is the first good box. And I hope that the other boxes were supposed to do the same thing, summarize the effects in an understandable way, just like an abstract should do. Well done [Sylvia Sander, Monaco]	Taken into account.
1565	47	1			The box should also mention societal tipping points: social tensions can degenerate in violent conflict, stress on nutrition can degenerate in famine and starvation, economic difficulties can degenerate in larger economic losses, if some thresholds are crossed, and society loses its resilience. [Noé Lecocq, Belgium]	Rejected. The aim of this box is to summarise tipping points in physical system. Title of box revised to make this clearer.
13897	47	1			Recommend to consult with the structured expert dialogue and its approved report from 2015 as a starting point. This seems too much focused on SREX [Elvira Poloczanska, Germany]	Taken into account. The SREX provides a logical context for this paragraph because of its focus on extremes.
13898	47	1			The RFC are based on the risks perspective as given in chp 19 WGII AR5 ie the risk of climate change impacts. Only one of the five tipping points in this box extend beyond the climate system to consequences for ecosystems and human systems, other than a superficial nod. SR offer a unique opportunity to integrate across WGI-WGII-WGIII knowledge and I suggest this opportunity is applied here [Elvira Poloczanska, Germany]	Rejected. The aim of this box is to summarise tipping points in physical system. Title of box revised to make this clearer.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12375	47	1			[1/2] I don't think a box is sufficient to cover this key issue in-depth. Or it has to be improved substantially. There are several key issues with this box:  # Approach: It is clear that uncertainties related to tipping points are very substantial. The deterministic approach still used at time for individual components of trying to pin-point the 'existence' of a tipping point between 1.5 and 2 is therefore not a very promising one and the scientific discussion has long moved beyond this. The assessment should consistently follow a risk approach, assessing ranges for different tipping points and classifying risks of crossing thresholds under 1.5°C and 2°C. Thereby  # Definition: Give a definition what constitutes tipping points (can be different classes, see e.g. Drijfhout et al. 2015).  # Ice sheets: It has become increasingly clear that there is no one 'single' tipping point for large ice sheets, but rather different ones for different glaciers, or full basins. The complexity of the issue needs to be conveyed and seminal papers related to such dynamics need to be cited. [Bill Hare, Germany]	Taken into account. Agreed that this topic needs to be covered in greater detail. Refer reader to section 3.5.
12376	47	1			[2/2] don't think a box is sufficient to cover this key issue in-depth. Or it has to be improved substantially. There are several key issues with this box: # Alpine glaciers are missing.  # Marine ecosystems need to be treated individually. The risks to coral reefs and other systems are very severe and need to be treated with sufficient diligence (compare Gattuso et al. 2015).  # Conclusion: The conclusion of 'low confidence in the identification of the potentially most critical climate tipping points' could be understood as if science was uncertain if any of these tipping points exist. While this might be true for some, it is certainly wrong for others. For several tipping points, such as outlet glacier basin instability, alpine glaciers, coral reefs and sea ice, there is little doubt about whether they exist. Convoluting this with the threshold is very unhelpful and separate confidence statements should be provided for existence and threshold level. [Bill Hare, Germany]	Taken into account. Agreed that this topic needs to be covered in greater detail. Refer reader to section 3.5.
7463	47	1	48	52	Please consider including ocean hypoxia and ecological regime shifts in box 3.5 on tipping points. [Øyvind Christophersen, Norway]	Taken into account but already mentioned under biomes towards end of box.
7464	47	1	48	52	Box 3.5: "Low confidence" is stated many times in relation to results/predictions presented in this box. They way this is phrased at the moment makes it sound as if the science is put in question, not that information is lacking, or that there is high scientific uncertainty associated with the result. Explanations for the low confidence is often too technical. Please consider re-phrasing in a way that makes it clear why there is low confidence at the same time as not undermining the statements [Øyvind Christophersen, Norway]	Accepted. All use of formal IPCC assessment style language has been removed.
17265	47	1	48	52	I am not sure what you mean by "tipping points" here since the text provided "only" provides a comparison between the two temperature scenarios, but not those temperature points where any particular system would change its state (e.g. from ice to melting, from C sink to C source, from a grassland to shrubland, etc.). [Maria Jesus Iglesias Briones, Spain]	Rejected. The context here is the SR1.5C. A wider discussion would be beyond our remit.
16278	47	1	47	1	The title seems to suggest that there are no tipping points below 1.5 C, and this appears to be not the case. For example, at least one ice stream in Antarctica is now said to be on a path to emptying out ice that will cause sea level rise of a couple of meters--that alone is a very serious change/tipping point. We already are apparently experiencing an increased rate of extinction--so species are being lost and will not be coming back. We already are seeing changes in key terrestrial ecosystems--such as forests in northwestern North America; the stress has weakened them and fire is eliminating them such that different ecosystems will eventually emerge. The title needs to be changed and early mention made that we are already passing through or even past some tipping points. [Michael MacCracken, United States of America]	Accepted. Title revised.
9120	47	1	48	52	see comment on p.108, line 48-50 in regard to Box 3.5 [Michael Oppenheimer, United States of America]	Taken into account. The comment requests that the various discussions of tipping points are better integrated. The SOD is attempting to do this. One option would be to have all of this discussion in 3.5.
18012	47	1	48	53	Box 3.5, please note the format of references in this box is different with those in main text, et al. year or et al., year. Note the comma. [Wilfran Moufouma Okia, France]	Editorial copyedit to be completed
20404	47	3	47	9	I find the current definition of tipping points is too vague. Anything can be a tipping point under this definition. The next paragraph also mixes this up with climate thresholds and abrupt changes, which are not exactly the same thing. [Olivier Boucher, France]	Taken into account. This is a wider issue that the authorship team needs to discuss because tipping points are discussed elsewhere in the chapter.
2520	47	3	48	52	See also Kopp et al. (2016), including the discussion of the definition of 'tipping point' therein. Kopp et al. (2016) suggest that the role of positive feedbacks is an important defining element of tipping points, in which case it is unclear whether, for example, sea ice counts as a tipping point or just a threshold. They also suggest that using the semi-popular term 'tipping point' to refer to a critical threshold that leads to a slow, lagging system response contributes to popular confusion.  R. E. Kopp, R. Shwom, G. Wagner, and J. Yuan (2016). Tipping elements and climate-economic shocks: Pathways toward integrated assessment. Earth's Future 4, 346-372. doi:10.1002/2016EF000362. [Robert Kopp, United States of America]	Taken into account. This is a wider issue that the authorship team needs to discuss because tipping points are discussed elsewhere in the chapter.
3557	47	4		5	strange comment in parenthesis, '... (and has been put forward by some authors as a motivation for 4 limiting global warming to as low a temperature as possible..' which can either be removed or amplified. Also, end prentesis missing. [Sylvia Sander, Monaco]	Accepted text edited
18011	47	4	47	4	(and..... please delete "(" [Wilfran Moufouma Okia, France]	Accepted text edited
19016	47	4	47	5	Instead of writing of "(IPCC 2014; Oppenheimer et al. 2014) (and has been put forward by some authors as a motivation for limiting global warming to as low a temperature as possible (Lenton et al., 2008; Smith et al., 2009) [...]", please write "(IPCC 2014; Oppenheimer et al. 2014; (and has been put forward by some authors as a motivation for 5 limiting global warming to as low a temperature as possible (Lenton et al., 2008; Smith et al., 2009) [...]" [JACQUES-ANDRE NDIONE, Senegal]	Accepted text edited



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1562	47	5	47	9	Would be nice to have a diagram that pedagogically illustrates the concept of tipping point (for example in the case of sea level rise obtained depending on the crossing of some tipping points concerning the melting of land ice) [Noé Lecocq, Belgium]	Taken into account. This is a useful comment however the variety of type of tipping point means that such a diagram would be difficult to create.
21147	47	11	47	13	add citation - Xu and Ramanathan 2017, Well below 2C: Mitigation strategies for avoiding dangerous to catastrophic climate changes, PNAS doi/10.1073/pnas.1618481114 [Nathan Borgford-Parnell, Switzerland]	Rejected. Box is about tipping points not mitigation strategies
10672	47	11	47	13	Additional citation to Xu and Ramanathan 2017, Well below 2°C: Mitigation strategies for avoiding dangerous to catastrophic climate changes, PNAS, doi/10.1073/pnas.1618481114. [Kristin Campbell, United States of America]	Rejected. Box is about tipping points not mitigation strategies
16279	47	15	47	15	Is this low confidence in exactly where a tipping point it, or that there is the tipping point being talked about? For example, there is likely some value at which the Greenland Ice Sheet will be lost because once started, as its elevation becomes lower and lower, the faster it will be lost due to the lower altitude being warmer. So, there is quite likely a tipping point here, but exactly where is uncertain. Similarly for ocean acidification, for loss of ecosystems, for thawing of permafrost, etc. [Michael MacCracken, United States of America]	Accepted. All use of formal IPCC assessment style language has been removed.
1951	47	15	47	19	Suggest not classifying as "low confidence" as suggests unlikely, as noted. Instead propose "unknown risk" or similar for such assessments, and make efforts to assess extent of impacts? Need some way of flagging currently uncertain / poorly understood, but high risk processes and impacts [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. All use of formal IPCC assessment style language has been removed.
501	47	21	47	40	This paragraph is too long. Consider reducing and/or breaking down. [David Docquier, Belgium]	Accepted. Paragraph shortened.
3558	47	25	26	26	listing of su-system changes, "...fast loss of sea-ice (years-decades) or land snow (decades), collapse of ocean convection (years-decades), abrupt vegetation changes (decades), reorganization of ocean circulation (decades-centuries), to loss of ice sheets (centuries-millennia)." are in strange order, I suggest to reorder abrupt vegetation changes (decades), fast loss of sea-ice (years-decades) or land snow (decades), to loss of ice sheets (centuries-millennia), collapse of ocean convection (years-decades), reorganization of ocean circulation (decades-centuries)". to keep them thematically together [Sylvia Sander, Monaco]	Taken into account. This sentence has been deleted.
500	47	27	47	28	I do not understand this sentence. [David Docquier, Belgium]	Accepted. This sentence has been reworded.
12015	47	39	47	40	Change last sentence to read "Types of tipping points that may be triggered at lower levels of warming are discussed below." [Paul Doyle, Canada]	Accepted. This sentence has been reworded.
2123	47	42			Is this correct? I have just looked at the graph of Arctic sea ice, and it looks to me that it is declining linearly. [Neville Nicholls, Australia]	Agreed. Non-linearly deleted
21148	47	42	47	52	Between 1979 and 2011, the declining Arctic sea ice resulted in a reduced albedo that, if the radiative forcing were averaged over the globe, was equivalent to 25% of the forcing from CO2 during the same timeframe (Pistone et al 2014, Observational determination of albedo decrease caused by vanishing Arctic sea ice, PNAS, doi/10.1073/pnas.1318201111). [Nathan Borgford-Parnell, Switzerland]	Taken into account. Useful information but does not fit into tipping-point context.
10673	47	42	47	52	Between 1979 and 2011, the declining Arctic sea ice resulted in a reduced albedo that, if the radiative forcing were averaged over the globe, was equivalent to 25% of the forcing from CO2 during the same timeframe (Pistone et al 2014, Observational determination of albedo decrease caused by vanishing Arctic sea ice, PNAS, doi/10.1073/pnas.1318201111). [Kristin Campbell, United States of America]	Taken into account. Useful information but does not fit into tipping-point context.
20405	47	42	47	52	This paragraph is illustrative of the sloppiness of the concept of tipping points and its lack of a clear definition. First it is not clear to me what is meant by "non-linear" : non-linear with respect to what variable ? Second where is the tipping point ? Sea ice decreases with global warming. Does it decrease (in cover or volume) more per 0.1°C warming in a particular range of global temperature change? Sure, an ice-free Arctic (presumably in September) is a threshold, but I don't see what makes it a tipping point. I think the concept is more useful for ice sheets and oceanic deep convection, which could show on-off behaviour, than for sea ice which responds much more continuously to warming. [Olivier Boucher, France]	Taken into account. This is part of a wider discussion that the authorship team will need to have around the definition of tipping points.
2521	47	42	47	52	It is unclear whether sea ice constitutes a tipping element; see for example Li et al (2013) and Bathiany et al (2016). Bathiany, S., D. Notz, T. Mauritsen, G. Raedel, and V. Brovkin (2016), On the mechanism of Arctic winter sea ice collapse, J. Climate, 29, 2703–2719, doi:10.1175/JCLI-D-15-0466.1. Li, C., D. Notz, S. Tietsche, and J. Marotzke (2013), The transient versus the equilibrium response of sea ice to global warming, J. Climate, 26(15), 5624–5636, doi:10.1175/JCLI-D-12-00492.1. [Robert Kopp, United States of America]	Taken into account. Useful information but does not fit into tipping-point context.
11714	47	42	47	55	The number of models reflecting specific characteristics is mentioned several times, but not the total number of models...adding this information would provide useful context. [David Schoeman, Australia]	Agreed. In all such instances, total population is now also given
6293	47	45	47	45	forecast -> projected [Nathanael Melia, New Zealand]	Agreed. Wording changed.
6292	47	45	47	47	Arctic or Antarctic? 2 models out of how many? [Nathanael Melia, New Zealand]	Agreed. In all such instances, total population is now also given
11715	47	49	47	49	Is 39% really "about as likely as not"? If so, this suggests substantial uncertainty...and a probability of .3 is as likely as 0.5... [David Schoeman, Australia]	Taken into account. This and other use of uncertainty language removed.
13899	47	50	47	50	Impacts to be defined. [Elvira Poloczanska, Germany]	Accepted. Replaced with consequences.
2326	48	1	48	3	See comment on Box 3.3 regarding Chadburn et al. (2017) results. Regarding "quasi-linear" response - if we consider that a number of factors affect the response of permafrost to changes in air temperature, and in some cases these factors will also change under a changing climate, then we may not have a response even close to linear. The transfer of heat through the ground is not a linear process so I think things are more complex than presented here. [Sharon Smith, Canada]	Accepted. Sentence removed.
6650	48	1	48	4	Transformation of coastal and shallow marine ecosystems (without permafrost) may be another type of relevant scenario to be considered in relation to CH4 dynamics. [Castor Muñoz Sobrino, Spain]	Taken into account. This is covered under biomes.
502	48	3			What is the point of having only one sub-section (3.3.13.1) within Section 3.3.13? [David Docquier, Belgium]	Accepted. SOD has an entirely rewritten section 3.3.12/13.
2327	48	3	48	4	See earlier comment and reference to Cooper et al. (2017) which is relevant to discussion of methane release from thawing permafrost. [Sharon Smith, Canada]	Taken into account. This is discussed in the main body of the chapter, here we can only offer an overview.
7466	48	11	48	12	Consider including how models there are in total, where 4 and 9 can be put in context. [Øyvind Christophersen, Norway]	Agreed. In all such instances, total population is now also given

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6651	48	15	48	16	This scenario might be quite similar to that recorded at the end of the Early Holocene (a notable warming that ultimately resulted the 8.2 ka cold/dry event) [Castor Muñoz Sobrino, Spain]	Taken account but out of scope for this box.
16280	48	18	48	23	And if one calculates the sea level sensitivity from the last glacial maximum, it is about 20 m per degree C, presumably at equilibrium, and given there was likely no land major land ice when the Earth was perhaps 4-5 C warmer, then this implies perhaps a 15 m per degree C for the future--again at equilibrium, which may be quite long. [Michael MacCracken, United States of America]	Rejected. This yields a very crude estimate. Other available techniques offer a better means making projections.
2522	48	18	48	23	During the Last Interglacial, global average sea surface temperature was about 0.5° ± 0.3°C above the preindustrial level (Hoffman et al. 2017), while polar temperatures were comparable to those projected for 1°C–2°C of global mean warming above the preindustrial level (Kopp et al., 2009). The 1°C comparison is therefore a bit too facile.  For an alternative perspective on the Greenland contribution during this time period, see Yau et al. (2015). who estimate a Greenland contribution at 121 ka of 4-6 m.  Hoffman, J. S., Clark, P. U., Parnell, A. C., & He, F. (2017). Regional and global sea-surface temperatures during the last interglaciation. <i>Science</i> , 355(6322), 276-279.  R. E. Kopp, F. J. Simons, J. X. Mitrovica, A. C. Maloof, and M. Oppenheimer (2009). Probabilistic assessment of sea level during the last interglacial stage. <i>Nature</i> 462, 863-867, doi:10.1038/nature08686.  Yau, A. M., Bender, M. L., Robinson, A., & Brook, E. J. (2016). Reconstructing the last interglacial at Summit, Greenland: Insights from GISP2. <i>Proceedings of the National Academy of Sciences</i> , 113(35), 9710-9715. [Robert Kopp, United States of America]	Taken into account. The intention is to provide a summary not detailed assessment.
3559	48	19			remove comma between sentences: '...the Greenland Ice Sheet (GIS) are in retreat. Paleoclimatic interpretations can be...' [Sylvia Sander, Monaco]	Accepted. Typos corrected.
5888	48	19	48	19	Some typographic mistakes were found in this line. [Joan A. Lopez-Bustins, Spain]	Accepted. Typos corrected.
1563	48	19	48	22	Make the sentence easier to read : is the main message that we have a 6-9 m sea level rise commitment from today's 1 °C warming ? [Noé Lecocq, Belgium]	Accepted. Wording tidied to make this more apparent.
11716	48	26	48	26	"Irreversible" needs some VERY careful defining, or at least a few caveats...is there anything that is truly irreversible? [David Schoeman, Australia]	Rejected. The statement is could become ...
1564	48	28	48	29	For clarity to the reader, indicate the warming obtained in RCP2.6 [Noé Lecocq, Belgium]	Rejected. This is not done elsewhere in the report and we believe this is not compatible with the overview nature of this box.
16281	48	31	48	32	This "less than a meter" for RCP2.6 is, I believe, for the Antarctic contribution only. And it is likely this low as the temperature returns to below 1.5 C in the future and does not stay up at 1.5 C as presumed to be the new sustainable level in this report. I think this statement is thus unduly optimistic and needs to be caveated (and do their models match the Eemian change in sea level?). [Michael MacCracken, United States of America]	Rejected. The statement reports the results. I believe that deC&P do match Eemian data.
13900	48	34	48	34	the biome regionalisation is not defined, do you mean ecosystems? Does this include marine? [Elvira Poloczanska, Germany]	Rejected. Marine examples are given.
13901	48	34	48	35	these citations are not in reference list. Do they present evidence for distributional shifts of Sahel vegetation?? [Elvira Poloczanska, Germany]	Editorial copy edit will ensure all references are correct.
16282	48	34	48	36	And what about the forest of northwest US and southwest Canada--it is undergoing transformation now at 1 C warming--and this is because warming is allowing much greater pest damage and then the weather is allowing fire. I think this seeming assurance that changes will only occur at >2 C is disproven by observations were equilibrium to have time to play out. [Michael MacCracken, United States of America]	Rejected. An overview of this nature has to be selective. We have attempted to identify key issues with global consequences.
6311	48	34	48	41	A lot of work has been done on insect responses to expected climate change and there are seral review papers, including this one: Musolin D.L. & Saulich A.Kh., 2012. Responses of insects to the current climate change: from physiology and behaviour to range shifts. <i>Entomological Review</i> . 2012. Vol. 92 (7): 715–740. [DOI: 10.1134/S0013873812070019] <http://link.springer.com/article/10.1134/S0013873812070019> ----- even with comparison of likely response with warming <2C and > 2C. (pdf is available upon request to musolin@gmail.com) [Dmitry L. Musolin, Russian Federation]	Rejected. An overview of this nature has to be selective. We have attempted to identify key issues with global consequences.
13902	48	36	48	36	There are studies on rising tree lines that could be included here [Elvira Poloczanska, Germany]	Rejected. An overview of this nature has to be selective. We have attempted to identify key issues with global consequences.
12016	48	37	48	37	We note that.... Realizing that use of first person is appearing more and more in technical papers, I still do not like it, especially when it is used in a redundant manner. Suggest that using it here is totally redundant as most of its use in other sections of this draft. [Paul Doyle, Canada]	Accepted. Sentence deleted.
16283	48	38	48	39	It really needs to be said explicitly that such transformations are clearly possible--such changes are well documented to have occurred in records from Earth history. What is uncertain is more precisely how much warming for how long will lead to the transformations. But make clear they could and have occurred in the past and persisted for very long times. [Michael MacCracken, United States of America]	Taken into account. Timescales are discussed earlier in the box.
5499	48	39	48	39	Delete an extra comma [Ismael Nunez-Riboni, Germany]	Accepted. Sentence deleted.
12017	48	39	48	39	.... assessed "at" present ..... [Paul Doyle, Canada]	Accepted. Sentence deleted.
7465	48	39	48	41	Please consider adding a time scale for degradation of tropical coral reefs and the irreversibility of this [Øyvind Christophersen, Norway]	Taken into account. Timescales are discussed earlier in the box.
8016	48	47	48	47	may significantly reduces these should be 'reduce' [Robert Shapiro, United States of America]	Accepted. Sentence deleted.
9317	48	47	48	47	The last word in "Restricting global warming to 1.5°C may significantly reduces" should be singular as "reduce." [Sir KILKIS, Turkey]	Accepted. Sentence deleted.
2716	48	47	48	49	Critical point, needs to be highlighted more in box and in executive summary. [Penny Urquhart, South Africa]	Taken into account. This line has been deleted however the relevant sections of the SOD make this point.
11717	48	48	48	48	Avoid compound nouns like "high-latitude tipping point risks"; alternatively figure out how to hyphenate them properly...failure to do so introduces ambiguity [David Schoeman, Australia]	Accepted. Sentence deleted.
12018	48	48	48	49	Referring back to comment on p.48, line37, the "we" used in on line 48 is acceptable as it refers to humans generally while the "we" used on line 49 is not acceptable - to me anyway - since the sentence can be reworded to eliminate it. [Paul Doyle, Canada]	Accepted. Sentence deleted.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11718	48	50	48	50	"To assign"...perhaps "the assignment of" would be better? [David Schoeman, Australia]	Accepted. Sentence reworded.
4572	49				Fig 3.13 - Add number from Fig 3.16 to header of column. [Radim Tolasz, Czech Republic]	Noted. Will improve information on regions in FGD.
10488	49		50		figures 3.13-3.15 these figures good example of figures that would benefit from pop-up definitions of regional hotspots and risk types by hovering cursor over acronym in electronic version [Jonathan Lynn, Switzerland]	Noted. Will be considered for FGD (if this is possible).
13730	49	1	50	30	revise numbering of Figures in the text [Elvira Poloczanska, Germany]	Accepted. Sections completely rewritten
503	49	1	51	14	As mentioned in Comment 12, it is strange to have a supplementary sub-section (3.3.13) after the global synthesis (3.3.12). I would include the text of Section 3.3.13 in a new box instead of having it in the main text. [David Docquier, Belgium]	Accepted. Sections completely rewritten
1195	49	1	51	16	This is a really useful and systematic way of using the 'hotspot' concept. [Petra Tschakert, Australia]	Accepted. Sections completely rewritten
2124	49	1	51	15	Will you be including a description of how you calculated figs 3-13 to 3-15? Since statistical significance depends as much on the length of record as the magnitude of an effect, it is crucial that you describe how statistical significance was estimated here. For instance if you compare the impacts using two 100-yr periods (one driven by warming of 1.5C and the other by 2C warming) then even a very small and not very important difference will be statistically significant. That is, you might find a statistically significant difference that is actually of almost no consequence. One the other hand, if you compare samples of just 20 years then you would need a much larger magnitude difference to reach statistical significance. These figures would be much more useful if the magnitude of the change in impact between 1.5C and 2C was shown, rather than just the sign. [Neville Nicholls, Australia]	Accepted. Sections completely rewritten
13903	49	3			provide a definition of hotspot for this SR – it is used in many ways...this section is only considering hotspots of climatic change which may not necessarily be the same geographically as hotspots of ecosystem or human system change (e.g. an extreme climate event does not necessarily infer extreme ecological consequences), if these hotspots cannot be linked with impacts on ecosystems or human systems they are not meaningful in this report. They should be characterized accordingly. [Elvira Poloczanska, Germany]	Accepted. Sections completely rewritten
8827	49	3	49	25	Figures numbering are incorrect. There is no mention about Figure 3.13, 3.14 and referring wrong figure numbers. [Lubna Alam, Bangladesh]	Accepted. Sections completely rewritten
4567	49	4			Change "Figures 3.15, 3.16, 3.17" by "Figures 3.13, 3.14, 3.15" [Radim Tolasz, Czech Republic]	Accepted. Sections completely rewritten
3560	49	4			reference to figures wrong. Must be Figures 3.13, 3.14, 3.15. please also check other refs to figures in this paragraph. [Sylvia Sander, Monaco]	Accepted. Sections completely rewritten
504	49	4			There seems to be confusions in figure titles. [David Docquier, Belgium]	Accepted. Sections completely rewritten
6178	49	4	49	4	Minor comment: Correct: Figures 3.13, 3.14, 3.15 instead of 3.15, 3.16, 3.17 [Vanessa Pántano, Argentina]	Accepted. Sections completely rewritten
20780	49	4	49	4	Figures 3.15, 3.16, 3.17 must be revised with the represented figures , it seemed to be Figures 3.13, 3.14, 3.15 [Amal Hussein, Egypt]	Accepted. Sections completely rewritten
13731	49	4	49	4	numbering wrong; should be Figures 3.13, 3.14, 3.15 [Elvira Poloczanska, Germany]	Accepted. Sections completely rewritten
13732	49	5	49	6	should say "...Wartenburger et al. (in review)..." [Elvira Poloczanska, Germany]	Accepted. Sections completely rewritten
4568	49	7			Change "Fig 3.18" by "Fig 3.16" [Radim Tolasz, Czech Republic]	Accepted. Sections completely rewritten
13904	49	7	49	7	rather than pointing out global land, please state that the much of the Arctic, Antarctica and the ocean is therefore not included [Elvira Poloczanska, Germany]	Accepted. Sections completely rewritten
13905	49	7	49	7	shouldn't this be fig 3.16? [Elvira Poloczanska, Germany]	Accepted. Sections completely rewritten
5467	49	10	49	10	Please rephrase the sentence and let link properly with next [Aliyu Barau, Nigeria]	Accepted. Sections completely rewritten
4569	49	11			Change "Fig 3.15" by "Fig 3.13" [Radim Tolasz, Czech Republic]	Accepted. Sections completely rewritten
4570	49	14			Change "Fig 3.16" by "Fig 3.14" [Radim Tolasz, Czech Republic]	Accepted. Sections completely rewritten
4571	49	20			Change "Fig 3.17" by "Fig 3.15" [Radim Tolasz, Czech Republic]	Accepted. Sections completely rewritten
11074	49	23	49	23	Instead of "cumulative" is should be "consecutive" [Anna Sörenaon, Argentina]	Accepted. Sections completely rewritten
7168	49	27	50	38	Consider sorting the columns of figures 3.13-3.15 by the number of the region in figure 3.16. This will group the regions closely connected (e.g., for Africa) in the table and will simplify the interpretation of the differences presented in these figures between various regions [Iulain Florin VLADU, Germany]	Noted. These figures have been now moved to Sections 3.3.2, 3.3.3 and 3.3.4, respectively. Order of table has been kept the same (using alphabetical order for sorting of regions).
20568	49	60			Figure 3.13 ; 3.14 and 3.15 need to be self explanatory in terms of the acronyms used. I realise that this is only a first draft, so apologies for noting this. This happens across other chapters, and I am sure it will be sorted as soon as there is more time for this. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Information is included in the caption and regions are included in caption Figure 3.16.
4573	50				Fig 3.14 - Add number from Fig 3.16 to header of column. [Radim Tolasz, Czech Republic]	Noted. Will improve information on regions in FGD.
4574	50				Fig 3.15 - Add number from Fig 3.16 to header of column. [Radim Tolasz, Czech Republic]	Noted. Will improve information on regions in FGD.
2478	50		50		Where are the abbreviations for the x-y axis in Figures 3.13, 3.14, and 3.15? [Lisa Lucero, United States of America]	These are acronyms for regions (previously shown in Fig. 3.3.16). Will improve information on regions in FGD.
10611	50	1	50	14	Caption should be in same page as figure [Elemér Briceño-Elizondo, Costa Rica]	Editorial - copyedit to be completed prior to publication
8828	50	11	50	36	Figure 3.18 is wrong should be Figure 3.15. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
6179	51				Minor comment: Figure 3.16 is already included in Figures 3.8, 3.9 and 3.11 [Vanessa Pántano, Argentina]	Taken into account: the figure has been removed (but is included in the supplementary information document)
20673	51		51		Fig. 3-16. It might be better to put this figure before 3.13, 14 and 15. [Deborah Ley, Guatemala]	Noted. Will be considered.
12377	51	1			Section 3.3 goes through the sectors (or hazards) one by one grouping observations and projections together. Section 3.4. groups observations for very different sub-items together before going into the projections. This structure makes the section much more difficult to read, leads to a lot of repetition, etc. I strongly suggest to adopt a section outline like in 3.3 to improve readability. [Bill Hare, Germany]	Taken into account: we have merged observations and projected risks in each subsection
13734	51	1	66	1	Sections 3.4.1 and 3.4.2 focus almost exclusively on plant species; impacts and risks for animal species should also be considered [Elvira Poloczanska, Germany]	Taken into account: animals are well covered (phenology of animals 52-21; also p52 Wiens 2016, Martay et al 2016, Pecl et al, p53 Laurance 2015, p54 polar bear; p54 Mortensen et al, p55: tropical fish); we have added more papers: Thackeray et al 2015, Roy et al 2015
13733	51	1	85	1	In section 3.4 there is a strong imbalance in amount of information and pages dedicated to Terrestrial and wetland systems (3.4.1; ~13pp) and all the other systems (3.4.2-3.4.5; 1-7pp) [Elvira Poloczanska, Germany]	Taken into account: it is not really true, but with the restructuring, we have shortened 3.4.1
507	51	3	51	14	Fig. 3.16: Why is this figure placed here? It should be at the beginning of the chapter when talking about SREX regions for the first time. [David Docquier, Belgium]	This figure concerns previous section

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6652	51	5	51	37	Of course this needs to be a manageable document of synthesis, but many of these named large regional domains contain huge diversities (environmental, ecological, demographic, social...). Intra-regional differences might be considered sometime, e.g. to realistically project risks in natural and managed ecosystems. [Castor Muñoz Sobrino, Spain]	Taken into account: this is an introductory paragraph
21278	51	16	52	37	this section of chapter 3, should be improved by more examples about phenological changes of vegetation cover related to climate change [Wael EL ZEREY, Algeria]	Taken into account: we have added new material, but we have to stay synthetic
13735	51	18	51	21	clarify that you are talking about PLANT species here! Provide examples for regions [Elvira Poloczanska, Germany]	Corrected
13906	51	19			Consider adding characterization of vulnerability [Elvira Poloczanska, Germany]	Taken into account: good remark, we have tried to add considerations on vulnerability together with impacts, specially for regional considerations
13907	51	19			As with the climate sections, much is a repetition of text in AR4 and AR5, lease think how to summarises this information to increase focus on 1.5 and 2C [Elvira Poloczanska, Germany]	Taken into account: the fact to have joined impacts and projections limits much more these repetitions
10244	51	19	51	19	Perhaps include estuaries in this section. [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: added in wetland section
9136	51	19	61	1	This section should give more consideration to compounding impacts of climate drivers and the implications for adaptation (including limits to adaptation). The report appears to be generally lacking in this area. For example, Table 3.4 speaks to marine biodiversity loss at a high rate of climate change; and reduced biodiversity, fisheries abundance and coastal protection by coral reefs to heat-induced mass coral bleaching and mortality increases exacerbated by ocean acidification; however, the respective adaptation measures do not give consideration to the physical destruction of these systems by damaging cyclones and extreme precipitation (increased sedimentation, etc). Further, given the limitations of the proposed adaptation measures in this table, especially as this relates to small islands, the issue of limits to adaption needs to be discussed more thoroughly in the text of this section. [Susanna De Beauville-Scott, Saint Lucia]	Taken into account: this updated version gives more place to adaptation and avoided risks with 1.5°C warming
5525	51	19	95	16	Here are my concluding remarks about Section 3.4 (Observed impacts and projected risks in natural and managed ecosystems): The present report is related to benefits and challenges of keeping the Earth's temperature increase under 1.5°C, in comparison to 2.0°C. Speaking here about concrete temperature values (1.5 vs 2°C) makes the reader think on studies where the different impacts of those two possible scenarios have been quantified. However, most of our knowledge about the reaction of marine ecosystem to climate change is qualitative, not quantitative. Contrary to the cases of physical oceanography or meteorology, there is still large need for mechanistic and statistical models shedding light on the effect of climate change on marine ecosystems. As far as I know, there are neither specific studies focusing on climate scenarios with path end-points of 2°C and 1.5°C, nor comparisons of the effect of such scenarios on marine ecosystems... [Ismael Nunez-Riboni, Germany]	Taken into account: this is an excellent remark, but it is more difficult to have quantification for these two thresholds for biological systems than for physical systems. Nevertheless we have better centered the section 3.4.1 on the objective of the report
5526	51	19	95	16	...I cannot recall a study comparing the effects of, say, RCP8.5 vs RCP4.5. Only through such modeling it would be possible to measure the different impacts for marine ecosystems in 1.5°C and 2°C worlds. In the absence of such modeling, the only thing that can be said for sure is that the smaller the temperature increase in comparison to pre-industrial values, the better (at least in general). But this is what we already know from the AR5. So, I see little point on such a long Section 3.4, adding little in comparison to the AR5, focusing on a particular scenario (i.e., 1.5°C world) from which we know quantitatively nothing and, which as far as I understand, is unrealistically reachable in the praxis. Wouldn't it be better to simply refer the reader to Chapter 6 of the AR5 and summarize the few new findings in a couple of paragraphs only? [Ismael Nunez-Riboni, Germany]	Taken into account: the section has been shortened and we have more focused on the projected risks; we have also added much information published after 2014.
13736	51	21	51	24	list systems in the same order as they are following [Elvira Poloczanska, Germany]	Taken into account: terrestrial and inland water systems (in this report now called terrestrial and wetland ecosystems), coastal and low lying areas, ocean systems, freshwater resources, food security and food production systems.
4575	51	22			Change ":" by"," [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
508	51	22			Be coherent in both this sentence and the ordering of the 5 sub-sections. [David Docquier, Belgium]	Taken into account, see answer to comment 13736
13737	51	22	51	22	NH, provide full name or define abbreviation above [Elvira Poloczanska, Germany]	Editorial: replaced by northern hemisphere
13908	51	22	51	23	Why change from inland water systems to wetland systems? This excludes freshwater ecosystems such as lakes and rivers from this chapter, which incidentally are included in a subheading with wetlands under the Arctic section below. Plus isn't there now an overlap with low-lying areas, many of which incorporate extensive wetlands eg mangroves? [Elvira Poloczanska, Germany]	Taken into account: water systems are distributed between terrestrial and wetland system, freshwater resources
13738	51	22	51	23	this statement from AR5 is of high confidence! [Elvira Poloczanska, Germany]	Taken into account: water systems are distributed between terrestrial and wetland system, freshwater resources
6235	51	24			observed (not observed), [Muhammad Mohsin IQBAL, Pakistan]	Editorial - copyedit to be completed prior to publication
4576	51	24			Change "observed" by "observed" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
3561	51	24			typo: observed [Sylvia Sander, Monaco]	Editorial - copyedit to be completed prior to publication
509	51	24			Typo: 'observed' instead of 'observed'. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
1953	51	24	51	24	observed should read observed [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
13739	51	24	51	24	should say "observed impacts" [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
12019	51	24	51	24	TYPO..."observed".... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
19195	51	24	51	24	Change "observed" by "observed" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
6653	51	24	51	24	Change observed by observed [Castor Muñoz Sobrino, Spain]	Editorial - copyedit to be completed prior to publication
5500	51	26	51	26	The acronym UNFCCC appears here for the first time in this chapter (the only one I'm reading). Is it defined somewhere else? Perhaps to define it here (again)? [Ismael Nunez-Riboni, Germany]	Taken into account: to be put in Glossary
12020	51	26	51	26	TYPO..."include".... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
2761	51	29			it would be important to add "climate migrations", "climate refugees". They will be millions in the future. [Jonathan Gómez Cantero, Spain]	Taken into account and has dedicated section in restructured section
20591	51	31	51	31	Risk of food nutrition insecurity [KENEL DELUSCA, Haiti]	Taken into account and has dedicated section in restructured section
13447	51	31	51	32	Water quality and availability is also a major threat. [Vidyunmala Veldore, Norway]	Taken into account and has dedicated section in restructured section
7015	51	38	51	38	* Risk from ozone-UVB-climate interactions to both aquatic and terrestrial ecosystems [Christos Zerefos, Greece]	Noted, but the level of detail is beyond the scope of this report which focuses on 1.5C warming and the issue should be covered in detail in IPCC AR6
13909	51	42			the discussion in the two introduction paragraphs in section 3.4.1.1 applies to all the ecosystem sections. [Elvira Poloczanska, Germany]	Taken into account: the paragraph focuses more on the ecosystem analysis

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13910	51	42			In relation to degree of (regional, local) climate change? [Elvira Poloczanska, Germany]	Rejected: Not necessary
13911	52	3	52	3	Provision of safe water is an ecosystem service, access to this ecosystem service is not itself an ecosystem service [Elvira Poloczanska, Germany]	Taken into account: the paragraph has been rewritten
13912	52	3	52	3	By safe water do you mean quantity and quality? [Elvira Poloczanska, Germany]	Taken into account: the paragraph has been rewritten
10582	52	7	52	13	The ecosystem response includes, but not only a degradation on species richness over time, and displacement, as well as increased or decreased rates of growth; The observations mentioned aid at introducing in detail the following sections [Elmer Briceño-Elizondo, Costa Rica]	Taken into account: the paragraph has been reworded
510	52	7	52	13	This paragraph seems unnecessary and talks about two very different things (ecosystem vulnerability and projection confidence). [David Docquier, Belgium]	Taken into account: the paragraph has been reworded, but I have to precise that projected risks must be based on impact observations
19196	52	8	52	9	It is difficult to assume that an ecosystem could adapt to change without changing their structure, composition and function [Rubén Retuerto, Spain]	Taken into account: the paragraph has been reworded
5501	52	9	52	13	Use numbers for the 3 reasons ( 1) climate change projected... 2) ecosystem responses... etc). [Ismael Nunez-Riboni, Germany]	Taken into account: the paragraph has been reworded
13913	52	9	52	9	Suggest and/or function, as a system may change its composition eg in terms of species, but keep its functions [Elvira Poloczanska, Germany]	Taken into account: the paragraph has been reworded
4324	52	12	52	12	2°C+ it is not clear to me [teodoro georgiadis, Italy]	Taken into account: 2°C or more
13914	52	16			Phenology shifts are not referred to again in the following section (3.4.1.2) however biome shifts are. Consider the structuring of these sections [Elvira Poloczanska, Germany]	Taken into account: a paragraph has been added on the projections
13915	52	16			there needs to be reference to the consequences from phenology shifts, or an uninformed reader will be left wondering so what? [Elvira Poloczanska, Germany]	Taken into account: a sentence has been added at the end of the section "In summary, avoiding a 2°C global warming may save a few days of advance in spring phenology and decrease the risk of maladaptation coming from the larger sensitivity of many species to increased climate variability"
6236	52	16	52	29	Spring advancement of -2.8+0.35 days/decade is the change in seasonal phenology not in plant or animal phenology. For animal species, the change in phenology would mean change in animal growth stages. Please check and add relevant data if available. [Muhammad Mohsin IQBAL, Pakistan]	Taken into account: it concerns plants and has been precised
1352	52	16	52	37	Sub-section 'Changes in phenology'. There is nothing on consequence for 1.5°C versus 2°C warming for phenology. Authors may want to change this bit of text. [GREGORY INSAROV, Russian Federation]	Taken into account: a paragraph has been added on the projections
1312	52	16	52	37	Sub-section 'Changes in phenology'. There is nothing on consequence for 1.5°C versus 2°C warming for phenology. Authors may want to change this bit of text. [GREGORY INSAROV, Russian Federation]	Taken into account: a paragraph has been added on the projections
2717	52	16	52	37	Africa seems to be left out of this discussion - would be good to include in discussion, if literature allows, and if not, to state this. [Penny Urquhart, South Africa]	Taken into account: much less data, but two references have been added
20543	52	16	52	37	Other key references for this section (important for covering a range of important implications of phenological change) include: Tansey, C.J., Hadfield, J.D. & Phillimore, A.B. (accepted) Estimating the ability of plants to plastically track temperature-mediated shifts in the spring phenological optimum Global Change Biology. Thackeray, S.J. et al. 2016 Phenological sensitivity to climate across taxa and trophic levels. Nature 535, 241–245, doi:10.1038/nature18608. Roberts, A.M.I.; Tansey, C.; Smithers, R.J. and Phillimore, A.B. (2015) Predicting a change in the order of spring phenology in temperate forests. Global Change Biology, 21: 2603–2611. Roy, D.B., Oliver, T.H., Botham, M.S., Beckmann, B., Brereton, T., Dennis, R.L.H., Harrower, C., Phillimore, A.B. & Thomas, J.A. (2015) Similarities in butterfly emergence dates amongst populations suggest local adaptation to climate. Global Change Biology. Amano, T.; Freckleton, R.P.; Queenborough, S.A.; Doxford, S.W.; Smithers, R.J.; Sparks T.H.; and Sutherland, W.J. (2014) Links between plant species' spatial and temporal responses to a warming climate. Proceedings of the Royal Society B, Biological Sciences, 281:1779. Amano, T.; Smithers, R.J.; Sparks, T.H. and Sutherland, W.J. (2010) A 250-year index of first flowering dates and its response to temperature changes. Proceedings of the Royal Society B, Biological Sciences, 277, 2451–2457. Phillimore, A.B.; Hadfield, J.D.; Jones, O.R. and Smithers R.J. (2010) Differences in spawning date between populations of common frog reveal local adaptation. Proceedings of the National Academy of Sciences of the United States of America, 107:18, 8292–8297. Thackeray S.J.; Sparks, T.H.; Frederiksen, M.; Burthe, S.; Bacon, P.; Bell, J.R.; Botham, M.S.; Brereton, T.M.; Bright, P.W.; Carvalho, L.; Clutton-Brock, T.; Dawson, A.; Edwards, M.; Elliott, J.M.; Harrington, R.; Johns, D.; Jones, I.D.; Jones, J.T.; Leech, D.J.; Roy, D.B.; Scott, W.A.; Smith, M.; Smithers, R.J.; Winfield, I.J. and Wanless, S. (2010) Trophic level asynchrony in rates of phenological change for marine, freshwater and terrestrial environments. Global Change Biology. 16:12, 3304–3013. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: several references have been added in the phenology section, but only references after 2014 are assumed to bring new information
1313	52	17	52	18	Indicate period for this statement. Provide reference to the WG contribution and chapter of the AR5. [GREGORY INSAROV, Russian Federation]	Corrected
1353	52	17	52	18	Indicate period for this statement. Provide reference to the WG contribution and chapter of the AR5. [GREGORY INSAROV, Russian Federation]	Corrected
13916	52	17	52	18	for most of northern hemisphere ecosystems, could you be more specific, does this include tropical, boreal, and polar? Which ecosystems? [Elvira Poloczanska, Germany]	Taken into account: between 30°N and 72°N, it has been added
12480	52	17	52	29	Hong and Kim (2011) showed that extreme weather event such as tropical cyclon can make substantial changes in phenology. "Hong, J. and J. Kim (2011) Impact of the Asian monsoon climate on ecosystem carbon and water exchanges: A wavelet analysis and its ecosystem modeling implication, Global Change Biology, 17, 1900-1916." [Jinkyu Hong, Republic of Korea]	Taken into account but we focus on more recent literature; moreover this paper does not concern phenology
11078	52	17	52	37	When assessing the sensitivity to an increase of 1.5°C GMST it is interesting to notice that some authors have suggested that increases in maximum temperatures should be considered instead of increases in mean temperatures when studying changes in phenology since leaf onset is mainly triggered by daytime temperatures (Tan et al. 2014; Peng et al. 2015; Piao et al. 2015). Piao et al. (2015) found that an increase of 1°C in Tmax would advance leaf unfolding dates by 4.7 days in Europe and 4.3 days in the United States, which is more than the advance when considering an increase of mean temperature by 1°C.  Peng et al. 2013: <a href="http://www.nature.com/doi/10.1038/nature12434">http://www.nature.com/doi/10.1038/nature12434</a> Piao et al. 2015: <a href="http://www.nature.com/doi/10.1038/ncomms7911">http://www.nature.com/doi/10.1038/ncomms7911</a> Tan et al. 2015: <a href="http://doi.wiley.com/10.1111/gcb.12724">http://doi.wiley.com/10.1111/gcb.12724</a> [Anna Sörenaon, Argentina]	Taken into account: it has been added a sentence about the daytime temperature

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20273	52	18			This sentence is unclear. Does this mean that 72% of species are affected by the spring advancement? Or a specific phenological stage (e.g. bud break, leaf unfolding of native deciduous trees?) is advancing by 2.8 days for 72% of species? What is the definition of spring in the previous sentence? [Aaron Glenn, Canada]	Taken into account: it has been precised that 72% of the plant species respond to warming spring with earlier flowering
7259	52	18	52	18	of species' not 'of the species' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
13917	52	18	52	18	could you give the taxonomic groups this applies to, as otherwise this sentence is misleading [Elvira Poloczanska, Germany]	Corrected
12021	52	19	52	19	TYPO..."needs".... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
13918	52	21	52	21	the same could be said for plants, eg day length [Elvira Poloczanska, Germany]	Taken into account: this is explained for plants in the paragraph
17266	52	21	52	21	For animals, what animals? Vertebrates, invertebrates? And instead, could you relate animal activities to changes in phenology (e.g. feeding and reproductive seasons). [Maria Jesus Iglesias Briones, Spain]	Taken into account: egg laying for birds
7630	52	23		26	It is not clear to me what 'recent amplified responses to climate variability' means. [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: sentence reworded
11077	52	23	52	23	Suggestion, insert here: "In a global study, Buitenwerf et al. (2015) showed that the phenology of vegetation activity changed severely on 54% of all land surface between 1981 and 2012."  Buitenwerf et al. 2015: <a href="http://www.nature.com/doi/10.1038/nclimate2533">http://www.nature.com/doi/10.1038/nclimate2533</a> [Anna Sörenaon, Argentina]	Taken into account: good suggestion, added!
11079	52	23	52	23	When considering responses of plants versus animals: "Thackeray et al. (2016) adverted for the threats to ecosystem functioning that results from the fact that different species forming part of the same ecosystem responds differently to climate change. Using mid-century climate change projections, they showed that the timing of phenological events could change more for primary consumers than for species in other trophic levels (6.2 versus 2.5–2.9 days earlier on average), with substantial taxonomic variation (1.1–14.8 days earlier on average)."  Thackeray et al. 2016: <a href="http://www.nature.com/nature/journal/v535/n7611/full/nature18608.html?foxtrotcallback=true">http://www.nature.com/nature/journal/v535/n7611/full/nature18608.html?foxtrotcallback=true</a> [Anna Sörenaon, Argentina]	Taken into account: see reply to comment 20543
7260	52	28	52	28	should be 'air temperature increase'? [Butt Nathalie, Australia]	Taken into account: this sentence has been removed according to the wish to shorten
19197	52	28	52	28	Since this chapter is reviewing 1.5 °C impacts, it would be helpful to precise the magnitude of air temperature responsible for affecting 32% of the vegetation [Rubén Retuerto, Spain]	Taken into account: this sentence has been removed according to the wish to shorten
1954	52	31	52	31	1985 - 2012 should read "1985 to 2012" [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: this paragraph has been removed
20274	52	31	52	37	See also: (1) Chmielewski et al. 2004, Agricultural and Forest Meteorology 121: 69–78; (2) Fitchett et al. 2014, Agricultural and Forest Meteorology 198–199: 285–293; (3) Guo et al. 2013, Agricultural and Forest Meteorology 180: 164–172; (4) Guo et al. 2015, Agricultural and Forest Meteorology 201: 1–7; (5) Grab and Craparo, 2011, Agricultural and Forest Meteorology 151: 406–413 [Aaron Glenn, Canada]	To be revised for preparation of FGD
10583	52	31	52	37	As ecosystem phenological response, it is expected that the growth season increases in time, which in high latitudes translates into increased growth of the biomass [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: this paragraph has been removed according to the wish to shorten
7262	52	31	52	37	could Japanese cherry blossom records be cited here as another example of spring advance, and accelerating spring advance over recent decades? [Butt Nathalie, Australia]	Taken into account, but as we have removed the too specific studies, this one is not anymore appropriate
13919	52	31	52	37	Why focus on this one location? There are many examples in the literature so please be explicit this is an example and why it was selected [Elvira Poloczanska, Germany]	Taken into account: this paragraph has been removed
9867	52	31	52	37	this paragraph seems much too specific/local compared to the rest of the section [Christopher Reyner, Germany]	Taken into account: this paragraph has been removed
7261	52	33	52	33	remove 'have been' [Butt Nathalie, Australia]	Taken into account: this paragraph has been removed
13920	52	40			Abundance not explicitly discussed in this section (but richness is) [Elvira Poloczanska, Germany]	Rejected: a paper like of this of Stephens et al 2016 is based on abundance
9588	52	40	52	57	Although there are some examples about the impacts of the past climate change on species distribution, compared to the number of all species living in earth, changing in distribution ranges of limited species can be attributed to climate change over the past years, and most species which have changed in distribution range can only be attributed to the land use change or investigation bias over the past years. And many species distributions did not change over the past years, and they may be not sensitivity to the past climate change or the changes delay to the past climate change. In addition, expanding of alian species is obvious in recent years, but changing in the distribution may be resulted from other reasons except climate change. reference: Wu Janguo, Shi Yingjie. Attribution index for changes in migratory bird distributions: The role of climate change over the past 50 years in China. Ecological Informatics, 2016, 31: 147–155. [Jianguo Wu, China]	Taken into account: this paper is cited in the phenology section
3873	52	40	53	14	Section 3.4.1.1.2 should include biome shifts attributed to anthropogenic climate change and the section should be titled something like "Changes in biomes and species ranges and species extinctions". The text should read something like "AR5 Chapter 4 confirmed, with high confidence, that field research has detected elevational and latitudinal shifts of biomes in boreal, temperate, and tropical ecosystems and, with medium confidence, that the biome shifts are attributable more to anthropogenic climate change than other factors (Gonzalez et al. 2010, Settele et al. 2014)." Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drake. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. Global Ecology and Biogeography 19: 755–768. Settele, J., R. Scholes, R.A. Betts, S. Bunn, P. Leadley, D. Nepstad, J.T. Overpeck, and M.A. Taboada. 2014. Terrestrial and inland water systems. In Intergovernmental Panel on Climate Change. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Cambridge University Press, Cambridge, UK. [Patrick Gonzalez, United States of America]	Taken into account: we have done this change in the biome section
21279	52	40	53	57	this section should refer clearly to the impact of climate change on biodiversity. [Wael EL ZEREY, Algeria]	Rejected: I think that the topic discussed here is not so large
17664	52	40	53	9	The report is focussed on the impacts of 1.5 degree C and 2.0 degree C, does the extinction species is solely due to warming temperature? If yes, now the warming is about 1 degree C as stated in the text so that a sentence may be needed to clarify on this findings. [Perdian Perdinan, Indonesia]	Taken into account: as stated in the beginning of the first paragraph, we focus on the temperature effect
1314	52	40	53	9	Sub-section 'Changes in species range, abundance and extinction'. There is nothing on consequence for 1.5°C versus 2°C warming for species range, abundance and extinction. You may want to adjust this text. [GREGORY INSAROV, Russian Federation]	Taken into account: with the merging observation-projections, this is now clearer
1354	52	40	53	9	Sub-section 'Changes in species range, abundance and extinction'. There is nothing on consequence for 1.5°C versus 2°C warming for species range, abundance and extinction. You may want to adjust this text. [GREGORY INSAROV, Russian Federation]	Taken into account: with the merging observation-projections, this is now clearer

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13921	52	41	52	43	which taxonomic groups and are these predominately NH?? There is no citation [Elvira Poloczanska, Germany]	Corrected
6654	52	41	52	43	In some territories these type of changes may also affect the regional distribution of a number of valuable or rare habitats/ecosystems (e.g. peatbogs) as also occurred during the Holocene (e.g. Muñoz Sobrino et al. 2005). Besides, this may be also true for coastal wetlands that are threatened by RSL rise. (e.g. Muñoz Sobrino et al. 2016). Muñoz Sobrino, C, Garc?a-Moreiras, I, Martínez-Carreño, N, Cartelle, V, Insua, T, L, Ferreira da Costa, J, Ramil-Rego, P, Fernández Rodríguez, C, Alejo, I, Garc?a-Gil, S (2016) Reconstruction of the environmental history of a coastal insular system using shallow marine records: the last three millennia of the Cies Islands (Ría de Vigo, NW Iberia). Boreas 45: 729–753 10.1111/bor12178 [Castor Muñoz Sobrino, Spain]	Taken into account: I know this paper, but I do not find it information useful for this section
20275	52	42	52	43	See also: (1) McKenney et al. 2007, BioScience 57(11): 929-937; (2) McKenney et al. 2014, BioScience 64(4): 341-350 [Aaron Glenn, Canada]	Taken into account: McKenney 2014 added
7467	52	43	52	46	Regarding reported changes in species richness: is it possible to state towards what direction (more or less species rich)? [Øyvind Christophersen, Norway]	Taken into account: declined, but the paragraph has been simplified and this part removed
13922	52	44	52	46	so currently, other drivers of change generally dominate ?? [Elvira Poloczanska, Germany]	Taken into account: declined, but the paragraph has been simplified and this part removed
18013	52	47	42	48	Is this statement also based on (Murphy and Romanuk 2014)? If not, it might be worth providing some evidence/reference from relevant papers. [Wilfran Moufouma Okia, France]	Taken into account: declined, but the paragraph has been simplified and this part removed
20276	52	48			Awkward wording, try "has likely been underestimated" [Aaron Glenn, Canada]	Taken into account: declined, but the paragraph has been simplified and this part removed
7631	52	49			This sentence does not make sense to me [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Corrected: the sentence has been rewritten
13923	52	49	52	49	976 what? Please provide taxonomic groups [Elvira Poloczanska, Germany]	Taken into account: added
19198	52	49	52	49	It is not clear to me if 976 refers to the number of studies or to the number of local extinctions reported in the 27 studies [Rubén Retuerto, Spain]	Taken into account: species, precised
1315	52	49	52	51	Indicate period for this statement. [GREGORY INSAROV, Russian Federation]	Taken into account: the period is variable depending on the publication, usually between mid 20th century to beginning 21st century
1355	52	49	52	51	Indicate period for this statement. [GREGORY INSAROV, Russian Federation]	Taken into account: the period is variable depending on the publication, usually between mid 20th century to beginning 21st century
7468	52	49	52	52	Evidence on species extinctions attributed to climate change is new since AR5, where such evidence was referred to as somewhat spurious. Please consider highlighting the clearer attribution and extinction, especially local extinction, to climate change. This attribution should preferably also be stated in the executive summary [Øyvind Christophersen, Norway]	The sentence seems clear and distinguish between these types of extinction (these papers have been published after AR5)
13924	52	50	52	50	climate change or changing climate?? [Elvira Poloczanska, Germany]	I do not understand the difference
12022	52	52	52	57	Break this extremely long sentence into two with some minor wordsmithing. [Paul Doyle, Canada]	Taken into account: for reasons of shortening, the sentence has been removed
17716	52	54	52	54	May be relevant to add pest species e.g. Sturrock et al. (2011, Plant Pathology) provides a review for diseases. Seidl et al. (2014, Nature Climate Change) for insects and pests in Europe. [Ana Bastos, France]	Rejected: not relevant for the topic
1955	52	56	52	56	Insert space after "2016)." [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
1196	53				Fig 3.17: we could not locate Table S2 as listed at the end of the caption. [Petra Tschaker, Australia]	Taken into account
12888	53	1			Spell out "IUCN" [Jorge Carrasco, Chile]	Rejected: it corresponds to the citation
1929	53	1	53	1	Climate change can also interact and augment the effects of other stressors on species (e.g., habitat loss and fragmentation, invasive species) (e.g., Mantyka-Pringle et al. 2012; Crain et al. 2008). Mantyka?pringle, Chrystal S., Tara G. Martin, and Jonathan R. Rhodes. "Interactions between climate and habitat loss effects on biodiversity: a systematic review and meta?analysis." Global Change Biology 18.4 (2012): 1239-1252. Crain CM, Kroeker K, Halpern BS (2008) Interactive and cumulative effects of multiple human stressors in marine systems. Ecology Letters, 11, 1304–1315 [Chrystal Mantyka-Pringle, Canada]	Rejected: I agree but it is not recent literature
9589	53	1	53	10	Most examples come from northern American or Europe, lacking the examples about the response of species distributions or interaction to the past climate change in other regions, for example Asia and African, please add some contents related to other regions or comparison examples in different regions. references: Wu Jianguo. Detection and attribution of the effects of climate change on bat distributions over the last 50 years. Climatic Change. 2016, 134?4??681-696. [Jianguo Wu, China]	Taken into account: this reference has been added in the phenology section
10584	53	1	53	5	Figures confirmed from paper Taylor and Kumar 2016. Should it not be cited by them instead of saying that they confirm the sensitivity? [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: for reasons of shortening, the sentence has been removed
13925	53	5	53	9	This applies to marine systems as well, consider its placement in the chapter [Elvira Poloczanska, Germany]	Taken into account: the figure is not really useful given that the observed impact section was to be shortened
7263	53	6	53	7	move 'of species redistribution' to the end of the sentence to clarify the meaning [Butt Nathalie, Australia]	Corrected
8829	53	7	53	7	Figure 3.19 is wrong should be Figure 3.17. [Lubna Alam, Bangladesh]	Taken into account: figure removed
19017	53	7	53	9	If allowed, this sentence "Even if greenhouse gas emissions stopped today, the effort for human systems to adapt to the most crucial effects of climate-driven species redistribution will be far reaching and extensive", should be in bold; it's one of the key message! [JACQUES-ANDRE NDIONE, Senegal]	Taken into account: yes it is an important message, but this is not the policy to put in bold
4325	53	7	53	9	probably a reference is needed [teodoro georgiadis, Italy]	Taken into account: it is the same reference Pecl et al 2017: the new sentence makes that clearer
19058	53	9	53	9	The title of the Fig 3.17 need to be higher resoluted [Heba Elbasiouny, Egypt]	Taken into account: figure removed
12023	53	10	53	10	Fig 3.17 carries different captions which probably explains the italicized part of the caption. [Paul Doyle, Canada]	Taken into account: figure removed
5721	53	10	53	14	Figure 3.17 needs to be redrawn for clarity. [Hong Yang, Switzerland]	Taken into account: figure removed
4731	53	10	53	14	Fig 1. is described as Figure 3.17. Please modify accordingly. Also the image is extremely blur [Spyros Schismenos, China]	Taken into account: figure removed
4577	53	12			Leave out "I" [Radim Tolasz, Czech Republic]	Taken into account: figure removed
9711	53	12	53	12	This is a redundant "I" that should be deleted. [Kai Fang, China]	Taken into account: figure removed
4578	53	13			Change "ecosystems" by "ecosystems" [Radim Tolasz, Czech Republic]	Taken into account, text revised.
3562	53	13			typo: ecosystems [Sylvia Sander, Monaco]	Taken into account, text revised.
4722	53	13	53	14	Changes in arthropod vector and pathogen distributions are not included - perhaps they should be unless it is explicitly mentioned that these are excluded. [Nicholas Ogden, Canada]	Taken into account: figure removed

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1928	53	13	53	14	Spelling correction needed for 'ecosystems health' - It should be 'ecosystem health'. "[Map develop a Figure based on Pecl et al. (2017)]." should also be edited to past tense. [Chrystal Mantyka-Pringle, Canada]	Taken into account: figure removed
2479	53	13	53	14	If use Figure 3.17, explain and discuss, especially the impact of the loss of resources/animals to humans [Lisa Lucero, United States of America]	Taken into account: figure removed
7469	53	17	54	29	Compared to ch. 3.4.1.2.3, this section do not seem to consider the broad range of ecosystem functions. Consider including more, or explaining why the information is more restricted here. [Øyvind Christophersen, Norway]	Taken into account: some points have been added but I do not understand where is the disequilibrium (GPP, NPP, carbon, fires, pathogens are in both subsections now merged)
17267	53	17	54	29	As a soil ecologist I really miss a good mention here to global SOM decline... [Maria Jesus Iglesias Briones, Spain]	Taken into account: the paragraph has reworded, SOM is implicit in it
5722	53	17	55	13	The information is general, not specific about 1.5C. [Hong Yang, Switzerland]	Taken into account: I think that it is now more balanced
18016	53	17	55	13	These sections seem to depend heavily on AR5, with less obvious linkage with the issue of 1.5 and 2 warming. Could the authors provide further clarification [Wilfran Moufouma Okia, France]	Taken into account: AR5 is just the starting point, afterward there is a lot of new literature and finally the 1.5/2°C warming is discussed
12889	53	18			Clarify "AR5-Chap4" is from WGI, WDI or WGIII [Jorge Carrasco, Chile]	Corrected: AR5 WG2 chapter 4 (Settele et al 2014)
18014	53	18	53	18	AR5-Chap4 of which WG? Possibly WGII? [Wilfran Moufouma Okia, France]	Corrected: WGII reference added
12481	53	18	54	1	Forest in monsoon region can be threatened by increased intensity and the number of tropical cyclones as a reduction of leaf area index. "Hong, J. and J. Kim (2011) Impact of the Asian monsoon climate on ecosystem carbon and water exchanges: A wavelet analysis and its ecosystem modeling implication, Global Change Biology, 17, 1900-1916." [Jinkyu Hong, Republic of Korea]	Taken into account, but there is not a clear evidence at now of cyclones increase
19059	53	19	53	19	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Editorial - copyedit to be completed prior to publication
19199	53	20	53	21	However, in some species prolonged exposure to elevated CO2 results in decreased rate of photosynthesis (see Grodzinski et al., 1996. Adv Space Res. 18(4-5): 203-211) [Rubén Retuerto, Spain]	Taken into account: given the publication year, it is assumed to have been taken into account by AR5
11080	53	21	53	21	Suggestion, insert here: However, climate change could contribute more to greening in cold climates than in the tropics. Zhu et al. (2016) used multiple ecosystem models and found that 70% of the global greening trend can be explained by CO2 fertilization and only 8% of the global greening trend can be explained by climate change. However in high latitudes and the Tibetan Plateau the effect of climate change was stronger. Zhu et al. 2016: <a href="http://www.nature.com/doi/10.1038/nclimate3004">http://www.nature.com/doi/10.1038/nclimate3004</a> (reference already used in the FOD, p53, l27) [Anna Sörenaon, Argentina]	This reference is already cited in the paragraph, line 27-28 modified accordingly
12074	53	23	53	26	Here, we need to consider the tradeoff as well. I would start with Davidson etal-2006-Nature-440-165-173 as well as other cross-referenced papers. [Debjani Sibi, United States of America]	Taken into account: sure but difficult to add something here because of restricted place
7264	53	25	53	26	potentially reducing the magnitude of the positive feedback between climate and the carbon cycle' is a bold statement, that doesn't necessarily follow from the preceding finding, and may not take into account the limits to plant water use efficiency (which we don't know about yet). I think the statement should be made more equivocal, or include this caveat. [Butt Nathalie, Australia]	Taken into account: sentence modified
20277	53	26			CO2 fertilization and/or N deposition? Insert "CO2" before "fertilization" if this is what is meant here to clarify. Replace "green" with "greening". [Aaron Glenn, Canada]	Corrected
13926	53	26	53	26	consider language for clarity 'often'? 'green effect'?? [Elvira Poloczanska, Germany]	Corrected
20278	53	27			Replace "0035" with "0.0035". [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
4579	53	27			Change "0035" by "0.0035"? [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
17717	53	28	53	28	Tropical forest IS mainly [Ana Bastos, France]	Taken into account: this sentence is removed
9590	53	29	53	30	Moving this to section 3.4.1.1.2 [Jianguo Wu, China]	Taken into account: done
7632	53	30			I would add fire here as a very important synergistic effect of climate change and fragmentation/deforestation [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: this sentence is removed
18015	54	3	54	29	Please note inconsistent form of unit, sometimes "yr-1", and others "yr" [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
7265	54	3	54	3	The recent slowdown of deforestation is now reversing, for example, in Brazil, and land clearing in Queensland, Australia, so this may need to be acknowledged. [Butt Nathalie, Australia]	Taken into account: added
10585	54	3	54	6	Reference concerning this? [Elemer Briceño-Elizondo, Costa Rica]	Taken into account : reference added
7633	54	4			Could add reference to Brienen et al. 2015 Nature showing that increases in Amazon biomass have slowed in last decade [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account in Amazon subsection
17718	54	4	54	4	Add other disturbances (Storms, pests), e.g. Seidl et al., 2014 Nature Climate Change [Ana Bastos, France]	Taken into account: added
12075	54	4	54	6	May want to look at Crowther etal-2016-Nature-540-104-108, where the authors have demonstrated that the vulnerability of loosing soil C from terrestrial ecosystems is proportional to initial stock size. [Debjani Sibi, United States of America]	This a good suggestion; unfortunately I missed it; I will check if this may be corrected for the next version
19200	54	6	54	7	Anderegg et al (2015) stated that "The terrestrial biosphere is currently a strong carbon (C) sink but may switch to a source in the 21st century as climate-driven losses exceed CO2-driven C gains...". It is not clear to me if such statement is consistent with the interpretation that total ecosystem respiration has decreased in response to increase of nighttime temperature. In fact, the manuscript follows saying: "Munoz-Rojas et al (2016) demonstrated increased rates of soil respiration...." [Rubén Retuerto, Spain]	Corrected: see reply to comment 20279
20279	54	6	54	7	This reference actually indicates that global NEE and TER variability has increased due to nighttime temperature increases and that higher TER correlates with nocturnal warming in the tropics. Suggest rewording this sentence as something like "Anderegg et al. (2015) show that the total ecosystem respiration, at the global scale, has increased in response to increase of nighttime temperature in the tropical regions." [Aaron Glenn, Canada]	Corrected: Anderegg et al (2015) show that total ecosystem respiration, at global scale, has increased in response to increased nighttime temperatures in the tropics, which suggests that C stored in tropical forests may be vulnerable to future warming.
4580	54	7			Change "Pg C / year / °C" by "Pg C year-1 °C-1" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
7634	54	9			There is also paper Lewis et al. 2009 Nature that measured a biomass sink across African intact tropical forests (though this is in AR5 WGII chapter 4) [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: it is cited in AR5
13927	54	9	54	10	This sentence is not written clearly [Elvira Poloczanska, Germany]	Taken into account: this sentence is removed
12024	54	10	54	10	TYPO...."increasing".... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10586	54	10	54	13	Please review: Kellomäki, S., Peltola, H., Nuutinen, T., Korhonen, K. T., & Strandman, H. (2008). Sensitivity of managed boreal forests in Finland to climate change, with implications for adaptive management. <i>Philosophical Transactions of the Royal Society B: Biological Sciences</i> , 363(1501), 2341–2351. <a href="http://doi.org/10.1098/rstb.2007.2204">http://doi.org/10.1098/rstb.2007.2204</a> . [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: it is cited in AR5
10587	54	10	54	13	Please review: Briceño-Elizondo E, Garcia-Gonzalo J, Peltola H, Kellomäki S. Carbon stocks in the boreal forest ecosystem in current and changing climatic conditions under different management regimes. <i>Environ. Sci. Policy</i> . 2006a;9:237–252. doi:10.1016/j.envsci.2005.12.003 [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: it is cited in AR5
10588	54	10	54	13	Please review: Briceño-Elizondo E, Garcia-Gonzalo J, Peltola H, Matala J, Kellomäki S. Sensitivity of growth of Scots pine, Norway spruce and silver birch to climate change and forest management in boreal conditions. <i>Forest Ecol. Manage.</i> 2006b;232:152–167. doi:10.1016/j.foreco.2006.05.062 [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: it is cited in AR5
10589	54	10	54	13	Please review: Kellomäki S, Väisänen H. Modelling the dynamics of the boreal forest ecosystems for climate change studies in the boreal conditions. <i>Ecol. Model.</i> 1997;97:121–140. doi:10.1016/S0304-3800(96)00081-6 [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: it is cited in AR5
19201	54	12	54	12	I would suggest to use "because of lower atmospheric moisture" instead of "because of drying air" [Rubén Retuerto, Spain]	Taken into account: this sentence is removed
12025	54	18	54	18	.....2013" with" temperature "being" the main.... [Paul Doyle, Canada]	Boreal forest productivity has increased as a result of warming (medium confidence) during the 1980s but many areas have experienced productivity decline (high confidence) because of drying air (which can lead to increased fire frequency and intensity) and lack of adaptation.
4581	54	21			Change "PgC/yr" by "Pg C yr-1" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
3843	54	21		29	I could not figure out what is the point of the paragraph. It starts with a reduction of the carbon sink such as peatlands and then moves on to another mitigation tool. Then what was the first mitigation tool? [Woonsup Choi, United States of America]	Taken into account: paragraph completely reworked
10593	54	21	54	21	Which reference is this one on the reference list? [Elemer Briceño-Elizondo, Costa Rica]	Corrected
19625	54	21	54	29	Similar remark as to one made above for chapter 4. There are three references in chapter 4 page 23, line 36-37 on labile nature of soil C with rising T. Should include these references with comment in this chapter in contrast to the optimism of Lal (2014). [Doreen Stabinsky, United States of America]	Taken into account: it is a good remark and alternative references have been added
12026	54	22	54	22	Forests must be..... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
6655	54	22	54	22	Shallow seashore marine ecosystems capable of accumulating great amount of muddy sediment that is very rich in organic matter (estuarine ecosystems, saltmarshes, etc) could be also listed here. [Castor Muñoz Sobrino, Spain]	Taken into account: this is mentioned in wetland section
12027	54	23	54	23	..... and", thus, "a powerful..... [Paul Doyle, Canada]	Taken into account: this sentence is removed
12076	54	24	54	29	I would also add examples from recent long-term studies and meta-analysis articles that confirm the hypothesis of increased soil carbon sequestration under different management practices. Org farming and associated soil organic carbon buildup is one such example (Gattinger etal-2012-PNAS-109-44, Sihi etal-2017-Journal of Plant Nutrition and soil Science-doi:10.1002/jpln.201700128). But, tradeoff mechanisms like higher soil organic matter will increase changes of greater GHG emission (Hadden and Grelle-2017-Agril and Forest Meteorology-1-8, McGee etal-2015-Agric Human values-32-255-263) by increasing substrates (and/or favorable biophysical condition or other non-farm operations) should be considered as well. [Debjani Sihi, United States of America]	Taken into account: I have added a few complementary reference on the carbon sequestration by the soils
12077	54	24	54	29	Also, it should be kept in mind that in terrestrial system, the feedback in soil quality-temperature relation is not always straight forward. E.g. For a given time, upland or terrestrial system may contain more recalcitrant organic matter but organic matter in wetlands may be more fresh due to lower decomposition at anerobic condition. Thus, we should not always generalize the rate parameters in global climate model like previously done (Kirschbaum etal-2004-Glob Change Biol-10-1870–1877, Knorr etal-2005-Nature-433-298–301), but also value the importance of redox condition and upland vs wetland area to correctly account for temprature response of greenhouse gas emission (Sihi etal-2016-Biogeochemistry-131-103-119). [Debjani Sihi, United States of America]	Taken into account: I have added a few complementary reference on the carbon sequestration by the soils
10594	54	24	54	29	Forest soil carbon sequestration and changes are generally underlooked on carbon sink estimations. This sink as Lal 2014 presents is changable according to management conditons, type of crop, depth of soil layers etc. It could be of great value to this section to enhace information on the importance of carbon soil management. [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: this section is not really on mitigation, but we give a few information to emphasize the role of the soil
9591	54	24	54	29	Not clear! Please explaining much more about information related to the effects of the past climate change on ecosystem founction. [Jianguo Wu, China]	Taken into account: unfortunately it is not possible discuss more that point, but the paragraph has been reworked
4582	54	25			Change "Pg C/year" by "Pg C yr-1" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
13928	54	27	54	27	spell out DOC [Elvira Poloczanska, Germany]	Taken into account: this sentence is removed
6656	54	32	55	13	Valuable or rare ecosystems (peatbogs, coastal lagoons, etc) also may be threatened at mid-latitudes (e.g. Muñoz Sobrino et al. 2005, 2016) and subtropical areas (e.g. rainforest, cloud forests, etc) [Castor Muñoz Sobrino, Spain]	Taken into account in wetland section
12890	54	33			add the appropriate cite after "... Chapter 4" (Settele et al. 2014) [Jorge Carrasco, Chile]	Corrected : reference added
13929	54	36	54	36	provide citation for polar bear study [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
1930	54	36	54	36	decling in number' should read as 'declining in numbers' [Chrystal Mantyka-Pringle, Canada]	Editorial - copyedit to be completed prior to publication
2335	54	37	54	38	Lantz et al. (2013, <i>Ecosystems</i> (2013) 16: 47–59) discusses shrub proliferation in the tundra and is relevant here. The latest Arctic Report Card and State of the Climate reports could also be referenced as they also describe changes that are occurring in the Arctic. [Sharon Smith, Canada]	Taken into account: reference added
13930	54	37	54	38	what is confirmed by recent literature? Does this refer to tundra, polar bears... [Elvira Poloczanska, Germany]	Taken into account: I think that the text is clear now
6237	54	40			(Mortensen et al. 2014) indicate - - - is suggested to be rewritten as 'Mortensen et al. (2014) reported - - -'. [Muhammad Mohsin IQBAL, Pakistan]	Editorial - copyedit to be completed prior to publication
19202	54	40	54	40	Please remove ( ) [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
1931	54	40	54	40	(Mortensen et al. 2014) should read "Mortensen et al. (2014)" [Chrystal Mantyka-Pringle, Canada]	Editorial - copyedit to be completed prior to publication
13740	54	40	54	40	Should say "...Mortensen et al. (2014)..." [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19203	54	40	54	42	It is not very informative that "...32 showed a positive trend and 51 a negative trend" without referring to the particular nature of the traits [Rubén Retuerto, Spain]	Taken into account: it is more informative (delay / advance in phenology)
13931	54	42	54	42	are predators a taxonomic group? [Elvira Poloczanska, Germany]	Taken into account: they are no taxa but trophic levels; it is now corrected
7635	54	47			In some areas woody encroachment into savanna is also occurring - Mitchard & Flintrop 2013 Phil. Trans. Roy. Soc. B [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: added
9592	54	47	54	56	Lacking examples related to the alpine or mountain ecosystems, the functions of ecosystems have change over the last years. [Jianguo Wu, China]	Taken into account: some have been added
17719	54	50	4	50	Do you mean all animal and plant species or just plants? [Ana Bastos, France]	Taken into account: plant
2718	54	50	54	50	When Mediterranean species is mentioned, does this refer to studies looking only at the region around the Mediterranean sea, or does it include species in Mediterranean biomes in other parts of the world - i.e. S America, Western Cape? [Penny Urquhart, South Africa]	Taken into account: Mediterranean region, it has been precised
6238	54	50	54	51	For the Mediterranean species, it has been observed shift in phenology, range contraction, health decline because of - - - is suggested to be rewritten as 'For the Mediterranean species, shift in phenology, range contraction and health decline has been observed because of - - -'. [Muhammad Mohsin IQBAL, Pakistan]	Editorial - copyedit to be completed prior to publication
7266	54	50	54	52	reword as 'For Mediterranean species, shifts in phenology, range contraction, and health decline to decreases in precipitation and increases in temperature, have been observed'. [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
9318	54	51	54	51	The phrase "it has been observed shift in" may be revised to read "a shift has been observed in". The same phrase is used in the summary table on page 63. [Siir KILKIS, Turkey]	Editorial - copyedit to be completed prior to publication
17720	54	52	54	52	At the same time, Camicer et al. (2011, PNAS) have pointed to an increase in defoliation from insects in Mediterranean regions linked to increasing drought [Ana Bastos, France]	Taken into account: not enough new
19204	54	52	54	53	I would rephrase this sentence: "The area percentage...the last 30 years." [Rubén Retuerto, Spain]	Taken into account: sentence modified
10595	54	54	54	57	Is there input to severity of the rainy season in concert to length? [Elemer Briceño-Elizondo, Costa Rica]	Taken into account: mainly length
6239	54	56			The word 'the' after 'estimated' is suggested to be replaced with 'that'. [Muhammad Mohsin IQBAL, Pakistan]	Editorial
7267	54	57	55	1	and an increase in fire incidence and severity in the southern Sierra Nevada mountain forests in this region - should this be mentioned too? [Butt Nathalie, Australia]	Taken into account: fire incidence/intensity added
19082	55		55		Resolution of figure 3.18 is low page 3-55 [Fathy Elbehiry, Egypt]	Editorial - copyedit to be completed prior to publication
6240	55	1			The word 'production' is suggested to be replaced with 'productivity'. [Muhammad Mohsin IQBAL, Pakistan]	Corrected
11719	55	3	55	13	This paragraph is not well developed. Much of the wording is clunky, and there are several issues with selection of words (e.g., "unprecedented" requires context...unprecedented over what timescales?), there are unitalicized generic and specific epithets, etc. [David Schoeman, Australia]	Taken into account: paragraph reworked
1932	55	3	55	13	This paragraph doesn't really flow very well. For example, the example of the tropical fish <i>Geophagus brasiliensis</i> (the species name should also be italicized) needs to be linked in with climate change explaining that invasive aquatic species are benefiting from climate change. This paragraph is also relatively short in comparison that freshwater ecosystems are among the most threatened. Another example that could also be used is with waterfowl. Climate change is likely to cause further changes in wetlands by shifting the seasonal availability and distribution of water and resultant vegetation communities (e.g., Withey, P. & van Kooten, G. C. The effect of climate change on optimal wetlands and waterfowl management in Western Canada. Ecol. Econ. 70, 798-805, doi:10.1016/j.ecolecon.2010.11.019 (2011)). [Chrystal Mantyka-Pringle, Canada]	Taken into account: reference added
7636	55	4			New papers on tropical peatland carbon stocks with first estimates for these areas and large amounts of carbon - Dargie et al Nature 2017 for Congo Basin and Draper et al. 2014 Environmental Research Letters [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: references added
7268	55	8	55	10	Unclear sentence - ecosystem water? [Butt Nathalie, Australia]	Corrected
12028	55	9	55	9	....Yellow River "had" a slightly..... [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
4583	55	10			Change "mm/year" by "mm yr-1" [Radim Tolasz, Czech Republic]	Taken into account: mm yr-1
3844	55	10		12	The sentence (Tropical fish...) looks out of place [Woonsup Choi, United States of America]	Taken into account: sentence removed
4938	55	10	55	11	<i>Geophagus brasiliensis</i> should be <i>Geophagus brasiliensis</i> (in italics) [Alejandro Cearreta, Spain]	Taken into account: sentence removed
13741	55	10	55	11	species names in italics [Elvira Poloczanska, Germany]	Taken into account: sentence removed
20280	55	10	55	12	Italicize <i>Geophagus brasiliensis</i> . This sentence seems out of place, the connection between it and the rest of the paragraph is not clear. [Aaron Glenn, Canada]	Taken into account: sentence removed
13742	55	10	55	12	what is the potential consequence of higher growth rates in the invasive species? [Elvira Poloczanska, Germany]	Taken into account: sentence removed
12029	55	11	55	11	.... introduced "into the NAME River in southwest Australia from South America"..... [Paul Doyle, Canada]	Taken into account: sentence removed
13743	55	12	55	13	on what measurements in the estimation by Xu et al based? What is the reason for the high resilience? More details needed. [Elvira Poloczanska, Germany]	Taken into account: sentence removed
13744	55	13	55	14	is Smith et al. Under review? Please specify [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
7269	55	18	55	18	This section, Biome shifts, doesn't include anything about Antarctica, and it is not included in the map in Figure 3.18, but there is already evidence of changes in ecological communities due to invasives being able to establish and persist due to climate change - should this be included? [Butt Nathalie, Australia]	Accepted, will be taken into account in final draft subject to suitable citations being located
1316	55	18	55	28	Figure 3.20 is taken from another source, not from Warszawski et al. (2013). Nothing on biome shifts is available from this figure. Authors team may want to provide correct references where this and some other figures are taken from, and to check references to figures, too. [GREGORY INSAROV, Russian Federation]	Corrected
1356	55	18	55	28	Figure 3.20 is taken from another source, not from Warszawski et al. (2013). Nothing on biome shifts is available from this figure. Authors team may want to provide correct references where this and some other figures are taken from, and to check references to figures, too. [GREGORY INSAROV, Russian Federation]	Corrected
13745	55	18	55	28	revise numbering of Figures in the text [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3874	55	18	55	38	This section needs to provide a more comprehensive review spanning many more of the approximately dozen published references on biome shift projections. Currently, the section mainly reviews just one reference. The text should read something like "A review of a dozen published biome shift projections indicates an approximate doubling of the fraction of global area with a potential biome shift in 2100, from ~5% to 10% from a 1.5°C to a 3°C global temperature increase (Betts et al. 2015). The fraction of global area with a potential biome shift could further increase from 10% to 16% from a 2.4°C (emissions scenario B1) to a 4°C (emissions scenario A2) global temperature increase (Gonzalez et al. 2010). Mixed temperate forest, tropical woodlands, and the tundra and alpine biomes have the greatest fraction of their areas highly vulnerable to projected biome shifts." Betts, R.A., N. Golding, P. Gonzalez, J. Gornall, R. Kahana, G. Kay, L. Mitchell, and A. Wiltshire. 2015. Climate and land use change impacts on global terrestrial ecosystems and river flows in the HadGEM2-ES Earth system model using the representative concentration pathways. Biogeosciences 12: 1317-1338. Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drake. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. Global Ecology and Biogeography 19: 755-768. [Patrick Gonzalez, United States of America]	Accepted, will be taken into account in final draft
9868	55	19	55	28	This paragraph mixes up the warszawski et al. and gerten et al. Paper. Warszawski et al was using only the five ISIMIP GCM while Gerten et al. Used 19 GCMS. The figure you are referring to as sbeing part of warszawski et al (i.e. 3.20 which most likely actually refers to figure 3.18?) is actzally from gerten et al. (which is correctly stated in the figure caption). [Christopher Reyer, Germany]	Accepted, will correct in final draft
13932	55	20	55	20	which biome typology? [Elvira Poloczanska, Germany]	This will be addressed in the FGD.
511	55	21			I guess you are talking about Fig. 3.18 (and not Fig. 3.20). [David Docquier, Belgium]	Corrected
5502	55	21	55	21	Figure 3.20 is mentioned here, but it appears only in page 89, that is, more than 30 pages later. Why? [Ismael Nunez-Riboni, Germany]	text revised
10590	55	21	55	38	Text refers to figure 3.20, however caption citres figure 3.18. The figure 3.20 is on page 89 on another section with other content. This needs correction. [Elemer Briceño-Elizondo, Costa Rica]	Corrected
10600	55	21	55	38	Text refers to figure 3.20, however caption citres figure 3.18. The figure 3.20 is on page 89 on another section with other content. This needs correction. [Elemer Briceño-Elizondo, Costa Rica]	Corrected
8830	55	21	55	38	Figure 3.20 is wrong should be Figure 3.18. [Lubna Alam, Bangladesh]	Corrected
9712	55	21	55	38	Unclear whether this fraction is responding to Figure 3.18 below since it doesn't match the citation above. I would recommend to recheck the order and citation. [Kai Fang, China]	Corrected
1956	55	24	55	24	Remove brackets surrounding approximately [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	text revised
17268	55	24	55	28	A reference to support this statement is needed here. [Maria Jesus Iglesias Briones, Spain]	text revised
3875	55	25	55	25	The text needs a citation for what it calls an "earlier study." [Patrick Gonzalez, United States of America]	text revised
20281	55	29	55	30	Screenshots of figures from other publications are not very clear in this draft. [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
512	55	29	55	38	Fig. 3.18: The image resolution is very low. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
513	55	29	55	38	Fig. 3.18: The figure caption is long and complex to understand. [David Docquier, Belgium]	Accepted - will be revised in final draft.
10596	55	29	55	38	Quality of figure not good enough too interpret data nor captions. [Elemer Briceño-Elizondo, Costa Rica]	Editorial - copyedit to be completed prior to publication
19018	55	30	55	30	The quality of his figure 3.18 should be improved. There is no need to have the tile original title of the figure included in the figure... Please, clip this former title. [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
994	55	32	55	32	The figure has poor visual quality. [Áttilia Buzási, Hungary]	Editorial - copyedit to be completed prior to publication
12030	55	32	55	32	Fig. 3.20 must be Fig 3.18. [Paul Doyle, Canada]	Corrected
12891	55	34			add the appropriate cite after "... Chapter 4" [Settele et al. 2014] [Jorge Carrasco, Chile]	Rejected as 'Chapter 4' cannot be located in figure 3.18
4584	55	36			Change format of °C [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
11720	55	36	55	36	Why is the "degree" sign here not correctly aligned in the vertical plane? [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
13933	56	1	56	1	This is the kind of specification that would be needed for the other impact sections too. [Elvira Poloczanska, Germany]	text revised
9593	56	1	56	14	Clarifying the effects of 1.5°C above pre-industrial levels on species distribution or extinction of species, climate change in future may result in increasing the risk of extinction for some species, or increasing vulnerability or dangerous for some species. In addition, the content of this report need to assess the effects of climate change related to 1.5°C above pre-industrial levels, so much more assessment should be the effects of 1.5°C above pre-industrial levels on biodiversity. In addition, error of reference, providing more references. [Jianguo Wu, China]	Accepted, text has been revised to include some publications that address this point that were submitted after the first order draft was written. Very few publications have been written on this.
1957	56	1	56	14	Replace +/- with correct symbol and for ranges replace hyphen with "to" [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
2480	56	3	56	5	Need page number for this quote [Lisa Lucero, United States of America]	Editorial - copyedit to be completed prior to publication
7470	56	8	56	14	Please consider highlighting this important point in the executive summary [Øyvind Christophersen, Norway]	Accepted, included in executive summary
19205	56	8	56	9	Rephrase this sentence as: "In comparison, with 2°C warming these projected losses were reduced by 60%." or "In comparison, these projected losses were reduced by 60% if warming were constrained to 2°C" [Rubén Retuerto, Spain]	Text revised
11721	56	8	56	9	This sentence doesn't make sense... "In comparison, with 2°C warming these projected losses were reduced by 60% if warming were constrained to 2°C." [David Schoeman, Australia]	Text revised
20282	56	9			Delete "if warming were constrained to 2degC" as it's redundant in the sentence. [Aaron Glenn, Canada]	Text revised
7270	56	9	56	9	should be 'constrained to 1.5°C' [Butt Nathalie, Australia]	text revised
13934	56	9	56	9	Repetition of the end of the sentence [Elvira Poloczanska, Germany]	text revised
5503	56	12	56	12	An extra closing parenthesis should be deleted after "warming". [Ismael Nunez-Riboni, Germany]	text revised
20283	56	13	56	14	Year is missing from Smith et al. citation [Aaron Glenn, Canada]	text revised
17269	56	13	56	14	Here and in many places throughout the text, full citations are missing. [Maria Jesus Iglesias Briones, Spain]	text revised
11722	56	13	56	14	Citation is missing a year [David Schoeman, Australia]	text revised
17721	56	14	56	14	Forests diseases are expected to change under changing climate. Sturrock et al. (2011 Plant Pathology) provide a review of studies. La Porta et al. (2008, Canadian Journal of Plant Pathology) discuss that the damage potential of diseases may also be greater under climate change. [Ana Bastos, France]	Accepted, will include in next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9869	56	17	57	8	It is misleading that within this section reference is only made to CMIP5 coupled climate vegetation models because some of the studies that are being cited are not coupled models but DGVMs (e.g. Friend et al. 2014 [Christopher Reyer, Germany])	Reject (i.e. there is no need to edit the text). It is correct that this section draws on more models than just CMIP5. All sentences and statements are fully referenced, and many of these references draw on results from beyond CMIP5.
7471	56	18	56	28	What is expected regarding changes in decomposition for terrestrial systems, and the effect of such changes in decomposition on the land carbon cycle, under future scenarios of climate change and elevated CO2? [Øyvind Christophersen, Norway]	Decomposition is accelerated as stated later in this paragraph
1317	56	21	56	21	Hewitt et al. 2016 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
1357	56	21	56	21	Hewitt et al. 2016 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
9870	56	21	56	23	I think a word of caution here about the persistence of CO2 effects vs. Acclimatization vs downregulation because of lacking nutrient supply would be warranted here. Also possibly the role of direct fertilization effects from CO2 vs more indirect effects through increased water-use efficiency could be discussed to provide a more balanced account of the uncertainties associated with the co2 fertilizatin effect. [Christopher Reyer, Germany]	Agree. N-limitation was mentioned further down, but moved here for better clarity
13935	56	23	56	23	Uptake of what? [Elvira Poloczanska, Germany]	of carbon - text clarified
7472	56	25	56	26	Please consider clarifying this sentence. [Øyvind Christophersen, Norway]	clarified that this means climate change
13936	56	26	56	26	should this say climate change? [Elvira Poloczanska, Germany]	clarified that this means climate change
13937	56	27	56	27	Is this carbon by vegetation? Or by vegetation carbon sink/store? [Elvira Poloczanska, Germany]	clarified: uptake of carbon by vegetation
7271	56	30	56	30	replace 'few' with 'little' [Butt Nathalie, Australia]	agree: text corrected
11723	56	30	56	30	"There is very published literature"...? [David Schoeman, Australia]	agree: text corrected
12031	56	30	56	30	There is "very little" published literature.... [Paul Doyle, Canada]	agree: text corrected
12078	56	31	56	33	Also, worth looking at Sihl et al-2017-GCB-doi:10.1111/gcb.13839, where gradual warming increase GWP, particularly CH4 production in a subtropical wetland system. This paper is also an important candidate as it highlights the importance of considering the rate of warming (in addition to magnitude of warming) in climate models. [Debjeni Sihl, United States of America]	agree - rate of warming is important, and is mentioned in the next sentence. References added.
4585	56	34			Add explanation of "GPP" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
13938	56	34	56	34	spell out GPP [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
7637	56	35			1 % per year of what? [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	of CO2 - text clarified
1318	56	44	56	44	Check if Figure 3.21 is the right figure here to refer to. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
1358	56	44	56	44	Check if Figure 3.21 is the right figure here to refer to. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
13939	56	44	56	44	responses of what? [Elvira Poloczanska, Germany]	of terrestrial carbon cycle - text clarified
8831	56	44	56	44	Figure 3.21 is wrong should be Figure 3.19. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
13746	56	44	56	44	revise numbering of Figures in the text [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
13940	56	46	56	46	spell out NPP if first use [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
7272	56	49	56	49	should be "weak signal related to noise" ? [Butt Nathalie, Australia]	text clarified: signal to noise ratio
20284	56	55			Replace "nutrient, limitation" with "nutrient limitations" [Aaron Glenn, Canada]	text clarified - see comment 12032
7638	56	55			For tropical forests phosphorus limitation is also possible - Ellsworth et al. 2017 Nature Climate Change (face experiment in eucalyptus). Yang et al. 2014 Biogeosciences (modelling Amazon carbon with CLM including P cycle) [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	agree - references added
12032	56	55	56	55	CHANGE entire line to read..."Nitrogen and other nutrients will limit the terrestrial carbon cycle response to"..... [Paul Doyle, Canada]	agree - text corrected
13941	56	55	56	56	sentence poorly written [Elvira Poloczanska, Germany]	text revised
3845	56	55	57	3	I could not figure out what is the point of the paragraph. It starts with the role of nitrogen and then moves on to permafrost thaw. [Woonsup Choi, United States of America]	agree - nutrient limitation part of this paragraph is moved earlier to align with CO2 fertilisation - as also suggested by comment 9870. What remains in this paragraph then is just about permafrost
13942	56	56	56	57	thaw in twice in this sentence [Elvira Poloczanska, Germany]	text corrected
11724	56	56	56	57	One too many "thaws" in "high confidence in thawing of permafrost thaw" [David Schoeman, Australia]	text corrected
2328	56	56	57	3	See earlier comments regarding Chadburn et al (2017) and issue of timing of these changes and complete loss of permafrost over the area that they predict. [Sharon Smith, Canada]	text revised
20285	56	57			Delete "thaw", it's redundant [Aaron Glenn, Canada]	text corrected
13943	57	1	57	2	use appropriate language - save doesn't give explanation, does this mean that stabilization at 2C would result in the thawing/loss of an extra 2 million km2 of permafrost compared to stabilization at 1.5? [Elvira Poloczanska, Germany]	agree - corrected to "avoid"
1319	57	3	57	3	Burke et al. 2017 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Burke, E.J., Chadburn, S.E., Huntingford, C. and Jones, C.D., 2017, CO2 loss by permafrost thawing implies additional emissions reductions to limit warming to 1.5 or 2C. Env. Res. Lett. in review
1359	57	3	57	3	Burke et al. 2017 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Burke, E.J., Chadburn, S.E., Huntingford, C. and Jones, C.D., 2017, CO2 loss by permafrost thawing implies additional emissions reductions to limit warming to 1.5 or 2C. Env. Res. Lett. in review
7473	57	6	57	8	This statement merits to be explained in more detail because of it's significance for natural carbon sequestration and because it initially seems counter-intuitive. [Øyvind Christophersen, Norway]	agree - more details are in the references provided, but text clarified to give brief explanation
7474	57	9	57	10	Figure 3.19: Consider using a legend to show which colour represents wich model. [Øyvind Christophersen, Norway]	Agree - editorial work to be done prior to final copyedit
13359	57	9	57	17	Figure 3.19: This is a complex set of graphs, which would benefit from a legend for the different colours, heading sub/headings for each plot to direct the reader to the main message of the data (currently the message was not clear to me), and ideally less use of acronyms if possible. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Agree - editorial work to be done prior to final copyedit
10597	57	9	57	17	Clarity of figure needs improvement. Tendencias area consistent with effects on tropical ecosystems, which area reflected on the global average. [Elemer Briceño-Elizondo, Costa Rica]	Agree - editorial work to be done prior to final copyedit
10598	57	9	57	17	Clarity of figure needs improvement. Boreal systems present expected trends. [Elemer Briceño-Elizondo, Costa Rica]	Agree - editorial work to be done prior to final copyedit

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1958	57	10	57	10	Rework figure for clarity, ep thicker lines, but also show interannual variability as shaded range? [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Agree - editorial work to be done prior to final copyedit
12033	57	11	57	11	Fig 3.19 corresponds to Fig. 21 description in text. I don't think that Figs 20 and 21 exist. Very confusing. Need to match Figure numbers to text description and make these jive. See p.56, line 44 and change Fig # there for starters. [Paul Doyle, Canada]	Corrected
19206	57	11	57	11	Please , change "top right" by "top left" [Rubén Retuerto, Spain]	corrected
4586	57	12			Leave out "the" [Radim Tolasz, Czech Republic]	corrected
20286	57	19	57	21	Replace "found" with "modelled". I also suggest replacing "acted as small carbon sink" with "were carbon neutral". I don't think 11.25 g/m <sup>2</sup> /a is significantly different from 0, especially with that interannual variability reported and uncertainty with both the model and underlying validation measurements used (r <sup>2</sup> value of 0.571 for NPP, Fig. 3; r <sup>2</sup> ranging from 0.31 to 0.57 for eddy covariance measurements, Fig. 4). [Aaron Glenn, Canada]	text revised
9594	57	19	57	23	Clearing the effects of 1.5°C above pre-industrial levels on carbon stocks in territorial ecosystems. [Jianguo Wu, China]	text revised
4587	57	20			The words "million hectares" is not consistent with the report. The km2 or Mha is used, km2 is best. [Radim Tolasz, Czech Republic]	text revised
9871	57	25	57	26	For forest ecosystems you might wish to add Seidl et al. 2017 highlighting the importance of interactions of different disturbance agents under climate change. Seidl R, D Thom, M K, D Martin-Benito, M Peltoniemi, G Vacchiano, J Wild, D Ascoli, M Petr, J Honkaniemi, MJ Lexer, V Trotsiuk, P Mairota, M Svoboda, M Fabrika, TA Nagel, CPO Reyer (2017) Forest disturbances under climate change. Nature Climate Change 7:395–402 DOI 10.1038/nclimate3303 [Christopher Reyer, Germany]	Accepted, will utilise in next draft provided information relevant to 1.5 or 2C warming can be deduced or inferred
13747	57	28	57	28	Are you referring to section 3.4.1.1? please specify [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19019	57	35	57	35	Instead of writing "0.5°C above pre-industrial" (Figure 10.5 panel A, Meehl et al. 2007). Romero-Lankao et al. (2014) (Box 26- [...]", please write "0.5°C above pre-industrial; Figure 10.5 panel A, Meehl et al. 2007). Romero-Lankao et al. (2014; Box 26- [...]" [JACQUES-ANDRE NDIONE, Senegal]	Citation will be improved in final draft
18017	57	35	58	1	Further clarification is needed on the following sentences "Romeao-Lankao et al. (Box 26-1) also indicated significantly lower wildfire risks in Nort America for near term warming (2030-2040, which may be considered a proxy for 1.5°C) than at 2°C"? [Wilfran Moufouma Okia, France]	Citation will be improved in final draft
17722	58	1	58	1	Suggestion: introduce results for impacts of storms and pests, if studies exist, otherwise mention that the same exercise has not been done for other disturbances [Ana Bastos, France]	text revised
11725	58	1	59	21	This entire section needs careful attention and editing. [David Schoeman, Australia]	text revised
13944	58	4			The ecosystem section here contain little text for each ecosystem, could the subheading be removed and text merged into a single section by biome (eg forests, polar, wetlands) summarized in a schematic? Eg see Fig 30.12 AR5 WGII Chp 30. Further much of this text has no reference to future change [Elvira Poloczanska, Germany]	Section restructured
10245	58	4	58	4	Baltic Sea is high risk regional ecosystem too [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Not terrestrial
12482	58	4	59	21	Asian forest must also be discussed with changes in regional climate such as monsoon and extreme weather events. [Jinkyu Hong, Republic of Korea]	We are grateful for your suggestion, and will be including consideration of it in the next draft
13945	58	9	58	9	Threatened by what? Do you mean climate sensitive ecosystems? [Elvira Poloczanska, Germany]	A large number of ecosystems threatened by climate change
13946	58	10	58	13	Nothing in the Americas? Further is this a repetition of AR5? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1320	58	11	58	11	Siberian ecosystems are in polar deserts, taiga, steppe inter alia. Authors may want to specify ecosystem type. [GREGORY INSAROV, Russian Federation]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1360	58	11	58	11	Siberian ecosystems are in polar deserts, taiga, steppe inter alia. Authors may want to specify ecosystem type. [GREGORY INSAROV, Russian Federation]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1321	58	12	58	14	Is this statement, "In all these systems, it has been shown that impacts accrue with greater warming and thus impacts at 2°C would be expected to be greater than those at 1.5°C (medium confidence)" taken from AR5? If so, specify chapter and section. If not, specify source(s)/base for this statement. [GREGORY INSAROV, Russian Federation]	This statement will be updated in the light of new publications in the FGD and references provided.
1361	58	12	58	14	Is this statement, "In all these systems, it has been shown that impacts accrue with greater warming and thus impacts at 2°C would be expected to be greater than those at 1.5°C (medium confidence)" taken from AR5? If so, specify chapter and section. If not, specify source(s)/base for this statement. [GREGORY INSAROV, Russian Federation]	This statement will be updated in the light of new publications in the FGD and references provided.
9595	58	14	58	14	Why confidence has been given in some case ,but some not?please consistently provide the confidence in all sections. [Jianguo Wu, China]	This is due to the incomplete nature of literature available to the authors at this stage and will be addressed in the FGD.
13947	58	16			This section is not very clear to read, try to avoid too much generalisation [Elvira Poloczanska, Germany]	Noted.
10591	58	16	58	24	Hutrya et al., 2005 missing from reference list [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10592	58	16	58	24	Good et al., 2011 missing from reference list [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10599	58	16	58	24	Borma et al., 2013; missing from reference list. [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10601	58	16	58	24	Nobre et al., 2016; missing from reference list. [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10602	58	16	58	24	Cox et al., 2000; missing from reference list. [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10603	58	16	58	24	Jones et al., 2009 ; missing from reference list. [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10604	58	16	58	24	Huntingford et al. 2013 ; missing from reference list. [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
10605	58	16	58	24	Sombroek, 2001; missing from reference list. [Elemer Briceño-Elizondo, Costa Rica]	Accepted - reference added in list of references
7475	58	17	58	18	Please state in which direction the climatic threshold of the Amazon tropical forest is expected to move under elevated CO2. [Øyvind Christophersen, Norway]	Accepted - to be considered in next draft.
16284	58	17	58	18	It needs to be made clear that the threshold being talked about here is the one for warmer conditions--the statement here is simply not clear. I'd note also that given what periods of drought have done to areas of the Amazon, it may also be close to a dryness threshold. [Michael MacCracken, United States of America]	Accepted - to be considered in next draft.
13948	58	18	58	18	Please provide an explanation for shift in threshold [Elvira Poloczanska, Germany]	Accepted - to be considered in next draft.
20287	58	24			Degrees symbol is missing between 4 and C [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
9986	58	24	58	24	Add "°" to "4C" [Mustafa Tufan Turp, Turkey]	text revised

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19207	58	24	58	24	Please, change "4C" by "4°C" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
13949	58	24	58	24	This are "tipping points" beyond which the forest cases to function or even exist???? Language not comprehensible to policy makers [Elvira Poloczanska, Germany]	The text can not be identified
9248	58	26			The "Arctic" section seems to be missing its text. [Marie-Jeanne S. Royer, Canada]	text revised
2329	58	26	58	26	Arctic is a heading here but there is no information, although some of the things in the following paragraphs may be relevant here. A key thing regarding Arctic regions is the greening of the tundra or shrubification which has been discussed in numerous papers. [Sharon Smith, Canada]	see new section on Arctic and Alpine ecosystems in rge regional section
17270	58	26	58	26	I guess that at some point there will be some text here for "Arctic". [Maria Jesus Iglesias Briones, Spain]	text revised
9596	58	26	58	26	there is nothing except Arctic?please add the content for this section. [Jianguo Wu, China]	see new section on Arctic and Alpine ecosystems in rge regional section
4588	58	27			The description for "Arctic" is missing. [Radim Tolasz, Czech Republic]	see new section on Arctic and Alpine ecosystems in rge regional section
1322	58	28	58	32	In Romero-Lankao et al. (2014), Box 26-2 is about wildfires, not the Box 26-1. There is no comparison of wildfire risks between 2013-2040 and +2°C word in this Box 26-2.. [GREGORY INSAROV, Russian Federation]	Accepted, the typo in the reference will be corrected in the next draft
1362	58	28	58	32	In Romero-Lankao et al. (2014), Box 26-2 is about wildfires, not the Box 26-1. There is no comparison of wildfire risks between 2013-2040 and +2°C word in this Box 26-2.. [GREGORY INSAROV, Russian Federation]	Accepted, the typo in the reference will be corrected in the next draft
7016	58	28	56	28	Ozone related to climate changes have through UV-B affected both coastal and terrestrial ecosystems. Dissolved organic matter (DOM) is increasing in many aquatic ecosystem resulting to a "browning" effect particularly evident in inland waters, e.g. at Rupert Bay, Quebec and Lake Michigan (reference Environmental Effects of Ozone Depletion and its Interactions with Climate Change: Progress Report 2015, 2016). DOM entering the aquatic ecosystems is broken down to release CO2, a process driven by solar UV-B radiation. Future changes in exposure to UV-B radiation will therefore affect how much of the carbon entering aquatic ecosystems due to "browning" is released to the atmosphere as CO2. Future changes in exposure to UV-B radiation will also affect the release of CO2 from organic matter in terrestrial. Reduced UV-B radiation in the future would result to less CO2 released by terrestrial and aquatic ecosystems. Terrestrial systems are affected by UV radiation and constraints from climate change (water availability, higher temperatures, CO2). [Christos Zerefos, Greece]	do not know if we have literature for the future risks
19208	58	29	58	30	It seems that the sentence is incomplete. [Rubén Retuerto, Spain]	yes, it should be: Projected impacts on forests include increases in the intensity of storms, wildfires and pest outbreaks
9872	58	29	58	30	You might wish to add Seidl et al. 2017 highlighting the importance of interactions of different disturbance agents under climate change. Seidl R, D Thom, M K, D Marlin-Benito, M Peltoniemi, G Vacchiano, J Wild, D Ascoli, M Petr, J Honkaniemi, MJ Lexer, V Trotsiuk, P Mairota, M Svoboda, M Fabrika, TA Nagel, CPO Reyer (2017) Forest disturbances under climate change. Nature Climate Change 7:395–402 DOI 10.1038/nclimate3303 [Christopher Reyer, Germany]	We have to check if this paper is useful and if it could be introduced in the next version
10246	58	29	58	32	Mediterranean forest are high risk areas for fires. Boreal forests in Scandinavian region of Finland and Baltic Sea states are subject to sea level rise too. [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	In the new version, fires are mentioned also for Boreal forests and other ecosystems as fynbos
13950	58	31	58	31	please be consistent in use of terms for fire, above you use fire risk and here wildfire risk [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
13951	58	34	58	34	Please be clear this is northern hemisphere [Elvira Poloczanska, Germany]	editorial: I think that it is implicit
13952	58	34	58	34	it isn't clear in text that this is due to the regional warming rates where they are situated [Elvira Poloczanska, Germany]	The sentence seems clear to me
7476	58	36	58	37	Regarding the impacts of increased disturbances: consider including more than merely possible effects on southern boundary of boreal forests. [Øyvind Christophersen, Norway]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1323	58	37	58	37	Gauthier et al., 2015 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Accepted - reference added in list of references
1363	58	37	58	37	Gauthier et al., 2015 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Accepted - reference added in list of references
2330	58	38	58	39	Recent references relevant to issue of impact of thawing permafrost on boreal forest Sniderman and Baltzer (2016, JGR Biogeosciences, 121:2988–3000), Baltzer et al. (2014, Global Change Biol., 20(3), 824–834). [Sharon Smith, Canada]	NOT taken into account: these papers are interesting but they do not give any information on the effect of a 1.5°C or 2°C global warming
12079	58	38	58	40	I would add citation for this statement of changing hydrology due to thawing permafrost and associated changes in soil biogeochemistry. There are plenty of literature out there on this topic. In addition to thermokarst lakes, an emerging idea out there is the zero curtain layer (Zona et al-2015-PNAS-113-40-45), which also seems to be a significant source of greenhouse gas production from arctic soils during winter season. [Debjani Sibi, United States of America]	To be taken into account in the section on wetlands
5468	58	42	58	42	There is a lot of mix up in this rubric. Not all svannas, shrublands are drylands. Also savannas may denote grasslands. However, what is in the text indicates process of desertification and hence the title may read as 'desertification' [Aliyu Barau, Nigeria]	Taken into account: the section has been reworked and more focused on the drylands
13953	58	42	58	42	Limited or no discussion below on most of these ecosystems [Elvira Poloczanska, Germany]	Taken into account: the section has been reworked and more focused on the drylands
16285	58	43	58	44	It also needs to be stated that the thresholds can involve pests as well--so the western North America lodgepole pine ecosystem experiences reduced winter chilling and this allows a pest to propagate and overwhelm the tree's defense mechanisms, and then one has fire. So, I would suggest that pests (and perhaps plant diseases) can also play an important role. [Michael MacCracken, United States of America]	This is more general than North America ecosystems. It is mentioned in the section "Changes in ecosystem function, biomass and carbon stock"
2719	58	45	58	51	Clarify: is this for all Mediterranean ecosystems, or only around the Mediterranean Sea? [Penny Urquhart, South Africa]	Taken into account: it is precised "in the Mediterranean" which is more precise than the Mediterranean ecosystems; possibly add basin
9987	58	46	58	46	It would be better to say "the Mediterranean Basin/area/region" [Mustafa Tufan Turp, Turkey]	taken into account
13954	58	48	58	48	it is not clear what is meant by water availability [Elvira Poloczanska, Germany]	Replace by water resource
7273	58	51	58	51	specify that 'the latter' refers to IPCC 2013 [Butt Nathalie, Australia]	Editorial: IPCC (2013) finds that only 1.5°C warming constrains
12034	58	52	58	52	While should replace "whilst" here and elsewhere in Chap 3. [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
19209	58	52	58	53	transformation of 12-15% of the Mediterranean biome area towards what? [Rubén Retuerto, Spain]	taken into account: while 2°C warming results in decrease of 12-15% of the Mediterranean biome area
9597	58	53	58	57	why give more assessment about the effects of 4°C above pre-industrial levels on ecosystem functions?the report should be given much more assessing the effects of 1.5°C above pre-industrial levels on ecosystem functions. [Jianguo Wu, China]	This is indicated to show the trend of a important warming on the Mediterranean ecosystems
20288	58	55			Do you mean short-term exposure? Suggest deleting "relative long-term" and just stating "42 days exposure to..." [Aaron Glenn, Canada]	text revised

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13748	58	55	58	55	also provide a common name for <i>Stipa baicalensis</i> [Elvira Poloczanska, Germany]	It is the common name for this <i>stipa</i> grassland, since different <i>stipa</i> species have different responses to warming. It does not need to change the name. It has also been revised in the new text.
11726	58	55	58	55	What is the significance of feathergrass...i.e., why highlight it here. If it is only an example to illustrate a principle/concept, then add that context. If not, provide other examples, too. [David Schoeman, Australia]	Yes, it does not make sense. It has been revised in the new text.
1324	58	55	59	9	In the two paragraphs, there is nothing on consequence for 1.5°C versus 2°C warming for dryland ecosystems: savannas, shrublands, grasslands, deserts. You may want to adjust this text. [GREGORY INSAROV, Russian Federation]	Here it just indicated the effects of elevated temperature, and to show the tendency. However, We still rewrote the text in order to make sense.
1364	58	55	59	9	In the two paragraphs, there is nothing on consequence for 1.5°C versus 2°C warming for dryland ecosystems: savannas, shrublands, grasslands, deserts. You may want to adjust this text. [GREGORY INSAROV, Russian Federation]	Here it just indicated the effects of elevated temperature, and to show the tendency. However, We still rewrote the text in order to make sense.
7639	58	55	59	9	It is unclear why such detail is given for a single species. It should be said why this species is so important (I am not familiar with it but do not work in dryland systems) [Sophie Fauset, United Kingdom (of Great Britain and Northern Ireland)]	This is a good question, but it can be interesting to have an example of adaptation in a steppic biome
4589	58	57			Add explanation of "Vcmax" [Radim Tolasz, Czech Republic]	text revised
8832	59	1	59	21	Nothing is mentioned about Table 3.2 [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
20289	59	2			Italicize <i>Stipa baicalensis</i> [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
4939	59	2			<i>Stipa baicalensis</i> should be <i>Stipa baicalensis</i> (in italics) [Alejandro Cearreta, Spain]	Editorial - copyedit to be completed prior to publication
4590	59	2			Use italics for latin name of " <i>Stipa baicalensis</i> ". [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
19210	59	2	59	2	Please, italicize <i>Stipa baicalensis</i> [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
7274	59	3	59	3	what are 'normal live activities' ? [Butt Nathalie, Australia]	text revised
13749	59	5	59	9	genus name in italics [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
20290	59	6			Italicize <i>Stipa</i> [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
4940	59	6			<i>Stipa</i> species should be <i>Stipa</i> species (in italics) [Alejandro Cearreta, Spain]	Editorial - copyedit to be completed prior to publication
19211	59	7	59	9	This sentence sounds weird. I would suggest to rephrase. [Rubén Retuerto, Spain]	text revised
20291	59	8			Italicize <i>Stipa</i> [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
4941	59	8			<i>Stipa</i> species should be <i>Stipa</i> species (in italics) [Alejandro Cearreta, Spain]	Editorial - copyedit to be completed prior to publication
7275	59	8	59	8	remove 'that' from the end of the line [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
19020	59	11	59	11	Please delete the ":" after the title "Rivers, lakes, wetlands, peatlands" [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication
13955	59	11	59	11	Limited or no discussion below on most of these ecosystems [Elvira Poloczanska, Germany]	Accepted, we will revise text in the next draft
5469	59	11	59	13	Please add more explanation to this paragraph, it is too scanty and incomplete more references and examples are needed [Aliyu Barau, Nigeria]	Accepted, we will revise text in the next draft
7477	59	11	59	21	In this section about Rivers, lakes, wetlands and peatland: consider including more information about impacts related to other than (water) temperature. I.e in northern countries which are expected to experience more precipitation, increase in runoff and erosion are regarded as perhaps even more important factors, with consequences for water quality, colour etc. [Øyvind Christophersen, Norway]	Accepted, we will revise text in the next draft
13956	59	13	59	13	Suggest declines in water quality, worsen suggests it is already poor? [Elvira Poloczanska, Germany]	Editorial, accepted
1365	59	17	59	17	Provide references. [GREGORY INSAROV, Russian Federation]	Will take into account in producing the final draft by adding the reference
1366	59	17	59	19	Provide references. [GREGORY INSAROV, Russian Federation]	Duplicate comment
1367	59	19	59	21	Because exact position of the threshold is unknown, we just know that it is within the 1.2-1.8 interval, this statement is not correct. [GREGORY INSAROV, Russian Federation]	Will take into account in producing the final draft by editing the statement
20292	59	20			Capitalize <i>Praire</i> Pothole to be consistent with line 16 [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication
1368	59	21	59	21	Johnson et al. 2016 is not in the reference list. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication
4591	60				Tab 3.2 - The symbol for "Precipitation" (in header) is not used in the table. [Radim Tolasz, Czech Republic]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
17271	60		65		Many key aspects on adaptations and drivers are empty. Regarding precipitation, cannot it be considered a driver in any of the key risks listed here? [Maria Jesus Iglesias Briones, Spain]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD. Adaptation and drivers are considered now in Ch 4 and are beyond the scope of Ch 3.
13957	60	1			Would it be possible to add more temperature numbers to the timeframe column eg present 0.9C, near term as an indicator of 1.5C???? (see chp 5 fig 5.2). Also the text is very long, could these be summarized or just key points included??? In fact, this table could be used to reduce requirement for detailed ecosystem sections in the text. Further, adaptation options column either needs updating or removal [Elvira Poloczanska, Germany]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
7169	60	1	60	1	I believe the addition avoided risks would improve the tables of key risk introduced in AR5. Would it be possible to provide information on how these risks evolved since AR5 (for example graphically in the tables on in the paragraphs explaining these tables)? [Iulain Florin VLADU, Germany]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
12035	60	1	60	1	Table 3.2: Running out of time.Only able to glance at it. [Paul Doyle, Canada]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
1959	60	1	60	1	Nice use of graphics; similar could be used more widely (though other parts of table are heavy on text -- highlight in bold key point)? [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
2351	60	1	60	4	Table 3.2 and the others like it, lessons appear not to have been learnt from the AR5 about diagram design. This diagram is too complex, the text too small and the subsequent graphics in columns 4 and 6 are indecipherable. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
10606	60	1	60	5	The creation of biological corridors has acted as a key element in connectivity for tropical countries (Costa Rican case). The coment is in reference to Table 3.2 :Increased risk of species extinction on adaptation options [Elemer Briceño-Elizondo, Costa Rica]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
10607	60	1	60	5	The adaptation option for the reduction in terrestrial carbon sink in Table 3,2 is repeated [Elemer Briceño-Elizondo, Costa Rica]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD. Adaptation and drivers are considered now in Ch 4 and are beyond the scope of Ch 3.
10608	60	1	60	5	The adaptation comments for the Amazon tipping point in table 3.2, given the magnitude of the sinks and issue, seem to poor to be put as general as they area described. Besides improving land use management, reduction of reforestation and fires, there are issues of leakage that can be tackled through reforestation of buffer zones, as well as increase in connectivity, monitoring and obligatory usage of improved management plans based on species needs as well species enrichment where possible. [Elemer Briceño-Elizondo, Costa Rica]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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9598	60	1	60	6	table 3.2 about avoided risk for species: not clear how to avoid risk from climate change [Jianguo Wu, China]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
9599	60	1	60	6	table 3.2 lacking adaptation options for avoiding tree mortality and forest loss from climate. [Jianguo Wu, China]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD. Adaptation and drivers are considered now in Ch 4 and are beyond the scope of Ch 3.
7478	60	1	61	1	Table 3.2: This is a very important and instructive table! However, for accessibility, the text in the table should preferably be shortened to state main points and be phrased in a non-technical way. [Øyvind Christophersen, Norway]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
1369	60	1	61	1	Table 3.2. In AR5, the last column of the similar table for terrestrial ecosystems for many risks was mainly based on authors' judgements, not on literature. For this SR we have very few literature, so this approach is even more superficial. Authors team may want to consider another way to sum up the SR findings. [GREGORY INSAROV, Russian Federation]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
5723	60	1	61	1	The text in the Table is too small to be readable. [Hong Yang, Switzerland]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
8834	60	1	65	1	Table 3.2 is not clear. [Lubna Alam, Bangladesh]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
13750	60	1	87	1	ensure that it is referred to Tables 3.2 - 3.6 somewhere in the text (not always done) [Elvira Poloczanska, Germany]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
19021	60	4	60	4	The quality of his table 3.2 should be improved. There is no need to have the title original title of the table included in top... Please, clip this former title. [JACQUES-ANDRE NDIONE, Senegal]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
11727	60	4	60	4	I'm assuming that this is an AR5 table standing proxy for a table to be developed...if not, why compare with 2° and 4° C warming? [David Schoeman, Australia]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
7479	61		61		Last row of Table 3.2: Please consider including the important finding on risks of loss of ecosystem functioning and services in the executive summary [Øyvind Christophersen, Norway]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
20569	61				On the table that continues to this page there are often no 'Adaptation Options' mentioned. It would be important for me to know why: is it down to lack of robust evidence? What is the quality of the evidence that is being used? Are you only using evidence emerging from previous well powered trials? As a Portuguese academic working in the UK I am still very aware of the plague of forest fires in continental Portugal. Parts of these fires are down to the interaction between humans and nature interaction with some contribution of global warming. Hence, there are issues in terms of how forests are maintained and cleaned as well as shaped/managed. Currently the use of trees that are not native to Portuguese forests such as Eucalyptus Globulus is prolific. Although these are associated with a key sector of the economy (production of paper) they are considered a fire hazard. One adaptation option could be to regenerate forests by planting other types of trees that can retain water and serve as a fire prevention tool. Given that the Eucalyptus Globulus trees are coppiced every 10 to 12 years, native species could be used to substitute them. If political will is amassed, for the future of the country (avoiding an increase in droughts), I am sure that there could be many different measures put in place that would deter the continuous use of the Eucalyptus in Portugal. Please disregard if this is supposed to be under the section under 'Tree mortality...' [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD. Adaptation and drivers are considered now in Ch 4 and are beyond the scope of Ch 3.
9600	61	1	61	1	table 3.2 lacking adaptation options description . [Jianguo Wu, China]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD. Adaptation and drivers are considered now in Ch 4 and are beyond the scope of Ch 3.
3876	61	1	61	1	In the row "Transformation of Global Ecosystems," column "Avoided Risks," edit the text to include other published biome shift research so that it reads something like "Approximately 5-10% of global ecosystem area vulnerable to biome shifts under 1.5°C warming, increasing to 10-40% under 3°C warming (Betts et al. 2015, Gonzalez et al. 2010, Warszawski et al. 2013)." Betts, R.A., N. Golding, P. Gonzalez, J. Gornall, R. Kahana, G. Kay, L. Mitchell, and A. Wilshire. 2015. Climate and land use change impacts on global terrestrial ecosystems and river flows in the HadGEM2-ES Earth system model using the representative concentration pathways. Biogeosciences 12: 1317-1338. Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drapek. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. Global Ecology and Biogeography 19: 755-768. [Patrick Gonzalez, United States of America]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
9798	61	17	7	11	Biogeographic distribution shift and phenology changes in the ocean are also very obvious as that in terrestrial ecosystem (Loarie et al. 2009; Burrows et al. 2011; 2014). It would be better to assess the related issues in 3.4.3 ocean systemem not so reseanable. [Rongshuo Cai, China]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12892	62	1			Check the font in table [Jorge Carrasco, Chile]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
5470	62	1	62	1	Please add risk of alien invasive species that may arise from climate change scenarios [Aliyu Barau, Nigeria]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
1370	62	3	62	3	Upper left cell. It is written "Wiens (2016) reported that 47% of the 976 found could be attributed to climatic change, especially in tropical regions and freshwater habitats". Indicate period of extinction and explain what is 976 for. [GREGORY INSAROV, Russian Federation]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
18018	62	3	62	3	specify the year of "Smith et al." [Wilfran Moufouma Okia, France]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
3563	63				table Mediterranean ecosystem: change to 'a shift has ben observed in phenology.....' [Sylvia Sander, Monaco]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
17723	63		63		Mediterranean ecosystems. "Tipping point [...] +2oC warminG [...]" [Ana Bastos, France]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
5751	63		63		Annex 3.1; Table S3.3:Key economic sectors: For the sector "water", the above mentioned study Marx et al. should be included. [Andreas Marx, Germany]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
6241	63	10			Under sub-heading 'Tree mortality and forest loss: threatened (not treathened). [Muhammad Mohsin IQBAL, Pakistan]	Table covered only risk and related observed impacts.
2331	64				Table 3.2 Transformation of Arctic Ecosystems - Some additional references are relevant and only a few examples are provided here. For changes in permafrost conditions the latest State of Climate report published in BAMS (see Romanovsky et al. contribution) is relevant (This report and Arctic Report Card are relevant for the other issues mentioned in this text for the Arctic). Also Lantz et al. (2013, Ecosystems 16: 47-59) discusses shrub proliferation in the tundra. The accompanying information regarding wooded tundra in the 3rd column (avoided risks) is confusing. With warming, greening or shrubification of the tundra has been predicted so the greater loss of wooded tundra doesn't make sense. For the permafrost comment, see previous comments regarding results of Chadburn et al. (2017). [Sharon Smith, Canada]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
17724	64		64		Spread of pests and diseases. A recent study has found that beetles might dampen fire risk rather than exacerbating it (as stated in the third column) by reducing fuel load. See Meigs et al. 2016 ERL [Ana Bastos, France]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
10609	64	1	64	1	Adaptation options for boreal forest. Why are there no measures considered? [Eliemer Briceño-Elizondo, Costa Rica]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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3877	64	1	64	1	In the row "Transformation of Global Ecosystems," column "Avoided Risks," edit the text to include other published biome shift research so that it reads something like "Approximately 5-10% of global ecosystem area vulnerable to biome shifts under 1.5°C warming, increasing to 10-40% under 3°C warming (Betts et al. 2015, Gonzalez et al. 2010, Warszawski et al. 2013)." Betts, R.A., N. Golding, P. Gonzalez, J. Gornall, R. Kahana, G. Kay, L. Mitchell, and A. Wiltshire. 2015. Climate and land use change impacts on global terrestrial ecosystems and river flows in the HadGEM2-ES Earth system model using the representative concentration pathways. <i>Biogeosciences</i> 12: 1317-1338. Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drapek. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. <i>Global Ecology and Biogeography</i> 19: 755-768. [Patrick Gonzalez, United States of America]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
8835	65	2	65	38	Nothing is mentioned about Table 3.3 [Lubna Alam, Bangladesh]	Table 3.2 will be revised for the final draft, a placeholder only is included in the SOD
3570	65	3	66	46	This entire sub-chapter needs to be revised. It reads like a string of unrelated references which out of contexts often don't make full sense. [Sylvia Sander, Monaco]	Taken into account - text revised
11728	65	3	71	11	This whole section needs a lot of attention...I include some specific comments below, but the whole things needs an overhaul [David Schoeman, Australia]	Taken into account - text revised
12378	65	5			Section 3.4.2.1 is particularly underdeveloped and is lacking a number of important observed impacts and adaptation for coastal and low-lying areas. Currently the section only briefly addresses SLR. However, there have been observed impacts on shoreline change, coastal ecosystems (including wetlands and coral reefs), biodiversity, water resources, locations of settlements, health, industries (including tourism, fisheries and agriculture), human health, relocation, displacement and migration of coastal residents. This section should also include discussion of the challenges facing small islands in particular in assessing existing impacts which likely contributes to not as many studies of observed impacts. See for e.g. (Thomas, A., & Benjamin, L. (2017). Management of loss and damage in small island developing states: implications for a 1.5° C or warmer world. <i>Regional Environmental Change</i> , 1-10.).P [Bill Hare, Germany]	Accepted - impacts taken into account where relevant to 1.5 deg and this chapter. Reference now cited.
13958	65	5			this section is poorly written and it is difficult to follow the main findings. [Elvira Poloczanska, Germany]	Taken into account - section has been rewritten
9137	65	5			Section 3.4.2.1 lacks a number of important observed impacts and adaptation for coastal and low-lying areas. E.g. observed impacts on shorelines, coastal ecosystems, biodiversity, water resources, settlements, health, industries (including tourism, fisheries, agriculture), displacement and migration of coastal residents. This section should also consider how loss and damage can be managed in small islands, particularly in the light of existing impacts. See for e.g. (Thomas, A., & Benjamin, L. (2017). Management of loss and damage in small island developing states: implications for a 1.5° C or warmer world. <i>Regional Environmental Change</i> , 1-10.). [Susanna De Beauville-Scott, Saint Lucia]	Accepted - impacts taken into account where relevant to 1.5 deg and this chapter. Reference now cited.
9601	65	5	65	31	Clearing the effects of 1.5°C above pre-industrial levels. [Jianguo Wu, China]	Rejected - don't understand comment
9173	65	6		7	Cross reference to relevant sections of Chapter 1 demonstrating on-going SLR [robert kay, United States of America]	Noted. Authors from Chapters 1 and 3 had extensive discussions on the representation of Earth system components with long times scales (where rate of change is related to GMST) to ensure consistent representation.
14345	65	6	65	31	Another impact that is not mentioned in the current version of the report concerns the impact that coral degradation may also lead to a decrease in bed roughness and therefore higher waves at coral reef islands (see e.g. "Quataert et al., 2015. The influence of coral reefs and climate change on wave-driven flooding of tropical coastlines, <i>Journal of Geophys. Research</i> ") [Alessio Giardino, Netherlands]	Accepted - sentence added
19022	65	6	65	8	If allowed, this sentence "Sea-levels will not stop rising with temperature stabilisation at 1.5°C or 2°C leading to salinisation, flooding and erosion, meaning that over multi-centennial timescales, adaptation, built on bespoke local practices, remains essential.", should be in bold; it's one of the key message! [JACQUES-ANDRE NDIONE, Senegal]	Noted - thank you.
16286	65	6	65	8	Saying "flooding" implies something temporary--low-lying islands are subject to increasing inundation, so permanent effect, and this needs to be mentioned. [Michael MacCracken, United States of America]	Accepted - permanent inundation added
12036	65	7	65	7	bespoke very unusual British word, maybe a synonym would be a better choice. [Paul Doyle, Canada]	Accepted - text revised
12037	65	10	65	10	....are "likely to be (and are being) felt"....first [Paul Doyle, Canada]	Taken into account - text now removed
5504	65	10	65	10	Observations of sea-level rise are likely (and are) to be felt first through slow onset events...: What is the sense of the "(and are)" in parenthesis? Delete? [Ismael Nunez-Riboni, Germany]	Accepted - words removed
11729	65	10	65	17	A paragraph with some strong (perhaps speculative) statements, but no citations [David Schoeman, Australia]	Taken into account - paragraph no longer exists. Statements made and changed elsewhere in the text.
2523	65	10	65	17	Another important early effect of sea-level rise is the increased frequency of tidal flooding; see, for example, Sweet and Park (2014). Sweet, W.V. and J. Park, 2014: From the extreme to the mean: Acceleration and tipping points of coastal inundation from sea level rise. <i>Earth's Future</i> , 2, 579-600. <a href="http://dx.doi.org/10.1002/2014EF000272">http://dx.doi.org/10.1002/2014EF000272</a> [Robert Koppu, United States of America]	Accepted - sentence added
13959	65	11	65	11	implications for low-lying small islands dependent on ground water as fresh water source? [Elvira Poloczanska, Germany]	Accepted - observation reference added (Pearce et al. 2017)
13960	65	11	65	11	use ecosystems rather than biological systems [Elvira Poloczanska, Germany]	Taken into account - sentence moved and changed, but accepted revision.
9168	65	11	65	14	such as... coral reefs, mangrove forests "and saltmarshes". [Ursule Boyer-Villemare, Canada]	Accepted - text revised.
9167	65	11	65	14	Not only impacts on barrier ecosystems affect the coastal dynamics. Changing ocean conditions also raise vulnerability of boreal coastline through warmer winters, which impedes the solidification of coastal icefoot, thus increasing the coastline vulnerability to winter storms, which did not used to be affected by those storms. This process is currently significantly accelerating the coastal evolution of the St. Lawrence Estuary and Gulf (Eastern Canada), both in terms of floods and erosion. This is superimposed to the fact that Eastern Canada is a hotspot of sea-level rise: contribution of thermal expansion combined with post-glacial subsidence. [Be aware that the St. Lawrence is not in the Arctic; located around 46-5 degrees of latitudes] REFERENCES: GOOD REVIEW: Government of Canada, 2016. Coastal Assessment. <a href="http://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2016/18388">http://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2016/18388</a> ; Ruest, B., Neumeier, U., Dumont, D., Bismuth, E., Senneville, S., Caveen, J., 2016. Recent wave climate and expected future changes in the seasonally ice-infested waters of the Gulf of St. Lawrence, Canada. <i>Climate Dynamics</i> , 46, 449-466. doi:10.1007/s00382-015-2592-3 [Ursule Boyer-Villemare, Canada]	Accepted - reference to Ruest added. Detail added appropriate to size of report.
12038	65	12	65	12	TYP0...."simultaneous".... [Paul Doyle, Canada]	text revised

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

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20570	65	13			You are missing an: as. It should read 'such as...' As I stated above: important to go over the whole document to check grammar, sentence construction, sentence construction as well as punctuation. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text removed
6242	65	13			Please add word 'as' between 'such coral'. [Muhammad Mohsin IQBAL, Pakistan]	Accepted - word added / sentence now reworded elsewhere
13961	65	14	65	17	this sentence has no temperature associated with it and does not talk about the degree of change / losses until stabilized temperature is reached. Also what are the extreme events and impacts to be expected in the changed climate? There are also no citations [Elvira Poloczanska, Germany]	Accepted / taken into account - section removed / split to other parts of the text and developed.
3565	65	15			I suggest using 'global' instead of 'planetary' [Sylvia Sander, Monaco]	Accepted - word added
11730	65	19	65	19	What does this opening sentence mean? I don't understand... [David Schoeman, Australia]	Accepted - sentence removed.
9169	65	19	65	31	In the next paragraph, I also suggest mentioning the coastal squeeze effect, which has been documented in Eastern Canada. REFERENCE: Bernatchez, P., & Quintin, C. (2016). Potentiel de migration des écosystèmes côtiers meubles québécois de l'estuaire et du golfe du Saint-Laurent dans le contexte de la hausse appréhendée du niveau de la mer. Le Naturaliste canadien, 140(2), 91-104. <a href="https://www.erudit.org/fr/revues/natcan/2016-v140-n2-natcan02523/1036507ari">https://www.erudit.org/fr/revues/natcan/2016-v140-n2-natcan02523/1036507ari</a> [Ursule Boyer-Villemare, Canada]	Not cited as no access to article so have requested it. Have cited coastal squeeze elsewhere, but this is potentially a good reference (but not totally relevant to 1.5C).
11731	65	19	65	31	This seems like a series of dot points tied together rather than a carefully constructed paragraph, and is symptomatic of this whole section [David Schoeman, Australia]	Taken into account and accepted - observations no longer have their own section.
12039	65	21	65	21	..... "Delaware River estuary on the USA east coast" upward..... [Paul Doyle, Canada]	Accepted - phrase rewritten
14344	65	23	65	24	sea-level rise may be the cause of increased salinity. It is not only strictly the sea-level rise that will cause an increased in salinity. Sea level will also result in larger waves and higher wave-driven water levels along islands. Models show that the interaction between the two will result into twice as much flooding for a given sea level rise scenario. As a consequence, annual flooding will result in a salinization of the limited freshwater resources (see e.g. "Storlazzi et al., 2015. Many Atolls may be Uninhabitable within Decades due to Climate Change. Scientific Reports") [Alessio Giardino, Netherlands]	Accepted - reference added
3564	65	24			do we have to explain accreted/accretion. I am assuming the authors mean the geological term, which might not be know to all readers. [Sylvia Sander, Monaco]	Rejected - text did not define accretion
6657	65	24	65	27	On the other hand these environments are typically favourable for generation (methanogenesis) and emission of biogas. [Castor Muñoz Sobrino, Spain]	Rejected - beyond scope of this section.
12040	65	25	65	25	ADD.... but "have" lost..... [Paul Doyle, Canada]	Accepted - word added
12041	65	28	65	28	CHANGE..... sea-level rise "on" a..... [Paul Doyle, Canada]	Taken into account / accepted - sentence reworded
1960	65	29	65	29	High confidence in italics? [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
13962	65	29	65	31	It is not clear what is being said here eg who or what is migrating?? [Elvira Poloczanska, Germany]	Accepted - 'human' added
16287	65	29	65	31	Somewhere here it needs to be said that, however, there are likely limits to the rate of accretion/adaptation, and that the increasing rates of sea level rise are likely to overwhelm the ability to accrete new materials. In any case, what will be happening is an adjustment of the coastline profiles and this would ultimately affect susceptibility to inundations, etc. [Michael MacCracken, United States of America]	Rejected - beyond scope, but have mentioned coastal squeeze / shoreline change elsewhere
7623	65	29	65	31	Some references are necessary for this sentence. [Keiko Udo, Japan]	Accepted - references added. Plus examples given elsewhere
7624	65	30			The "multiple drivers" should be indicated. [Keiko Udo, Japan]	Taken into account - text around this section has been reworded in response to multiple other reviewers
12042	65	31	65	31	..... are "increasingly" being considered..... [Paul Doyle, Canada]	Accepted -word changed
9319	65	31	65	31	The word "increasing" should be "increasingly" in the phrase "Retreat and migration are increasing being considered in management response" [Siir KILKIS, Turkey]	Accepted - word changed
3571	65	32			add spaces: "... (Woodroffe 1990), of up to 8-9 cm of rise over the last hundred years (Ellison and Stoddart 1991), [Sylvia Sander, Monaco]	Taken into account - text now completely removed
12379	65	34			There is new literature that links SLR with global temperature goals that can be referenced here See for e.g. (Schleussner, C. F., et al. (2016). Differential climate impacts for policy-relevant limits to global warming: The case of 1.5° C and 2° C. Earth Syst. Dyn. Discuss., 6, 2447-2505.). There are also other temperature specific impacts such as increased extreme precipitation intensity, extreme temperatures, longer durations of heatwaves, etc. that have implications for coastal areas and small islands. There also needs to be discussion of projected risks to coral reefs and the implications on ecosystem services, livelihoods and economy. Some discussion of the non-linearity of SLR and possible tipping points affecting SLR and resultant existential threats to small islands should also be included. For small islands in particular, the differences in risk between 1.5 and 2 are of particular concern and they may be unable to adapt. This is an essential point that needs to be included. [Bill Hare, Germany]	Accepted - this is a very important comment. However literature on all these topics relevant to 1.5C is not yet available. This has been described qualitatively where possible / where space allows.
13963	65	34			there is little consideration of biodiversity in this section [Elvira Poloczanska, Germany]	Taken into account - new text added.
9138	65	34			For the small islands it is particularly important to consider the differences in risk between 1.5 and 2°C as in some cases these may involve impacts that go beyond adaptive capacity. This should also include the potential for tipping points and non-linear behaviour (in SLR), which could result in an existential threat for some small islands. This section could also draw upon literature that quantitatively links SLR with global temperature goals (e.g. Schleussner et al. (2016). Differential climate impacts for policy-relevant limits to global warming: The case of 1.5° C and 2° C. Earth Syst. Dyn. Discuss., 6, 2447-2505.). There are also impacts related to rising temperatures (heat waves, increased extreme precipitation intensity) that are important for for coastal areas and small islands, and should be included here. [Susanna De Beauville-Scott, Saint Lucia]	Accepted - this is a very important comment. However literature on all these topics relevant to 1.5C is not yet available. This has been described qualitatively where possible / where space allows.
3332	65	34	65	41	You can refer to Yotsukuri et al (2017), which estimated global inundation impacts due to SLR and astronomical tide according to change in GMT. There is little difference between 1.5 and 2.0 degree. Their threshold was estimated around 2.5 to 3.4 degree. Yotsukuri M, Tamura M, Kumano N, Masunaga E, Yokoki H (2017) Global impact assessment of sea level rise based on RCP/SSP scenarios. Journal of Japan Society of Civil Engineers G (Environment) 73(5):1_369-1_376 (in Japanese). [Makoot Tamura, Japan]	Thanks. Papers will be revised for TOD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9170	65	34	65	41	At mid-latitude, there is a great confidence about the reduced protection offered by the coastal ice cover, which increases the coastline exposure to erosion and floods. [Ursule Boyer-Villemaire, Canada]	Accepted - reference to new 1.5C Arctic ice melt papers added
9171	65	34	65	41	Globally, there is a lack in attribution studies connecting coastal erosion and floods with climate change, oceanographic and meteorological indicators. This is partly due to the complexity of wave patterns due to anthropogenic structures [Didier, D., Bernatchez, P., Boucher-Brossard, G., Lambert, A., Fraser, C., Barnett, R. L., & Van-Vliets, S. (2015). Coastal flood assessment based on field debris measurements and wave runup empirical model. Journal of Marine Science and Engineering, 3(3), 560-590. [Ursule Boyer-Villemaire, Canada]	Rejected - accept there are a lack of attribution studies, but the reasons for this and the paper cited is beyond the scope of this 1.5C report
9172	65	34	65	41	Currently, for calibrating damaging levels with the inclusion of runup and climate probabilities, only semi-empirical with combinatory statistical analysis have been used. (REFERENCE : Boyer-Villemaire et al., 2016, <a href="https://www.ouranos.ca/publication-scientifique/2016/06/Synthesis-Report-Atl-Qc.pdf">https://www.ouranos.ca/publication-scientifique/2016/06/Synthesis-Report-Atl-Qc.pdf</a> [Ursule Boyer-Villemaire, Canada]	Rejected - outside of scope of report
4733	65	34	66	45	Perhaps it would be more "clear" to the readers, if examples of the socio-environmental impacts in other water-source/body areas are presented as well, such as lakes, lagoons, etc., since all the wetlands face similar risks due to the climate change. [Spyros Schismenos, China]	Taken into account / rejected. Lakes beyond scope of coastal zone section. Wetlands section has expanded.
2125	65	35			Not sure I understand this. Even though some sea level rise is committed because of past warming, won't a greater warming lead to more sea level rise? But I think this statement is saying that is not correct? [Neville Nicholls, Australia]	Accepted - sentence has now been reworded
6807	65	35	65	35	This meaning of this sentence is unclear. What is commitment to sea level rise? [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - now defined very early in text.
13965	65	35	65	41	risk levels and their changes should be assessed in line with approaches used in the AR5 synthesis report. [Elvira Poloczanska, Germany]	The tables are to be revised in the FGD and this comment will be taken into account at that time.
13964	65	36	65	36	sentence is unclear [Elvira Poloczanska, Germany]	Accepted - sentence has been removed
13966	65	38	65	39	Most published articles on what and where? Do you mean studies? And why is this an issue? [Elvira Poloczanska, Germany]	Taken into account / accepted - sentence removed to avoid confusion
2720	65	39	65	41	Really? surely this should be spelled out a bit more? Small island states are already losing territory - meaning that no-in-situ adaptation was possible. [Penny Urquhart, South Africa]	Accepted - reference to small islands removed.
2126	65	43			I dont think you mean to imply that the small islands will migrate? [Neville Nicholls, Australia]	Accepted - text now reworded
4179	65	43		48	In addition to small islands, women, primarily in developing countries are compromised due to lack of information and the ability to decipher such information. Relying on traditional knowledge but also partnering with communities to help them have disaster plans in place and to be able to report on climate data will be essential. <a href="http://news.trust.org/item/20141105084703-1dkyn/">http://news.trust.org/item/20141105084703-1dkyn/</a> [Michelle Leslie, Canada]	Taken into account/ rejected - traditional knowledge already acknowledged in text. Also beyond the scope of this set of the report
5505	65	43	65	43	What is meant with "migration of small islands"? Sure we are talking here not of the island themselves, but of their population, right? [Ismael Nunez-Riboni, Germany]	Accepted - text now reworded
13967	65	43	65	43	Migration of small island populations? Should this paragraph in in the human system section? [Elvira Poloczanska, Germany]	Accepted - text now reworded
16288	65	43	65	43	Wording needs adjustment: small islands (like trees) do not migrate. Populations may migrate and relocate as islands are flooded and then permanently inundated, etc., but islands don't migrate. Whether cultural communities can migrate is a tougher question--sort of like talking about ecosystems migrating; can one tear apart a community and then have all its members reassemble elsewhere in a way that keeps the culture? I'd not want to be defending that hypothesis--migration/relocation will mean changes and disruption/inadequacy of Indigenous knowledge for new areas, etc. [Michael MacCracken, United States of America]	Accepted - 'people' added in text
2622	65	43	65	48	add reference to equity and justice concerns, eg. distributive justice? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	This is an important point that is beyond the scope of the special report. It will be considered in the AR6.
19023	65	43	66	2	The paragraph is well written, and the analysis is quite excellent! [JACQUES-ANDRE NDIONE, Senegal]	Noted - thank you. Amendments undertaken in line with new literature and other reviewer comments
11732	65	43	66	2	There has been a sudden and jarring change from discussion of physical-ecological interactions/impacts to human impacts...this needs at least some preamble to provide context... [David Schoeman, Australia]	Taken into account - whole section has now been restructured
13968	65	44	65	44	Currently being made or have been made, give an example [Elvira Poloczanska, Germany]	Accepted - example added
13751	65	45	66	2	Is adaptation a topic for chapter 3, or is it better left to chapter 4? [Elvira Poloczanska, Germany]	Taken into account - adaptation is mentioned in impacts here.
13752	65	48	65	48	need consistency in terminology in report: community knowledge, local knowledge, indigenous knowledge, traditional knowledge. Which is it? [Elvira Poloczanska, Germany]	Noted.
4732	66	4	66	10	There is no information regarding the riparian areas. Only delta and later coastal areas. It would be more accurate riparian areas to be mentioned as well, since they are connected to deltaic territories at a great level in multiple ways. [Spyros Schismenos, China]	Rejected - beyond scope of coastal areas
11733	66	4	66	10	Discusses impacts at 2° to 5° C of warming, which seems beyond the ambit of this Report. To be pertinent, these results need to be interpreted in the light of 15°C... [David Schoeman, Australia]	Accepted - sentence removed to ensure focus
5506	66	4	66	4	What is meant with "water security"? [Ismael Nunez-Riboni, Germany]	Accepted - wording changed
13969	66	4	66	4	Increased salinity due to sea level rise?, please be clear [Elvira Poloczanska, Germany]	Accepted - sentence changed
12043	66	5	66	5	..... temperature (up to 5°C)" is likely..... [Paul Doyle, Canada]	Accepted - sentence removed to ensure focus
5507	66	5	66	5	There is a opening parenthesis which never closes "(up to 5....". [Ismael Nunez-Riboni, Germany]	Accepted - sentence removed to ensure focus
19212	66	5	66	6	Change "(up to 5°C" by "(up to 5°C)" [Rubén Retuerto, Spain]	Accepted - sentence removed to ensure focus
19213	66	7	66	10	To my understanding it is not clear the meaning of this long sentence [Rubén Retuerto, Spain]	Accepted - sentence broken into two
12044	66	7	66	7	..... found that "in" the Snohomish..... [Paul Doyle, Canada]	Accepted - word changed
9602	66	7	66	8	(A1B 1.6°C and B1 2°C in the 2040s) , using the different climate change scenarios from RCP scenarios. [Jianguo Wu, China]	Noted
12045	66	9	66	10	Reword last part of sentence... intrusion "both upstream and downstream in low flow conditions". [Paul Doyle, Canada]	Accepted - wording changed.
13970	66	9	66	10	this sentence is unclear [Elvira Poloczanska, Germany]	Accepted - wording changed in response to comment 12045
2972	66	9	66	10	resulting in a shift in the salinity intrusion upstream in low conditions, and further downstream in low conditions These two phrases appear to be contradictory. Should the second phrase be "and further downstream in high conditions"? [Erica Head, Canada]	Accepted - wording changed in response to comment 12045
11734	66	9	66	10	What are "low conditions"? [David Schoeman, Australia]	Accepted - wording changed in response to comment 12045

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13448	66	10	66	11	It is also essential to mention high altitude regions and their impacts due to climate change. Increasing flooding might lead to landslides and cloud bursts. I am unsure if there are studies covering this issue, but would be a good option to mention them here. (HICAP project from ICIMOD). [Vidyunmala Veldore, Norway]	Rejected - beyond scope of coastal zones
4180	66	12		22	Sea-level rise will result in hundreds of millions of people being displaced. What will happen to these climate refugees? How will countries work to relocate their displaced citizens and will other countries adopt immigration policies for people displaced as a direct result of climate change? [Michelle Leslie, Canada]	This is an important point that is beyond the scope of the special report. It will be considered in the AR6.
2481	66	12	66	12	First clear mention of risks to humans.... [Lisa Lucero, United States of America]	Noted
3333	66	12	66	22	You can refer to Yotsukuri et al (2017), which estimated global inundation impacts due to SLR and astronomical tide high tide using MIROC-ESM. It shows potential inundated areas varied 370 thousand km2(RCP2.6) to 420 thousand km2(RCP8.5) and affected population varied 55.3 million(RCP2.6, SSP1) to 106 million (RCP8.5, SSP3) in 2100. [Makoot Tamura, Japan]	Thanks. Papers will be revised for TOD.
13971	66	12	66	22	Should this paragraph be in the human system section? [Elvira Poloczanska, Germany]	Taken into account - text edited
11735	66	12	66	22	This paragraph is a bit of a jumbled mess that needs fixing [David Schoeman, Australia]	Taken account - paragraph has been changed and reworded in light of new literature
2127	66	13			You use "by 2030" twice in this sentence. Delete one of these. Just another of the many examples that indicate that no-one has actually read through this draft before it was sent out to review. It really does raise questions about whether or not the science in this assessment is as reliable (or not) as the standard of the language used. [Neville Nicholls, Australia]	Noted
3566	66	13			... if there is no further adaptation' Who decides about that, why should there be or shouldn't there be any different adaptaion then now? [Sylvia Sander, Monaco]	Taken into account - wording has been omitted in the paragraph / section changed.
3846	66	13		14	Does the sentence ("By 2030, if...") mean that the 23 coastal megacities are not coastal cities now? Because of sea level rises will they become coastal cities? [Woonsup Choi, United States of America]	Taken into account - section has been removed
4592	66	13	33	15	In the sentence "400 million people could be living in 23 coastal megacities, 370 million in Asia, Africa and South America" the 30 million people is missing. [Radim Tolasz, Czech Republic]	Accepted - section has been removed
12046	66	13	66	13	Redundant ..... 0.3m by 2030, 400.... Delete the second "by 2030". [Paul Doyle, Canada]	Accepted - section has been removed
19214	66	13	66	13	Please, remove the second "by 2030" [Rubén Retuerto, Spain]	Accepted - section has been removed
9320	66	13	66	14	A recent study by Tapia et al. (2017) put forth the cities with relatively high to medium sensitivities to climate vulnerabilities. In the study, an indicator-based vulnerability assessment to five climate threats were evaluated for 571 European cities. The impacts included heat waves and human health, vulnerabilities to pluvial and fluvial floods, coastal flooding as well as the impact of droughts on water planning. The reference is "Tapia, C., Abajo, B., Feliu, E., Mendizabal, M., Martínez, J., Fernández, J., Laburu, T., Lejarazu, A., Profiling urban vulnerabilities to climate change: An indicator-based vulnerability assessment for European cities, Ecological Indicators, Vol. 78, pp. 142-155, 2017." <https://doi.org/10.1016/j.ecolind.2017.02.040>. Such a reference may support the statements on the impacts of climate change on cities. Currently, this is only represented based on statements, such as "By 2030, if sea-levels rise by 0.3m by 2030, 400 million people could be living in 23 coastal megacities." [Siir KILKIS, Turkey]	Rejected - paper is not focused sufficiently on 1.5C.
13972	66	13	66	14	Sentence sounds awkward, inappropriate use of 'if' [Elvira Poloczanska, Germany]	Accepted - section has been removed
2524	66	13	66	15	Where does the 0.3 m by 2030 number come from? This seems extremely high. By comparison, Kopp et al. (2014)'s very likely range of 2030 relative to 2000 is 11-18 cm. R. E. Kopp, R. M. Horton, C. M. Little, J. X. Mitrovica, M. Oppenheimer, D. J. Rasmussen, B. H. Strauss, and C. Tebaldi (2014). Probabilistic 21st and 22nd century sea-level projections at a global network of tide gauge sites. Earth's Future 2, 287–306, doi:10.1002/2014EF000239. [Robert Kopp, United States of America]	Accepted omission - sentence has been removed.
3567	66	14			subsidence will enhance those exposed'. I am assuming 'those refers to the continents, but it is not clear. [Sylvia Sander, Monaco]	Taken into account - section has been removed
2525	66	15	66	17	The study of Jevrejeva et al. (2016) cited here is highly problematic, as it uses a time-slice based analysis of a phenomenon (sea-level change) with a great deal of lags in it. GMSL rise under RCP 8.5 at the time slice when global mean temperature hits 2.0°C is quite different from GMSL rise in 2100 in a world stabilized at 2.0°C. The latter is, I suspect, of greater interest to most of the users of this report than the transient sea level at the moment the world overshoots 2.0°C. [Robert Kopp, United States of America]	Accepted - the commitment to SLR is a challenge here. Reference kept, reduced and made clearer.
3568	66	16			please add 'global' behind '80% of ...' [Sylvia Sander, Monaco]	Taken into account - sentence has been removed. See 2525.
9605	66	16	66	17	Clearing the effects of 1.5°C above pre-industrial levels [Jianguo Wu, China]	Rejected - do not understand comment
13973	66	17	66	17	An updated estimate should be used. Also sea level rise does not stop in 2083. [Elvira Poloczanska, Germany]	Taken into. See response to 2525.
6808	66	20	66	22	Perhaps it is worth including the compound effects of fluvial flooding here as well (e.g. Moftakhari et al., 2017, PNAS, 114, 37). [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - reference added
3569	66	24		45	These three paragraphs need thorough rewriting. They are [Sylvia Sander, Monaco]	Accepted - see 10209.
13753	66	24	65	29	See point above (p65 line 45) – better left to chapter 4? This chapter is about impacts [Elvira Poloczanska, Germany]	Taken into account - adaptation is important in coastal zones, with adaptation estimates at 1.5C now in SOD.
19215	66	24	66	25	I suggest to rephrase this sentence. It seems quite obvious that "Adaptation pathways...help broaden possibilities of adaptation" [Rubén Retuerto, Spain]	Accepted - sentence has been reworded.
11736	66	24	66	25	This is circular..."Adaptation pathways...help broaden possibilities of adaptation!" [David Schoeman, Australia]	Accepted - sentence has been reworded.
10209	66	24	66	45	This has very little to do with SR1.5 -delete? [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - adaptation remains important so needs acknowledgement. Impacts depend on combined effects so has been kept. Wetlands section has had substantial revision.
11737	66	25	66	26	Little adaptation in coastal systems ("but is not widespread practice in coastal zones")? Go and look at Laura Airoldi's work on the armouring of European coasts...and similar work by various folk in Australia, among several other places. Adaptation is so commonplace as to be one of the most significant threats to ocean-exposed beaches, globally (see recent reviews by Defeo, Schlacher, Dugan, etc...) [David Schoeman, Australia]	Rejected - common referred to adaptation pathways, not defences. Text has been revised due to new material / other reviewer comments.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1469	66	27	66	28	Globally, adaptation must consider dual threats and solutions, including subsidence (which may be greater than the effects of sea-level rise at 1.5°C and 2°C). This statement should also be supported by some references, e.g. The Chao Phraya Delta in Thailand has been sinking by 5–15 cm year-1 and the Mekong Delta in Vietnam by 2 cm year-1 because of intense groundwater use and/or natural consolidation in addition to sea-level rise (Giosan et al., 2014; Takagi et al., 2016). References: Giosan, L., Syvitski, J., Constantinescu, S., Day J., 2014. Protect the world's deltas. Nature, 516, pp. 31–33. Takagi, H., Thao, N. D., Anh, L. T., 2016. Sea-level rise and land subsidence: impacts on flood projections for the Mekong delta's largest city. Sustainability, 8(9), DOI: 10.3390/su8090959. [Hiroshi Takagi, Japan]	Accepted - references to papers now added
19024	66	27	66	29	I think that this analysis tackle the issue of adaptation limits. Please, you can refer to "Box TS.8. Adaptation Limits and Transformation", from the Technical Summary (TS) of WGII (AR5). [JACQUES-ANDRE NDIONE, Senegal]	Accepted - reference add in adaptation section.
6809	66	27	66	29	An important, yet often overlooked topic on coastal response to sea level rise, is the analysis of the embayed or geologically constrained beaches and barriers. Coastal sedimentary systems that are backed by rocky cliffs or artificial structures have limited adaptation potential and the likely continued rise in sea-level will potentially lead to submergence and complete disappearance of many of such systems. Although sediment availability and accommodation space will play a fundamental role in each system, it is anticipated that some are likely to erode or become submerged. Recent modelling investigation by Trenhaile (2017. Marine Geology, in press) provide support to such scenarios. Considering the prevalence of rocky shores around the world's coastlines, this is likely to have widespread impacts and significant economic implications. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - Presently insufficient evidence to relate to 1.5C. Constrained wetlands (e.g. via coastal squeeze) is now noted in text.
6810	66	27	66	29	Overall, there is an absolute lack of consideration for impacts and risks on rocky coastal areas. Increases in sea level rise and storms will potentially lead to increase in mass movements and cliff failures on both hard and soft rock cliffs. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account / rejected - lack of evidence in literature at 1.5 deg, but an acknowledgement of change added in text
6811	66	27	66	29	Not only dual but multiple threats. On this point, perhaps earthquakes hazards are not the most relevant threat when considering coastal areas (although they are not negligible). Perhaps tsunamis and tropical and extra-tropical cyclones are the most relevant hazards for which to target coastal adaptation to climate change. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - sentence reworded in light of comments
13974	66	27	66	30	Longer term perspective is missing. What is projected over centuries in a 1.5°C world? Start with AR5 synthesis report. [Elvira Poloczanska, Germany]	Accepted - new journal articles now submitted, so reference to this has been included. This is important.
2526	66	31	66	37	The units used in this paragraph are somewhat confusing and lacking in context. 12 cm/100 yr = 1.2 mm/yr, well below the current rate of GMSL rise. [Robert Koppu, United States of America]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
3572	66	32	66	33	of sea-level rise over a one hundred year timeframe provided the sufficient sediment exists. [Sylvia Sander, Monaco]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
19216	66	32	66	32	Chane "cmof" by "cm of" [Rubén Retuerto, Spain]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
5508	66	32	66	32	cmof should be "cm of"? [Ismael Nunez-Riboni, Germany]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
1933	66	32	66	32	A space is needed between "of up to 8-9cmof rise" [Chrystal Mantyka-Pringle, Canada]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
4326	66	32	66	32	cmof change in "cm of" [teodoro georgiadis, Italy]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
9606	66	32	66	37	literature is old, please add new literatures [Jianguo Wu, China]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
13975	66	34	66	36	how do these relate to the levels of sea level rise expected under 1.5 or 2C???? [Elvira Poloczanska, Germany]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
12047	66	35	66	35	When "rates" of..... [Paul Doyle, Canada]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
3573	66	36	66	37	sentence structure revised: ' When the rate of sea-level rise was greater than this in the Holocene, mangrove systems collapsed (Ellison and Stoddart 1991). [Sylvia Sander, Monaco]	Taken into account - paragraph removed and replaced with more appropriate text on wetlands
3574	66	37	66	37	Salinisation may lead to shifts to more salt-tolerant plants (Blasco et al. 1996).' like what plants? Mangroves are already very salinity tolerant. [Sylvia Sander, Monaco]	Accepted - sentence removed and a new reference to wetlands and salinization of ecosystems has been added
13976	66	37	66	37	This sentence is hanging on its own.. should be expanded as an introduction in this paragraph on how coastal vegetation may shift [Elvira Poloczanska, Germany]	Accepted - sentence removed and a new reference to wetlands and salinization of ecosystems has been added
11738	66	39	66	40	This statement is ridiculous: "The projections given only take account of sea-level rise and subsidence, but not any additional sediment gain from river deposition, which could reduce the rate of loss". The impoundment of rivers is a major issue around the world...and this, along with extensive sand mining in many parts of the world, are starving beaches of their sand, exacerbating the effects of sea-level rise. Please go and do a proper literature search for impacts to soft-sediment shores, and especially beaches. [David Schoeman, Australia]	Taken into account. This part of the text has been extensively reworded in light of new literature. The scope of this must focus on 1.5C.
7626	66	39	66	45	Udo and Takeda (2017) projected effect of the sea level rise on beach loss in Japan and evaluated its uncertainty.  Udo, K. and Y. Takeda (2017): Projection of future beach loss due to sea-level rise and uncertainties in projected beach loss, Coastal Engineering Journal, 59, 1740006. [Keiko Udo, Japan]	Accepted - reference and beach loss added

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2024	66	41		45	Sundarban, in Bangladesh is the largest mangrove in the world. Inadequate literature review of this forest. There are credible evidences that the main species of Sundarban, i.e "Sundari tree" is suffering from "Top Dying" problem due to increase in salinity level. Also the low saline tolerant species like "Sundari" are replaced by high saline tolerant species like "Goran" as the salinity level along the entire forest is increasing. Intrusion of salinity is further aggravated due to upstream withdrawal of water along the Ganges river at Farakka Barrage site inside India, so that during dry season, sea water can enter further inland because of low upstream fresh water flow. The South West region of the country, known as Ganges Dependent Area or GDA is severely affected from salinity intrusion due to this couple effect of sea level rise as well as upstream water withdrawal effect. [Md. Sirajul Islam, Bangladesh]	Taken into account: Salinity intrusion added to text. Dams/barrages added to text. Rejected: Top dying problem (see doi: 10.11648/j.ajaf.20140204.20) - more evidence required to add detail.
12048	66	44	66	44	Eliminate " Temporarily"..... [Paul Doyle, Canada]	Accepted - this section has been reworded in light of new literature
4593	66	45			Change "km2/yr" by "km2 yr-1" (2x) [Radim Tolasz, Czech Republic]	Accepted - this section has been reworded in light of new literature
3575	67				entire chapter: this is a very well written sub-chapter. It is not only a string of references, but follows a lineof thought and makes very good points. Well done. I wish some of the other chapters would be written this good. [Sylvia Sander, Monaco]	We are grateful for your suggestion, and will be including consideration of it in the next draft
17272	67		67		Many key aspects on adaptations and avoided risks are empty. Is the column "drivers" needed? They are all related to sea level increase. [Maria Jesus Iglesias Briones, Spain]	We are grateful for your suggestion, and will be including consideration of it in the next draft
12049	67	1	67	1	Table 3.3 not mentioned in text but very useful. [Paul Doyle, Canada]	Noted
9603	67	1	67	4	table 3.3 lacking of adaptation options [Jianguo Wu, China]	Taken into account - table is being revised
6812	67	1	67	4	Although stated as incomplete, therefore subjected to major changes, the column on avoided risks has details that do not related at all to avoided risks, but to potential impacts. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account - table is being revised
11739	67	1	67	4	A major ecosystem service overlooked in this table is the fact that beaches and associated dunes (which I am assuming fall into this category) provide extensive buffering between the ocean and some of the world's most valuable residential real estate... [David Schoeman, Australia]	Taken into account - beaches and shoreline section revised, but within the scope of report
16289	67	9	67	15	The ocean is also vital for maintaining life on Earth, generation of oxygen and more—including its vital roles for life on Earth in an estimate of the dollar value of goods and services is simply not an adequate description of the essential aspects of ocean systems. [Michael MacCracken, United States of America]	Accepted: text has been simplified.
4594	67	12			Change "\$ (US) 2.4" by "2.4 US\$" [Radim Tolasz, Czech Republic]	Editorial - copy-editing for consistency to be completed prior to publication
9988	67	12	67	12	It would be better to say "2.4 trillion USD" instead of saying "\$ (US) 2.4 Trillion" [Mustafa Tufan Turp, Turkey]	Editorial - copy-editing for consistency to be completed prior to publication
12380	67	12	67	12	Cost of ecosystem services of 2.4 trillion (Hoegh and Guldberg 2015) seems a very precise number - do we have a range? [Bill Hare, Germany]	Accepted: We have now provided a range and avoid specific numbers.
13977	67	12	67	12	is this grey literature? Follow protocol [Elvira Poloczanska, Germany]	Hoegh-Guldberg et al. 2015 is grey literature and will be processed accordingly.
2128	68	4	68	4	Another example of a sentence which a reader will have great trouble understanding because of the poor language and lack of any editing. I chose this one of the many examples because it refers to a study led by one of the CLAs. So I am surprised that the sentence referring to this study is incomprehensible. [Neville Nicholls, Australia]	Accepted: Text has been carefully modified and clarified.
3576	68	5			...projected risks and challenges, have increased significantly since AR5 and the focus on the ocean and its [Sylvia Sander, Monaco]	Accepted: Text has been carefully modified and clarified.
19217	68	5	68	5	I would suggest to change "which" by "when" [Rubén Retuerto, Spain]	Accepted: Text has been carefully modified and clarified.
12050	68	5	68	6	Reword sentence thusly..... since AR5 "with" the focus on the ocean and its systems "having" increased significantly..... [Paul Doyle, Canada]	Accepted: Text has been carefully modified and clarified.
3966	68	6	68	8	The statement of "growing evidence" needs references [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: Text has been carefully modified and clarified.
9321	68	7	68	9	The word "however" may be deleted from the statement for better grammar "The world's largest habitat, the deep sea, remains one of the least understood on the planet, however, despite the growing evidence that current changes in the deep ocean may encase significant risks of irreversible change within the Earth's climate system." [Siir KILKIS, Turkey]	Accepted: Text has been rewritten and now addresses this issues.
11740	68	8	68	8	"Current changes"? Changes in ocean currents? Or changes that are currently happening? [David Schoeman, Australia]	Accepted: Text has been rewritten and now addresses this issue.
12051	68	9	68	10	Reword sentence thusly..... tipping points "of the ocean", as well as how humans are changing this vast part of the earth", is likely..... [Paul Doyle, Canada]	Accepted: Text has been rewritten and now addresses this issue.
2129	68	12			Another example of poor language - "regionally, the ocean can be separated into a number of global regions...". The number of mistakes in this short clause is staggering. Can an ocean be "separated"? Why start the sentence with "regionally" and then a few words later say you are separating the ocean into "regions"? And what is a "global region" anyway? Please try harder to write sentences that a reader wil understand. [Neville Nicholls, Australia]	Accepted: Text has been rewritten and now addresses this issue.
12052	68	12	68	12	DELETE.... "Regionally," [Paul Doyle, Canada]	Accepted: Text has been rewritten and now addresses this issue.
2130	68	14			This phrase ("A range of ocean systems operate within these ocean regions...") is meaningless and is an example of just words that add nothing to the reader's understanding of the subject. More "pithiness" is required throughout this chapter. And why are these regions now "complex regions"? Do you mean they are bordered by convoluted land masses? [Neville Nicholls, Australia]	Accepted: Text has been rewritten and now addresses this issue.
6401	68	18	68	19	Much of the discussion centres on ocean basins, which is correct and understandable. However, a significant proportion of the world's population interacts with coastal resources only and I wonder whether attention should be drawn to this. This is particularly so with regards to aquaculture ventures which may offer an adaptive response to climate change, albeit an increasingly expensive one if the impacts of ocean acidification are to be obviated. [Brendon Dunphy, New Zealand]	Taken into account - the global regions match those of the oceans chapter in AR5 which is being deliberately used here is the departure point for contributing to the impacts chapter regarding ocean systems.
3967	68	19	68	27	The references to all the different tables here was very confusing! [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - tables have been collapsed into one. Explanation has been simplified.
5509	68	20	68	21	... there are examples of high levels of attribution of changes to climate change, and not. Hard to understand this sentence, please rewrite. [Ismael Nunez-Riboni, Germany]	Accepted - tables have been collapsed into one. Explanation has been simplified.
3577	68	21			there are examples of high levels of attribution of changes to climate change. ...' delete "and not" [Sylvia Sander, Monaco]	Accepted - tables have been collapsed into one. Explanation has been simplified.
2589	68	21	68	21	remove "and not" [Guilleim Chust, Spain]	Accepted: removed
1934	68	21	68	21	Incomplete sentence "there there are examples of high levels of attribution of changes to climate change, and not....."? [Chrystal Mantyka-Pringle, Canada]	Accepted: Text has been rewritten and now addresses this issue.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5510	68	21	68	22	The full set of projected key risks, avoided risks at 1.5 oC and adaptation options has been laid out in Table 3.4 which is an update and modification of Table 3.3, based on AR5. Are you sure the correct table of AR5 is 3.3? Table 3.3 of AR5 is "Categories of climate change adaptation options for the management of freshwater resources". The Table 3.4 of the present report looks a lot more like Table 6.6 of the AR5. [Ismael Nunez-Riboni, Germany]	Accepted - tables have been collapsed into one. Explanation has been simplified.
12053	68	22	68	26	Confused by the repeated mentioning of Table 3.4 as whether this table is the one in this report or in AR5 [Paul Doyle, Canada]	Accepted - tables have been collapsed into one. Explanation has been simplified.
13978	68	25	68	28	Suggest this approach is applied to other sections in this chapter [Elvira Poloczanska, Germany]	Accepted - tables have been collapsed into one. Explanation has been simplified.
17665	68	30	69	56	This section includes proposed adaptations in broad direction. If possible, can the authors add some adaptation practices that has been applied in a region or provide information if there is further elaboration on the adaptation in the next section or chapter? If possible, the author can review Perdinan and Winkler (2014) published in Environmental Management discussed about land use and climate feedbacks, also proposed a summary to define adaptation options. [Perdinan Perdinan, Indonesia]	Accepted - tables have been collapsed into one. Explanation has been simplified. Repetition of AR5 materials reduced and reliance the risk analysis develop and implemented. - use of confidence language proved and increased.
5511	68	30	70	14	I think it is OK that the text describes the contents of Table 3.4 referring to list rows. However, it would help a lot if the table itself would have a column with row numbers so that the reader does not have to count each row from the beginning. (for instance, in Section 3.4.3.1.4, we refer to row 13th, considering this is a table that spans through many pages, it is a bit complicated to count so many rows). [Ismael Nunez-Riboni, Germany]	Accepted - tables have been collapsed into one. Explanation has been simplified. Repetition of AR5 materials reduced and reliance the risk analysis develop and implemented. - use of confidence language proved and increased.
13979	68	31			Synthesis report not considered and Literature post AR5 seems to be too few, not considered where risk analysis has been carried out. Also suggest consulting the structured expert dialogue 2015. These section need to be developed towards being more specific with respect to impacts of a 1.5°C world. Confidence language mostly missing in this section. [Elvira Poloczanska, Germany]	Accepted - tables have been collapsed into one. Explanation has been simplified. Repetition of AR5 materials reduced and reliance the risk analysis develop and implemented. - use of confidence language proved and increased.
24	68	32	68	38	Changes in the productivity of ocean systems is rapidly mentioned in the present version but not well argued. Indeed, if most current model projections suggest a decrease in global NPP compared to contemporary values (cf above) with the exception of the Southern Ocean, a restructuring of phytoplankton communities and important regional heterogeneity are expected (Bopp et al. 2013, Dutkiewicz et al. 2014). [Paul TREGUER, France]	Accepted: more complete treatment of productivity changes in the open ocean.
23	68	32	69	18	There is a contradiction here. On the one hand "warming and stratification are leading to reduced oxygen concentration in ocean water generally", i.e. both in surface, subsurface and deep waters. But on the other hand most current model projections suggest a decrease in global NPP compared to contemporary values (e.g. Bopp et al. 2013) and a decreased in export production (e.g. Dutkiewicz et al. 2013, Fu et al. 2016) which means less consumption of di-oxygen in subsurface and deep waters and thus a decreased extension of the di-oxygen minimum zones of the world ocean. So, it is not clear why di-oxygen concentration should decrease in "ocean water generally" (cf. line 57, page 68). [Paul TREGUER, France]	We have worked to make this clearer in text. There are general trends in ocean oxygen, for example, plus specific issues associated with particular regions ( Increased coupling, localised increases in NPP, decreases in deepwater oxygen as per Bakun et al. 2015)
13980	68	33			There is a section further below dealing with fisheries, this section would be better placed concentrating on fish (or marine biodiversity) with the fisheries text moving to the fisheries and livelihoods section (3.4.3.2.3) and fisheries production sections (4.4.5.1.3 and 3.4.5.2.3) [Elvira Poloczanska, Germany]	Accepted - Have reorganised ocean systems so that fish are discussed in one section and fisheries in later section.
3578	68	33			...There are numerous observations of impacts of climate change on ocean systems, with various degrees...' [Sylvia Sander, Monaco]	Accepted: rewritten
2131	68	33	68	38	Please read this paragraph and translate it into readable English. [Neville Nicholls, Australia]	Accepted: text rewritten and is now clearer.
3968	68	36	68	38	References needed for this statement [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: rewritten
19218	68	37	68	37	Please, rephrase. It seems that something is missing [Rubén Retuerto, Spain]	Accepted: rewritten
13754	68	37	68	37	similar levels of confidence... is a bit vague [Elvira Poloczanska, Germany]	Accepted: rewritten
19219	68	40	68	40	Weird sentence [Rubén Retuerto, Spain]	Accepted: rewritten
12054	68	40	68	40	ADD and Shorten sentence to this..... drivers of primary "productivity" as well as fisheries productivity". [Paul Doyle, Canada]	Accepted: rewritten
12055	68	40	68	41	New second sentence now is "For example, shifts in isotherm locations as the ocean warms (Row 2, Table 3.4)." [Paul Doyle, Canada]	Accepted: text rewritten
11741	68	40	68	41	"These changes add to other drivers of primary as well as fisheries productivity such as changes to where isotherms are located as the ocean warms."??? This is just unintelligible. [David Schoeman, Australia]	Point accepted and text rewritten
2590	68	41	68	42	Phytoplankton individuals are not moving to higher latitudes. Change "Organisms from phytoplankton to sharks are moving" to "Biogeographic ranges of certain species from phytoplankton to sharks are shifting" [Guillem Chust, Spain]	Point accepted and text rewritten - now includes the nuance Identified. Text now reads: Many organisms, from phytoplankton to sharks, are tracking local temperatures as they change, with biogeographical ranges shifting to higher latitudes as ocean waters warm, at rates of up to 40 km/year.
4595	68	42			Change "km2/yr" by "km2 yr-1" [Radim Tolasz, Czech Republic]	Editorial: copy edit to be completed prior to publication.
12056	68	42	68	42	Reorganize sentence thusly...latitudes "(at rates greater than 10 km/year) as ocean waters warm", with..... [Paul Doyle, Canada]	Point accepted and text rewritten
1961	68	42	68	42	/year should read "yr" in line with other units [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial: copy edit to be completed prior to publication.
13981	68	43	68	43	suggest redistribution rather than moving, so this doesn't give the impression of individual animals moving [Elvira Poloczanska, Germany]	Point accepted and text rewritten
2591	68	44	68	44	add 2 references: Chust et al 2014a (Chust, G., C. Castellani, P. Licandro, L. Ibaibarraga, Y. Sagarmínaga, and X. Irigoien. 2014. Are Calanus spp. shifting poleward in the North Atlantic? A habitat modelling approach. ICES Journal of Marine Science: Journal du Conseil 71:241-253.) and Bruge et al. 2016 (Bruge, A., P. Alvarez, A. Fontán, U. Cotano, and G. Chust. 2016. Thermal Niche Tracking and Future Distribution of Atlantic Mackerel Spawning in response to Ocean Warming. Frontiers in Marine Science 3:86.) [Guillem Chust, Spain]	Accepted: have read and have added references.
13982	68	45	68	45	Also see Garcia Molinos et al 2016 doi:10.1038/nclimate2769 and Poloczanska et al 2016 https://doi.org/10.3389/fmars.2016.00062 [Elvira Poloczanska, Germany]	Accepted: have added references.
11742	68	45	68	45	What is a "fixed organism"? [David Schoeman, Australia]	Accepted: typo - removed.
3579	68	46			add box number [Sylvia Sander, Monaco]	Editorial: copy edit to be completed prior to publication.
3580	68	48			...drivers will be important to for adaptation strategies in which fishing infrastructure is relocated, downsized...' [Sylvia Sander, Monaco]	Editorial: copy edit to be completed prior to publication.
12057	68	48	68	48	ADD comma....."drivers", will be important.... [Paul Doyle, Canada]	Editorial: copy edit to be completed prior to publication.
13983	68	48	68	50	and for real time fisheries management [Elvira Poloczanska, Germany]	Editorial: copy edit to be completed prior to publication.
2132	68	49			Do you really mean "might"? Or should this be "must"? [Neville Nicholls, Australia]	Suggestion declined: 'must' is policy prescriptive.
12058	68	49	68	50	ADD..... infrastructure might "not" necessarily be flexible "enough" to meet..... [Paul Doyle, Canada]	Accepted: text rewritten

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2133	68	50			I cant imagine why fishing infrastructure couldn't change quickly enough to keep up with the changes projected. These don't seem "rapid", in the context of the flexibility of fishing operations. [Neville Nicholls, Australia]	Suggestion declined: keeping up with change add to economic burden. Given that most fishing is subsidised, added costs of trying to keep up with the changing fish stock and technology are likely to be difficult challenges.
12059	68	52	68	53	Rework sentence thusly....assistance "might be needed to provide employment for out of work fishers." [Paul Doyle, Canada]	Accepted: rewritten
7480	68	56	69	19	Please check this sub-chapter for overlap with sub-chapter 3.3.11 [Øyvind Christophersen, Norway]	Accepted: rewritten - with overlap significantly reduced.
3969	68	57	69	5	References needed throughout this paragraph [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: rewritten and references now added.
12060	69	1	76	36	Due to looming deadline, unable to even peruse this section of draft. [Paul Doyle, Canada]	We think the reviewer for their efforts and contribution.
12381	69	3	69	5	Do we have any quantitative estimates for how much the number of hypoxic areas has increased? [Bill Hare, Germany]	Diaz has put refers to the growth of dead zones as being exponential - text now reads: The number of dead zones has been increasingly exponentially over the past few decades (Altieri and Gedan, 2015; Diaz and Rosenberg, 2008; Schmidtko et al., 2017). [Diaz, R. J., and Rosenberg, R. (2008). Spreading Dead Zones and Consequences for Marine Ecosystems. Science (80-. ). 321, 926–929. doi:10.1126/science.1156401.]
11743	69	4	69	4	"Off limits" is a bit casual for a report like this. [David Schoeman, Australia]	Accepted: rewritten
12382	69	7	69	19	This section could reference other sections with examples of corals that have been affected by acidification [Bill Hare, Germany]	Accepted: text rewritten
7481	69	7	69	9	The value 30% is given for the increase in proton concentration since pre-industrial time, while in section 3.3.11 (p. 42, line 36-38) the value 26% is used. [Øyvind Christophersen, Norway]	Now 30% increase in acidity is being used across the report. This make up is essentially rounds off the estimate to 30%.
3847	69	9		11	1. "and growth," -> growth of what? 2. if the sentence meant declining calcification, then "increases in de-calcification" looks redundant [Woonsup Choi, United States of America]	Accepted: rewritten
3970	69	10	69	10	Add section number to "see ocean chemistry above" [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Editorial: copy edit to be completed prior to publication.
13755	69	16	69	17	There is an increasing amount of field studies on the impact of different pCO2 levels on organisms and communities [Elvira Poloczanska, Germany]	Accepted: rewritten
3971	69	19	69	19	A few lines discussing projections of multiple stressors would be a good fit here, e.g. <a href="https://doi.org/10.5194/bg-10-6225-2013">https://doi.org/10.5194/bg-10-6225-2013</a> doi:10.1038/nclimate2441 doi:10.1038/ncomms14682 [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: text rewritten to include mention of multiple stresses: text now includes: Importantly, stress factors really operate in isolation. Consequently, the effect of global warming at 1.5°C versus 2°C, has to be considered in the light of multiple interactive factors that may accumulate over time to produce complex effects within human and natural systems.
5471	69	22	69	22	this rubric is unclear - ecosystem services or resources? [Aliyu Barau, Nigeria]	Accepted: rewritten. Depends on the context.
17273	69	22	69	24	I would rather prefer to see these organisms referred as to "physical ecosystem engineers" for which abundant literature is available. [Maria Jesus Iglesias Briones, Spain]	Accepted: have added reference to ecosystem engineers.
7482	69	22	70	10	Please consider including a paragraph on ecological regime shifts in this sub-chapter [Øyvind Christophersen, Norway]	I believe we have in our discussions of impacts on food webs and other large-scale changes.
3972	69	27	69	27	Row 5?? [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: removed
5109	69	49	69	56	a discussion of salinization (particularly for impacts on food livelihoods) as a result of SLR seems appropriate but is not included here or elsewhere. [Tonya Rawe, United States of America]	Accepted: now mentioned in SLR section
3581	69	50			add comma: "... (e.g. mangroves, sea grasses)" [Sylvia Sander, Monaco]	Editorial - copy-editing for consistency to be completed prior to publication
6243	69	51			Please see if the word 'curtailment' can be replaced with 'curtalls'. [Muhammad Mohsin IQBAL, Pakistan]	Accepted: curtail now used.
9322	69	51	69	51	The word "curtailment" in the phrase "coastal development often curtailment these opportunities" should be "curtail." [Siir KILKIS, Turkey]	Accepted: curtail now used.
2592	69	52	69	52	add a reference after "...in general": Valle et al. 2014 (Valle, M., G. Chust, A. del Campo, M. S. Wisz, S. M. Olsen, J. M. Garmendia, and A. Borja. 2014. Projecting future distribution of the seagrass <i>Zostera noltii</i> under global warming and sea level rise. Biological Conservation 170:74-85.) [Guillem Chust, Spain]	Accepted and rewritten, referring to reference
6244	69	55			Please add the word 'and' between 'storms coastal'. [Muhammad Mohsin IQBAL, Pakistan]	Done
3973	69	55	69	56	Completely unintelligible sentence [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and rewritten
6813	69	55	69	56	Meaning unclear: 'inundation of saline conditions' [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and rewritten
2134	69	56			Do you need "and" after "storms"? [Neville Nicholls, Australia]	Accepted and rewritten
2135	70	2	70	4	This sentence talks about "concentrating efforts" but I am lost as to what "efforts" the sentence refers to? [Neville Nicholls, Australia]	Accepted and rewritten: In addition, concentrating adaptation efforts in locations where organisms may be more robust to climate change than others or less exposed to climate change (Bongaerts et al., 2010; van Hooidonk et al., 2013), may have benefits in terms of efficient and effective use of resources.
2136	70	7			Are you saying that life on earth will not survive global warming if these "organisms" are lost? I think you will need very strong evidence to suport that implication. [Neville Nicholls, Australia]	I think the meaning is clear.
13756	70	12	70	14	revise position of parentheses [Elvira Poloczanska, Germany]	Accepted and reorganised
11744	70	13	70	22	This paragraph fails to mention the multiple interacting impacts that affect fish populations (i.e., they are impacted not only by climate change, but also by fishing, for example), or that these interactions make attribution of climate impacts difficult. It also fails to cite even a single paper. [David Schoeman, Australia]	Point accepted - text modified
2137	70	14	70	18	I think I understand what you are trying to say with the sentence beginning "As a result..." but once again the language is so error-laden and convoluted that I am not sure. Please have an editor read your text. [Neville Nicholls, Australia]	Point accepted - text rewritten
16290	70	14	70	22	I would think that the issue of overfishing has to be mentioned right near the start of paragraph as having the major influence to date, but that climate related changes are becoming more and more important as fishery ranges shift. [Michael MacCracken, United States of America]	Point accepted - text rewritten
4596	70	16			Italics for "high confidence" [Radim Tolasz, Czech Republic]	Editorial - copy-editing for consistency to be completed prior to publication
13984	70	17			there are no citations in this section [Elvira Poloczanska, Germany]	Citations added text has been rewritten as well.
4597	70	17			Italics for "medium confidence" [Radim Tolasz, Czech Republic]	Editorial - copy-editing for consistency to be completed prior to publication
4598	70	18			Italics for "high confidence" [Radim Tolasz, Czech Republic]	Editorial - copy-editing for consistency to be completed prior to publication



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2138	70	19			Just a simple example of how even a quick read through of your text would have resulted in more readability. You start this sentence with "In addition..." and then throw in "also". You don't need both. [Neville Nicholls, Australia]	Editorial - readability analysis, and copy-editing for consistency to be completed prior to publication
5512	70	22	70	22	Is "food production systems" a section of this report? Use its section number as well? [Ismael Nunez-Riboni, Germany]	Editorial - copy-editing for consistency to be completed prior to publication
5473	70	25	25	25	delete 3.4.3.2 [Aliyu Barau, Nigeria]	Done
3582	70	28		57	confusion with use of words avoidable and avoided. I think these paragraphs are about 'avoidable' risks and I have commented accordingly. [Sylvia Sander, Monaco]	Point accepted - text rewritten
5472	70	28	44	70	this should moved to introduction [Aliyu Barau, Nigeria]	Point accepted - text rewritten
3583	70	29			Understanding the avoidable risks [Sylvia Sander, Monaco]	Accepted: rewritten
5926	70	29	70	30	Industrial Period should probably be edited. The term "pre-industrial" is more common. [Borgar Aamaas, Norway]	Editorial - readability analysis, and copy-editing for consistency to be completed prior to publication
2139	70	29	70	30	No. We are NOT talking about warming of 1.5C "above the Industrial Period". We are talking about 1.5C warming above the pre-industrial period. [Neville Nicholls, Australia]	Agreed: rewritten.
3974	70	29	70	44	I doubt the responses of ocean biology and biogeochemistry show "a simple linear extension" of current conditions. What about overshoots, adaptation, acclimation, resilience.....? [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	These issues are discussed in 3.2 and 3.3.
16291	70	29	70	44	Just a note that I like the indication of impacts are increasing levels of warming starting at 0.5 C and working up—it is really vital to make clear that there are many important impacts at 1.5 C and that this should not be viewed as a scientifically acceptable new baseline value—to really reduce impacts and help system recover, warming needs to go back below 0.5 C. [Michael MacCracken, United States of America]	Accepted: this has been recognised across the chapter and indeed the report. It is very important to avoid the impression that 1.5°C is safe. In reflecting the objective science, I have been careful not to make judgements either way.
1962	70	29	70	44	Justify both margins to match other paragraphs, and throughout [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - readability analysis, and copy-editing for consistency to be completed prior to publication
19220	70	40	70	40	I suggest to change "impact" by "affect" [Rubén Retuerto, Spain]	Editorial - readability analysis, and copy-editing for consistency to be completed prior to publication
11745	70	40	70	40	"Impacts of hypoxia would impact..." Well, of course they would... [David Schoeman, Australia]	Accepted: rewritten
2140	70	43			Again you use "significant". Do you mean "statistically significant"? Or do you mean "substantial"? I guess the latter. In which case, how "substantial"? [Neville Nicholls, Australia]	Accepted - most references to 'significant' have been converted to "substantial".
3584	70	47			Abrupt changes in avoidable risks [Sylvia Sander, Monaco]	Accepted: but text rewritten and removed
11746	70	48	70	48	Throughout this Section (i.e., not only this paragraph) there seems to be a bit of confusion between "continuous" and "linear". For example, "In other cases, changes are likely to be less continuous and gradual..."...both exponential curves and step functions are continuous...so this sentence makes little sense... [David Schoeman, Australia]	Accepted: Text rewritten to fix this issue.
12383	70	48	71	2	Section on 'abrupt changes in avoided risks' discusses coral bleaching and mortality at 1.5 and 2 degrees, with no reference to Schlieussner et al. 2016, which found that under 1.5 deg 70% of corals would be at risk of serious degradation. [Bill Hare, Germany]	Accepted: work by Schlieussner et al. 2016 now discussed in considerable detail.
9323	70	50	70	50	There is a missing word "by" in the phrase "recently demonstrated (by) the Great Barrier" [Siir KILKIS, Turkey]	Accepted: rewritten
13985	70	51	70	51	title sounds a bit convoluted? [Elvira Poloczanska, Germany]	Accepted: rewritten
2141	70	53	70	56	You repeat "2-4" times per decade or bleaching events per decade, in just a few lines. Rewrite this sentence in a less verbose way. [Neville Nicholls, Australia]	Accepted: rewritten
19221	70	54	70	54	...which will drive average coral cover on these various downward over time It seems to me a weird sentence [Rubén Retuerto, Spain]	Accepted: rewritten
16292	70	57	71	2	This analysis seems to be based solely on change in temperature, but at 1.5 C one would likely also have elevated CO2 concentration and perhaps other ocean related changes. Is use of the word "will" without caveat really justified? Perhaps say in certain regions to indicate that large scale distribution will be quite limited compared to today. [Michael MacCracken, United States of America]	Point is taken. Have indicated multiple stresses issue in several places now in the ocean systems section
2593	71	2	71	2	add the following text at the end "Another example of non gradual changes is the trophic amplification of the changes in phytoplankton biomass into the zooplankton biomass with the sea warming (Chust et al. 2014b) [Chust, G., J. I. Allen, L. Bopp, C. Schrum, J. Holt, K. Tsiaras, M. Zavatarelli, M. Chifflet, H. Cannaby, I. Dadou, U. Daewel, S. L. Wakelin, E. Machu, D. Pushpadas, M. Butenschon, Y. Artioli, G. Petihakis, C. Smith, V. Garçon, K. Goubanova, B. Le Vu, B. A. Fach, B. Salihoglu, E. Clementi, and X. Irigoien. 2014. Biomass changes and trophic amplification of plankton in a warmer ocean. Global Change Biology 20:2124-2139.]. Trophic amplification (or attenuation) describe the propagation of a hydroclimatic signal up the food web, causing magnification (or depression) of biomass values along one or more trophic pathways. Projected warming characterized by an increase in sea surface temperature of 2.3 °C leads to a reduction in zooplankton and phytoplankton biomasses of 11% and 6%, respectively. This suggests negative amplification of climate driven modifications of trophic level biomass through bottom-up control, leading to a reduced capacity of oceans to regulate climate through the biological carbon pump (Chust et al. 2014b). " [Guillem Chust, Spain]	I have read this reference and have added it to the latest SOD version
7483	71	4	71	11	Please check this sub-chapter for overlap with sub-chapter 3.4.5.1.3 [Øyvind Christophersen, Norway]	Accepted: have worked to reduce overlap in the latest version in which we have rewritten the text to flow from organism to ecosystem service to human sector.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12384	71	4	71	11	Cheung 2016 is referenced many times with no quantitative information on the avoided impacts at 1.5 deg - some quantification would be useful [Bill Hare, Germany]	Synthesizing information on observed and model responses by fisheries to climate change has the potential to outline potential benefits from constraining global warming to particular levels. Cheung et al., (2016b) examined the potential benefits to marine fisheries of meeting the Paris Agreement long-term goal of 1.5°C and used the output of 19 Earth system models from AR5 to derive oceanic conditions, biological responses and impacts on marine ecosystems. Using the projected maximum catch potential and species turnover as indicators of risk for fisheries, Cheung and colleagues were able to estimate the loss in fishery productivity for different amounts of global warming (i.e. 1.5°C, 2.0°C and 3.5°C above the preindustrial period). From this analysis, Cheung et al 2016 concluded that the potential global catch for marine fisheries was likely to decrease by more than 3 million metric tons for every degree of warming. As has been discussed above, some regions do better than others in the shorter term (e.g. northern hemisphere high latitude fisheries versus low latitude fisheries. This is a very significant proportion of the estimated 100 million tonnes (FAO) caught annually by global fisheries which is driving in the wrong direction in terms of producing food for a growing global population.
11747	71	4	71	11	This paragraph implies that fisheries are the only livelihood that matters... [David Schoeman, Australia]	Accepted: rewritten
2142	71	5			I thought this was the topic of the whole section. Why do you need to repeat it? [Neville Nicholls, Australia]	Accepted: rewritten - taking into account the comment.
1963	71	5	71	11	1.5-2 change hyphen to "to" [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - readability analysis, and copy-editing for consistency to be completed prior to publication
13986	71	5	71	6	Projections Schleusner et al. and associated numbers to be assessed? [Elvira Poloczanska, Germany]	Accepted: rewritten to include studies by Schleusner and colleagues
2143	71	5	71	7	I thought this report was about 1.5C versus 2C, not about 1.5C-2C versus any other possible warming. [Neville Nicholls, Australia]	The chapter has been rewritten/restructured around comparison of 1.5°C to 2°C
2144	71	7	71	8	Run a grammar checker over this sentence please. [Neville Nicholls, Australia]	Editorial - readability analysis, and copy-editing for consistency to be completed prior to publication
6245	71	7	71	8	The sentence is suggested to be rewritten as 'Sensitivity to - - - differs between regions, with fish stocks and fisheries in the tropical and polar systems being highly sensitive'. [Muhammad Mohsin IQBAL, Pakistan]	Accepted: text reorganised and rewritten
1935	71	8	71	8	sensitivity' should be 'sensitive' [Chrystal Mantyka-Pringle, Canada]	Accepted: corrected
2145	71	9			How "substantial"? 20% higher revenue compared with 2C warming? We need numbers, not just words that can be interpreted in many different ways. [Neville Nicholls, Australia]	Accepted: rewritten
4599	72				Tab 3.4 - The symbol for "Precipitation" (in header) is not used in the table. [Radim Tolasz, Czech Republic]	Accepted: no longer using table
7484	72		72		Table 3.4, last row on page 72: The way this risk is phrased now gives the impression that ocean acidification is the largest threat to coral reefs, while in fact increased temperatures do much more harm on the living tissue (due to bleaching). There is commonly confusion, in the public mind, on the cause of bleaching in tropical corals, assuming it is an effect of ocean acidification rather than high temperatures. Please re-phrase the risks for tropical coral reefs in ways that do not contribute to this confusion. [Øyvind Christophersen, Norway]	Accepted: no longer using table
5513	72		72		1st row and first column (updated key risk) of table: "in equatorial" should be "in equatorial regions"? [Ismael Nunez-Riboni, Germany]	Accepted: no longer using table
5514	72		72		2nd row and first column (updated key risk) of table: Acronyms are not known to everyone? What are EUS, CBS and STG? [Ismael Nunez-Riboni, Germany]	Accepted: no longer using table
5515	72		72		3rd row and 3rd column (avoided risks) of table: I suggest to simplify "maintain mixing of the water (i.e. less column stratification)" to "maintaining the stratification of the water column". [Ismael Nunez-Riboni, Germany]	Accepted: no longer using table
3585	72	1			Table heading and column in table. Is it avoided or avoidable risk? Please make sure you get it right. Avoidable makes much more sense to me. [Sylvia Sander, Monaco]	Accepted: no longer using table
13987	72	1			Emphasize that this is cross-chapter risk table developed by all ocean chapters in AR5, as a basis for modification in this report. [Elvira Poloczanska, Germany]	Accepted: no longer using table
3975	72	1	72	1	Table 3.4 It would be helpful to add a column on the far left which, in 1-2 words, summarises what that row concerns, e.g. Productivity, Fish, Habitat, Ocean Acidification.... [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: no longer using table
9139	72	1	72	1	This table should clearly show the identified differences between 1.5 and 2°C. At the moment the graphic shows differences between 2 and 4°C, but this does not sufficiently reflect the content of the chapter. [Susanna De Beauville-Scott, Saint Lucia]	Accepted: no longer using table
12385	72	1	74	1	The tables used to show key risks, impacts, adaptation options and avoided risks does not show the difference between 1.5 and 2 degrees, only that between 2 and 4 degrees. Some sort of indication of a) whether there is a difference between 1.5 and 2, b) whether it can be quantified, and c) how significant the difference is would be useful. [Bill Hare, Germany]	Accepted: no longer using table
11069	72	1	74	1	This section does not appear to include the effects of changes to terrestrial and freshwater systems on anadromous fish species (e.g., salmon). In particular, warming of streams can result in changes to life history of aquatic species and even, in extreme cases, mortality. Reduced streamflow can make it difficult for species to migrate upstream to spawning grounds. Potential mitigation actions include re- or afforestation of riparian zones to provide shade, and changes to water management (e.g., reduce upstream withdrawals). [Robert Daniel Moore, Canada]	Given limited space versus the vast amount of information available wrt themes, organisms et cetera - we chose to focus on particular organisms, ecosystems and sectors - hoping that these would be broad enough to allow people to understand the general patterns of a 1.5°C world versus 2.0°C world.
2594	72	3	72	3	In the Table, in the cell row 1, column 1 (Updated key risk x Changes in ecosys productivity), add the following reference: Chust et al. 2014b [Chust, G., J. I. Allen, L. Bopp, C. Schrum, J. Holt, K. Tsiraras, M. Zavatarelli, M. Chifflet, H. Cannaby, I. Dadou, U. Daewel, S. L. Wakelin, E. Machu, D. Pushpadas, M. Butenschon, Y. Artioli, G. Petihakis, C. Smith, V. Garçon, K. Goubanova, B. Le Vu, B. A. Fach, B. Salihoglu, E. Clementi, and X. Irigoien. 2014. Biomass changes and trophic amplification of plankton in a warmer ocean. Global Change Biology 20:2124-2139.] [Guillem Chust, Spain]	Accepted: no longer using table
19025	72	3	72	3	The quality of his table 3.4 should be improved. There is no need to have the tile original title of the table included in top... Please, clip this former title. [JACQUES-ANDRE NDIONE, Senegal]	Accepted: no longer using table

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5516	73		73		4th row and 2nd column (adaptation options) of table: "Evidence for differential resistance and evolutionary adaptation of some species exists". I think this is very interesting and I only know the case of the water flea ( <a href="http://www.nature.com/nclimate/journal/v5n7/full/nclimate2628.html">http://www.nature.com/nclimate/journal/v5n7/full/nclimate2628.html</a> ). Why no references are given on this in this table cell? Or are the references relating this statement given in the cell to the left (first row)? [Ismael Nunez-Riboni, Germany]	Accepted: no longer using table
2595	73	1	71	1	In the Table, in the cell row 1 column 2 (Updated key risk x Coastal inundation), add the following reference: Valle et al. 2014 [Valle, M., G. Chust, A. del Campo, M. S. Wisz, S. M. Olsen, J. M. Garmendia, and A. Borja. 2014. Projecting future distribution of the seagrass <i>Zostera noltii</i> under global warming and sea level rise. <i>Biological Conservation</i> 170:74-85.] [Guillem Chust, Spain]	Accepted: no longer using table
6814	73	1	73	1	Aspects of this table, particularly related to coastal protection and coastal inundation should be moved to the previous table. I understand that coasts are a part of the ocean, but if a separate section has been created for coastal and low lying areas, these aspects should be addressed there and not as a part of the ocean systems. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: no longer using table
5517	74		74		9th row and 3rd column of table: "Increased NPP in some systems is likely lead". The sentence is missing a word? Should this be "is likely *to* lead" or "will likely lead" or something like that? [Ismael Nunez-Riboni, Germany]	Accepted: no longer using table
5518	74		74		11th row and 3rd column of table: The sentence "These differences will be smaller at 1.5 C persons to decrease healthier for higher" makes no sense. [Ismael Nunez-Riboni, Germany]	Accepted: no longer using table
12386	74	1	74	1	In the second row of the table on page 74 (redistribution of fisheries), the last part of the "avoided risks" box is not clear. "Increased NPP in some systems is likely to lead to decreases in oxygen and, in cases, increased anoxia at depth" - it is at 2 deg or at 1.5 deg? [Bill Hare, Germany]	Accepted: no longer using table
12387	74	1	74	1	For the 4th row of the table on page 74 (on variability in small pelagic fishes) the 'avoided impacts' box does not make sense: "These differences will be smaller at 1.5 deg persons to decrease healthy for higher". [Bill Hare, Germany]	Accepted: no longer using table
2762	74	23			in some areas of the Mediterranean, total rainfall is reduced, but they occur more torrentially. [Jonathan Gómez Cantero, Spain]	Accepted: no longer using table
5474	75	1		1	box 3.6 please consider reducing this table and redundant references [Aliyu Barau, Nigeria]	Accepted - Table no longer part of box.
5724	75	1	75	57	The text in Box 3.6 should be in the main body as impact on coral reefs is a significant aspect of impact. [Hong Yang, Switzerland]	Decided to leave as is but make more effective linkages between box and main text.
9484	75	1	76	35	I suggest you consider adding a paragraph about deep water corals to this box. See my earlier comments re Page 42 line 52 and Page 8 line 33). [David Wratt, New Zealand]	Accepted - have added reference to cold corals
2352	75	1	76	35	Box 3.6 appears superfluous. Whilst it gives interesting information about coral reefs it fails to quantify any observed impacts (use some examples of recent events) and neither does it look into adaptation and resilience responses. It is also too long. It appears to be written out of context with the rest of the chapter [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	We believe it is important to highlight given its ramifications for ecosystems, people in poverty - box rewritten to make shorter and to make it discuss relevant issues e.g. Adaptation options et cetera
19026	75	1	76	35	A map inside this text box will be helpful [JACQUES-ANDRE NDIONE, Senegal]	Space is at premium - we are over our allocation
7485	75	1	76	35	Box 3.6: Please insert "tropical" before "coral reefs" throughout this box (and chapter 3) each time the text refers to tropical coral reefs. This is to avoid confusion with cold water corals in boreal waters, which also form huge reef structures with associated biodiversity and ecosystem functions. These corals do not contain symbiotic algae and usually live in deeper waters than tropical corals, and are therefore not subject to coral bleaching. They are however still vulnerable to increasing temperatures, due to their being cold-water adapted, and ocean acidification due to disintegration of the calcified skeletal structures that form the reefs. Some of the worlds largest cold-water coral reefs occur in Norwegian waters. [Øyvind Christophersen, Norway]	Accepted - have put in sentence explaining that we do not mean coldwater deepwater boreal coral reefs.
5519	75	3	75	5	Coral reefs ... underpin the livelihoods ... through the support of ... livelihoods? This should be rewritten. [Ismael Nunez-Riboni, Germany]	Accepted - reworded
19222	75	4	75	5	I would remove the second "livelihoods" in: "...underpin the livelihoods of...small-scale fisheries, livelihoods, and..." [Rubén Retuerto, Spain]	Accepted - reworded
3586	75	5			underpin the livelihoods of an estimated 500 million people through the support of small-scale fisheries, and income from industries such as fisheries and tourism (Burke et al....' [Sylvia Sander, Monaco]	Accepted - reworded
3587	75	9		10	The success of reef-building corals is the result of a symbiosis between simple animals (corals) and small algae, like the organisms belonging to the genus <i>Symbiodinium</i> ....' [Sylvia Sander, Monaco]	Accepted - reworded
11748	75	10	75	10	Genus, not genus [David Schoeman, Australia]	Correct - Modified
3588	75	11			...traps the energy of the sun, through photosynthesis, and provides food....' [Sylvia Sander, Monaco]	Accepted - reworded
11749	75	14	75	15	If corals have survived on tropical and subtropical coastlines for hundred of millions of years, as stated here, why would they be susceptible to 1.5 - 2.0°C of warming? [David Schoeman, Australia]	Most published evidence points to the fact that that we are seeing exceptional rates of warming that are overwhelming the ability of more corals to adapt. Rates of change in temperature are amongst the highest in potentially millions of years.
3589	75	19			least 50% of coral reefs have been lost over the past 30 years with an increasing signature from elevated sea temperature' [Sylvia Sander, Monaco]	Accepted - reworded
11750	75	20	75	20	What does "long term" mean in this context? [David Schoeman, Australia]	Accepted - text rewritten
4942	75	21			<i>Symbiodinium</i> should be <i>Symbiodinium</i> (in italics) [Alejandro Cearreta, Spain]	Accepted
19223	75	21	75	21	Please, italicize "Symbiodinium" [Rubén Retuerto, Spain]	Accepted
5520	75	22	75	22	Perhaps use "in large numbers" instead of "en masse"? [Ismael Nunez-Riboni, Germany]	Accepted
19224	75	24	75	24	I suggest to change "with" by "to" or by "for" [Rubén Retuerto, Spain]	Accepted
5521	75	32	75	32	Missing closing parenthesis in: "(Box 18-3." [Ismael Nunez-Riboni, Germany]	Accepted
2527	75	34	75	36	See Von Euw et al. (2017) on the possible resilience of aragonite mineralization by corals to ocean acidification. Von Euw, S., Zhang, Q., Manichev, V., Murali, N., Gross, J., Feldman, L. C., ... & Falkowski, P. G. (2017). Biological control of aragonite formation in stony corals. <i>Science</i> , 356(6341), 933-938. [Robert Koppu, United States of America]	There is considerable around these and other results concerning the mechanism of calcification. As we are not discussing mechanisms of calcification within the context of understanding climate change and ocean acidification we respectfully don't dig into this particular (though important) discussion here. Unfortunately, This is a consequence of the extreme short space of this report .
5522	75	44	75	44	Double period "." at the end [Ismael Nunez-Riboni, Germany]	Removed
2353	75	46	75	47	Please be specific about which 3 years, this refers to now, when published it will be out of date. This also makes reference to RCP 1.9, which gas not been used before in the is chapter. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - reworded with years listed not '3 years'

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11751	75	51	75	52	What is meant by "...supporting subsequent with modelling work..."? [David Schoeman, Australia]	Accepted - reworded
13988	75	54	75	55	Schleussner et al. post AR5 work to be assessed here, which models 1.5 vs 2 on a RCP 8.5 trajectory. Does this accurately reflect the future of coral reefs in relation to temperature? [Elvira Poloczanska, Germany]	Accepted - Schleussner now discussed
18019	76	3	76	3	Figure 30-10? Maybe Figure 3-10? [Wilfran Moufouma Okia, France]	Text re-written (superseded)
13989	76	3	76	3	could this figure be adapted to show bleaching risk at 1.5 and 2C??? [Elvira Poloczanska, Germany]	We explored this but will not adopt due to limited space and time are limited. We have added an expert analysis that looks at risk for coral reefs in the broadest sense using a burning embers diagram.
3590	76	15		25	this paragraph is redundant and only summarizes what has been said before. In my opinion this paragraph can be simply deleted, or must at least be tied up and checked for redundancy of previous paragraphs in the same box. [Sylvia Sander, Monaco]	Accepted - removed and reworded
2528	76	15	76	16	RCP 2.6 and RCP 4.5 have likely temperature increases by 2100 of 1.9-2.3°C and 2.0-3.6°C per AR5. [Robert Koppu, United States of America]	Noted - see main text - we use Bopp et al for changes in ocean temperature for RCP2.6 and RCP 4.5. Temperature lags behind average global temperature of land based areas.
7486	76	16	76	17	It is unclear whether the expected number of bleaching events for the two RCPs are world wide expectations or expectations per region (i.e. 2-4 vs 10 events per decade on a global scale or for each tropical coral region/reef). This has huge implications for impacts due to the recovery time for coral reefs to a bleaching event. If each tropical coral reef region can expect 2-4 bleaching events per decade, they are basically all doomed also at RCP 2.6. But if it is 2-4 bleaching events per decade globally, then we still have some hope that coral reefs may survive at least in some regions. [Øyvind Christophersen, Norway]	Accepted - have decided to use analysis of Schleussner et al. instead. See new text.
2146	76	17			the repetition of the 2-4 versus 10 bleaching episodes makes me wonder what this actually means. Do you mean that with 1.5C warming every bit of coral will be bleached 2-4 times per decade. This seems a lot to me. Are you confident that the corals would survive such frequent bleaching? If not, then doesn't follow that warming of 2C, ie bleaching 10 times per decade, would not impact on the survival of corals (ie, they would all be gone even with 1.5C warming, so it wouldn't matter if we went to 2C warming)? [Neville Nicholls, Australia]	Accepted - is global average - so some reefs Will have a higher frequency while others will have a lower frequency. You raise important point and I have included this in the discussion.
13990	76	17	76	20	This text does not sound logic, mass mortality presently occurs and RCP 2.6. not yet reached?? [Elvira Poloczanska, Germany]	It is correct. We have been having devastating bleaching events already and is that is one of the big issues that all this coming much faster than we originally in the late 90s.
11752	76	19	76	20	Clunky use of words..."case" used three times in quick succession in the same sentence. [David Schoeman, Australia]	Accepted - text modified
11753	76	20	76	20	Can other scenarios really be "higher" than RCP4.5? There must be a clearer way of writing this. [David Schoeman, Australia]	Accepted - reworded
13991	76	27	76	35	Comment on adaptation capacity of corals, associated fauna and human systems would be useful [Elvira Poloczanska, Germany]	Accepted - text modified
14346	76	27	76	35	Among avoided risks which would result from protecting coral reefs, it would be worse to mention the decrease in flooding levels due to: (a) enhanced wave breaking and (b) higher bottom friction in an environment with healthy coral reef environment (see e.g. "Quataert et al., 2015. The influence of coral reefs and climate change on wave-driven flooding of tropical coastlines, Journal of Geophys. Research") [Alessio Giardino, Netherlands]	The issue of coastal protection and interaction and sea level is dealt with in this box now as well as in the main text of Chapter 3. The interaction between rising sea levels, increasing storm intensity, flooding, and coastal protection is a very important aspect which we have tried to reflect throughout the box and accompanying text in the main chapter.
7487	76	31	76	35	Please consider including this in the executive summary [Øyvind Christophersen, Norway]	Will do so.
2721	76	31	76	35	This is very good; can a statement be made here on impacts on equity as well? [Penny Urquhart, South Africa]	Have done so. Have included statement on equity Issues associated with coral reefs and the degradation.
3634	76	38	81	5	Overall, the current draft of Section 3.4.4 ("Freshwater Resources") is a good start, but it needs work. I understand that this is a concise summary document, but some additional detail is required, and the detail provided needs to be correct. Length requirements may still be met by omitting a few discussions that aren't required or productive. I provide more specific ideas in the following review comments. A really good starting point, though, would be to add maps of anticipated changes to streamflow under different climate scenarios, e.g., Asadih and Krakauer, 2017, Hydrology and Earth System Science Discussions. Global-scale maps like this have some limitations, and they may not correspond to exactly 1.5°C warming, but they're an excellent communication tool nonetheless. The section as currently written doesn't provide a clear view of the diversity of hydrologic changes expected across the world, and a graphic like this would communicate that information effectively and succinctly. [Sean Fleming, United States of America]	Taken into account. Physical impacts are covered in section 3.3.5.
3640	76	38	81	5	The literature citations in Section 3.4.4 ("Freshwater Resources") aren't quite adequate. I acknowledge that a thorough literature review cannot be provided in a summary document like this, but over-reliance on a few documents can lead to errors and omissions. In particular, Cisneros et al. 2014 is cited repeatedly as the sole source of information for several statements in the freshwater resources section, and several of those assertions are oversimplified. The Cisneros et al. 2014 document isn't actually listed in the references section at the end of chapter 3, but I presume this is the freshwater chapter from the previous IPCC report. That's fine up to a point - after all, Cisneros et al. 2014 is an excellent document, if it is what I think it is (again, it's not actually listed in the references) - but building one summary on the outcomes of another summary is risky, and that single document is relied on a bit too much. This may help explain some of the notable errors and omissions discussed in other comments in this review. [Sean Fleming, United States of America]	Accepted. Text revised. "Cisneros et al. 2014" is cited from WGII AR5 Ch.3 as starting point.
11773	76	38	87	53	This whole section is pretty poorly written, and could do with a thorough revision. The writing improves markedly from p. 88 [David Schoeman, Australia]	Accepted. Text revised.
5475	76	40			please add more sentences to make it clear and link to CC [Aliyu Barau, Nigeria]	Accepted. More sentences to make clear and link to CC are added.
12061	76	42	76	43	Ref (Cisneros et al. 2014) should be, I think, "Jimenez Cisneros" et al. As it is listed in the Ref section. If so, this needs changing in several places. [Paul Doyle, Canada]	Editorial - copyedit to be completed prior to publication
12062	76	49	76	49	CHANGE..... earlier breakup of river ice in "northern rivers around the globe". [Paul Doyle, Canada]	Noted. This part is cited from WGII AR5 Ch.3 as starting point
12063	76	50	76	50	CHANGE..... Streamflow is lower in summer, "a decrease in winter snowpacks is exacerbating this problem". (Many references exist.) [Paul Doyle, Canada]	Noted. This part is cited from WGII AR5 Ch.3 as starting point
2147	76	52			Progresses? [Neville Nicholls, Australia]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
2973	76	52	76	56	From "Progresses since the AR5 in observed physical changes" to "changes have been increasing since AR5". This part of this paragraph was incomprehensible, to me, at least. [Erica Head, Canada]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
12064	76	52	80	6	Able to barely scan this section but can tell there are many grammatical errors and too many numbers to absorb in text form. Multiple tables, figures and close review of text are required to improve these pages. [Paul Doyle, Canada]	Take into account. Text revised. Table consolidated with other subsections in 3.4.4 is installed.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3635	76	52	77	16	The major assertion in Section 3.4.4.1.1 ("Water availability including stream flow") that climate change-related trends in streamflow cannot be reliably detected in historical observational datasets, due to the confounding effects of watershed-scale land use/land cover change and water withdrawals, is incorrect. Granted, it's true that where these local-scale anthropogenic effects exist, they usually overwhelm the climate signal. The section also provides some good references on separating climatic trends in hydrologic datasets from other factors. However, this section (and in fact the entire document) is missing a large (literally 100s of papers, if not more) part of the research literature on using sophisticated statistical analysis of observational streamflow datasets, sourced from reference streamgages on rivers that have experienced little or no upstream alteration, to detect climate change impacts. This is a major oversight, but easily corrected (see for example comment 3 below). [Sean Fleming, United States of America]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
3636	76	52	77	16	Section 3.4.4.1.1 ("Water availability including stream flow") needs to do a better job of summarizing and citing the significant body of work on using modern data analytics - in particular, statistical analysis and modeling - of historical observational streamflow datasets for climatic trends. Such studies serve two fundamentally important purposes that even a short summary document like this needs to acknowledge and provide literature citations for. (1) Unlike GCM-driven process simulation models of future streamflow, which can only incorporate what we know about a system, data science-driven analysis of historical datasets enables discovery of previously unknown effects. The widely cited review paper by Moore et al. (2009, Hydrological Processes, 23: 42-61) provides an intriguing and globally relevant example of how this worked for the unexpectedly complex streamflow impacts of climatically forced glacier change, a key issue given that mountain glaciers and icefields form the core of continental "water towers" like the Himalayas, Alps, Andes, and Northern Rockies. These processes, discovered through data mining of historical databases, have only just begun to be rigorously incorporated into process simulation-based models of hydrologic response to climate change. (2) Statistical analysis of observational water resource data provides an approximate "ground truth" against which the performance of GCM- and hydrologic model-driven projections can be compared. A recent, clear, and timely (given the ongoing federal review of the US-Canada Columbia River Treaty) example is the work of Fleming and Barton (2015, Journal of the American Water Resources Association, 51: 833-841). They performed a variety of trend analyses on observational streamflow indices, and on runoff simulations from an ensemble of CMIP5 historical GCM runs over the same timeframe, over the most water-stressed region in Canada, which is also a major tributary to the international Columbia River. Several key points of agreement were found, providing confidence in those outcomes, and a discrepancy between the two sets of analysis indicated a point of lower confidence that provided direction to future research. These two key examples from the recent literature should be cited and briefly summarized in the report, as they help provide a much more accurate view of the large body of science that has been done on historical hydrologic datasets, and the outcomes and broader implications and value of that work for planning and policy purposes, without adding much length to the section. [Sean Fleming, United States of America]	Taken into account. Physical impacts are covered in section 3.3.5.
6518	76	55	77	16	Here, it is distinguished between impact of climate changes and impact of anthropogenic changes. Since climate change is also largely driven by anthropogenic activities, it is suggested to use a different term, e.g. non-climate anthropogenic changes. [Heike Hebbinghaus, Germany]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
3591	77	2			...and have reveal revealed that... [Sylvia Sander, Monaco]	Editorial.
6246	77	2			have revealed (not have reveal) [Muhammad Mohsin IQBAL, Pakistan]	Editorial.
19225	77	2	77	2	I would suggest to change "reveal" by "revealed" [Rubén Retuerto, Spain]	Editorial.
9324	77	2	77	2	The word "reveal" should be "revealed" in the phrase "have reveal that anthropogenic" [Sir KILKIS, Turkey]	Editorial.
1936	77	2	77	2	reveal' should be 'revealed' [Chrystal Mantyka-Pringle, Canada]	Editorial.
5523	77	2	77	2	have reveal should be "have revealed" [Ismael Nunez-Riboni, Germany]	Editorial.
10247	77	2	77	3	This is highly subjective statement: which region are we talking about here? Must be more specific here, one cannot argue for this on the basis of only one study. [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
3592	77	4		6	For example, anthropogenic influence had a far greater contribution (>56.6%) to the streamflow variability than that by climate change (<43.4%) in the Liao River Basin, one of the largest basins in northeast China (Zhang et al., 2017). I think this statement is downplaying grossly the major impact (i.e. almost 50%) of climate change. I suggest rewriting this sentence to: "For example, anthropogenic influence had a far greater contribution (>56.6%) to the streamflow variability than that by climate change (<43.4%) in the Liao River Basin, one of the largest basins in northeast China (Zhang et al., 2017). [Sylvia Sander, Monaco]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
5889	77	4	77	6	Please consider including this paper for the case of the Mediterranean basin which talks about the influence of the dams in the streamflows: Vicente-Serrano et al. (2016) Effect of reservoirs on streamflow and river regimes in a heavily regulated river basin of Northeast Spain. Catena <a href="http://dx.doi.org/10.1016/j.catena.2016.03.042">http://dx.doi.org/10.1016/j.catena.2016.03.042</a> [Joan A. Lopez-Bustins, Spain]	Taken into account. Physical impacts are covered in section 3.3.5.
12388	77	9	74	9	Is the "climate variability" mentioned here anthropogenic? [Bill Hare, Germany]	Text revised
11754	77	12	77	12	"Population under water scarcity has increased by nearly 16 times since the 1900s"...in this increase absolute or relative (i.e., %)? This matters. [David Schoeman, Australia]	Take into account. Text revised.
6247	77	12	77	13	Population under water scarcity has increased nearly 16 times since 1900 although the total population during the same period increased only 4-fold. This is against the common expectations. Needs some explanation as to how population increased more under adverse conditions? Also, the reference 'Kummu et al. (2016)' is missing from the Reference list. [Muhammad Mohsin IQBAL, Pakistan]	Take into account. Some explanations are added.
5890	77	13	77	13	I could not find the study of Kummu et al. (2016) in the list of references: Kummu, M., Guillaume, J. H. A., de Moel, H., Eisner, S., Flörke, M., Porkka, M., Siebert, S., Veldkamp, T. I. E., Ward, P. J. (2016) The world's road to water scarcity: shortage and stress in the 20th century and pathways towards sustainability. Scientific Reports 6, Article number: 38495 [Joan A. Lopez-Bustins, Spain]	Editorial.
5477	77	19			why reptition in page 79 line 20 [Aliyu Barau, Nigeria]	Noted. 3.4.4.1.2 is observed impacts but 3.4.4.2.2 is projected risk. SOD combines these components.
1433	77	19			is it not similar to section 3.3.5? [Philippe Roudier, France]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
13992	77	19			isn't this covered in section 3.3.4 and 3.3.5? [Elvira Poloczanska, Germany]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7729	77	19	77	23	Being that floods have both a meteorological component and a cultural/infrastructural management component, there should be an explanatory statement to the assertion made here that "there is low confidence, due to limited evidence that anthropogenic climate change has affected the frequency and magnitude of floods at global scale...". safeguards on the ground may have improved even with more intense instigation by meteorological factors to reduce losses. [Hilary Inyang, Nigeria]	Noted. This part is cited from WGII AR5 Ch.3 as starting point
4734	77	19	77	34	Perhaps torrents should also be mentioned, since torrential flood, that is a type of flood, could be included in this section [Spyros Schismenos, China]	Taken into account. Torrential flood is covered in Section 3.4.5 "Coastal and low lying areas (inc. Small islands)"
9704	77	19	77	34	Please consider referencing the following paper published in august 2017 that shows a clear shift in the timing or european floods. Changing climate shifts timing of European floods. Günter Blöschl et al. Sciences, 11 Aug 2017, Vol 357, Issue 6351, pp 588-590 [Eric Martin, France]	Taken into account. Physical impacts are covered in section 3.3.5.
3593	77	25			[Sylvia Sander, Monaco]	Noted
3637	77	25	77	28	Add "land use/land cover change, in particular urbanization" after "hydroclimatic conditions" on line 28. This is a key piece of the puzzle - in fact, possibly the most important one after increased settlement on floodplains. [Sean Fleming, United States of America]	Accepted. Text revised.
3638	77	28	77	30	Actually, I believe the standard view is that flood damages are increasing across much of western Europe and North America, the exact opposite of what is asserted here. Though complex, this trend is primarily felt to be due to a combination of climate change, increased numbers of people living on floodplains, and the loss of rainwater infiltration and storage capacity under the impermeable area increases associated with urbanization. I don't think there's much controversy about this. [Sean Fleming, United States of America]	Noted.
19027	77	28	77	31	Tanoue et al., 2016; this reference iis to be added in the References Section [JACQUES-ANDRE NDIONE, Senegal]	Editorial
13993	77	28	77	31	unclear writing [Elvira Poloczanska, Germany]	Accepted. Text revised.
5476	77	33			check spelling of the word beginning [Aliyu Barau, Nigeria]	Editorial - copyedit to be completed prior to publication
2148	77	33	77	33	I think the attribution of the Syrian drought to human-induced climate change is contested. I don't think you can just baldly attribute it without caveats. [Neville Nicholls, Australia]	Taken into account. This part is covered in BOX 3.3
9989	77	33	77	34	Although this is a good ouput, it is very local and specific. It would be better if it could be linked tightly to the rest of text. This can also be analyzed with more details. [Mustafa Tufan Turp, Turkey]	Taken into account. This part is covered in BOX 3.3
3639	77	33	77	34	This passage repeats the controversial notion that climate change contributed to the Syrian civil war; it is not clear that including the idea here will be a productive choice. If the question of conflict and cooperation over scarce water resources is to be broached, I suggest instead going to the significant body of work on that topic. I'll provide three particularly useful examples here. Start with the seminal work of Wolf (1998, Water Policy, 1: 251-265) on conflict and cooperation along international waterways. Then add some more recent research by, say, Bohmelt et al. (2014, Global Environmental Change, 29: 337-348) on conflict and cooperation over scarce water resources in domestic (civil) contexts. And a useful, compact, and balanced overall synopsis of key social science research on water conflict and cooperation, how it may or may not link to former World Bank VP Ismail Serageldin's hypothesis of 21st century "water wars", and how all of this might fare under the combination of explosive global water demand growth and climate change-induced changes in supply, see the concluding chapter of Fleming (2017, Where the River Flows: Scientific Reflections on Earth's Waterways, Princeton University Press, Princeton, NJ). [Sean Fleming, United States of America]	Taken into account. This part is covered in BOX 3.3
12389	77	33	77	34	Human-induced climate change contributed to a 3-year drought in Syria since the beginning in the winter of 2006/2007 - can we say how much was due to climate change? (Kelley et al 2015 suggest such droughts are 2-3 times more likely because of anthropogenic climate change) [Bill Hare, Germany]	Taken into account. This part is covered in BOX 3.3
13994	77	33	77	34	further explanation is needed [Elvira Poloczanska, Germany]	Taken into account. This part is covered in BOX 3.3
11755	77	33	77	34	Human-induced climate change contributed to 3-year drought in Syria since the beginning in the winter of 2006/2007 (Kelley et al., 2015). I have seen several analyses that dispute the significance of the role of climate change in the drought and subsequent events. Since this is likely to be a point of contention, it would be pertinent here and elsewhere (i.e., wherever this statement is made) to provide more detail and nuance, as well as a confidence statement. [David Schoeman, Australia]	Taken into account. This part is covered in BOX 3.3
12796	77	33	77	34	The study is based on an analysis of PDSI and precipitation. It fits better in the regional climate section on drought above as it is not an impact attribution study. [Robert Vautard, France]	Taken into account. This part is covered in BOX 3.3
5891	77	37	77	37	This section is too short. Additional studies could be added to this section. Please review these two articles about groundwater in the western Mediterranean basin: 1) Jiménez-Martínez et al. (2016) The role of groundwater in highly human-modified hydrosystems: A review of impacts and mitigation options in the Campo de Cartagena-Mar Menor coastal plain (SE Spain). Environmental Reviews 24(4), pp. 377-392 // 2) Candela et al. (2012) Modelling impacts of climate change on water resources in ungauged and data-scarce watersheds. Application to the Siurana catchment (NE Spain). Science of the Total Environment 440: 253-260 [Joan A. Lopez-Bustins, Spain]	Taken into account. This part is covered in BOX 3.3
5725	77	37	78	8	Need more elaboration on impact of 1.5C warming on these items. [Hong Yang, Switzerland]	Noted.
4735	77	38	77	39	It would be better if some references were presented to further support this statement. [Spyros Schismenos, China]	Noted. This statement is cited from WGII AR5 Ch.3 as starting point
19226	77	39	77	39	Cisneros et al. 2014 are not listed in the References [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
17274	77	39	77	48	Cisneros et al. 2014 not in the references list [Maria Jesus Iglesias Briones, Spain]	Editorial - copyedit to be completed prior to publication
13449	77	43	77	43	Irrigation also poses a potent threat, with increased need of food and excessive irrigation leads to drying of aquifers. Especially, in agriculture production based countries like Asia, SEAsia, Australia, Mediterranean. [Vidyunmala Veldore, Norway]	Noted.
19227	77	47	77	47	What water quality variables affected by climate change has been considered? [Rubén Retuerto, Spain]	Take into account. Several indices of water quality are included.
3641	77	50	77	54	Sure, warmer air temperatures in a warmer climate will tend to produce warmer streams, but we need to provide a brief but important caveat here so that readers don't come away with a grossly oversimplified view of changes in water temperature. For example, land use/land cover change, such as the removal of riparian vegetation and associated shading, can overwhelm climate signals in streamflow temperature. For example, see (and cite) Arismendi et al. (2012, Geophysical Research Letters, 39, doi:10.1029/2012GL051448). Also note that the air temperature dependency of stream temperature can be highly nonlinear - an obvious example is wintertime stream temperature in cold regions. [Sean Fleming, United States of America]	Take into account. Text revised.
19028	77	51	77	53	It would be good to find more examples over Africa and America [JACQUES-ANDRE NDIONE, Senegal]	Noted.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3594	77	52		53	(10 years)-1: superscript -1 two times! [Sylvia Sander, Monaco]	Editorial - copyedit to be completed prior to publication
18020	77	52	77	53	(10years)-1 may be replaced by decade -1? [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
4600	77	52	77	53	Change "(10 years)" by "decade-1" (2x) [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
11756	77	54	77	54	What is the -1 doing outside the bracket here? [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
3848	78	2		5	The sentences sound contradictory. First it says there is little or no observation of soil erosion altered due to climate change. Then it says climate change impacts on soil erosion have been observed over the world. [Woonsup Choi, United States of America]	Noted. Line 2-3 is cited from WGII AR5 Ch.3 as starting point and Line 5-8 is new findings since AR5.
9604	78	2	78	5	There is little or no observational evidence related to soil erosion and sediment loads being altered significantly due to changing climate. Climate change have brought the impacts on soil erosion over the past years in some regions, and please add the related contents. [Jianguo Wu, China]	Noted. Line 2-3 is cited from WGII AR5 Ch.3 as starting point and Line 5-8 is updated by additional information.
2974	78	2	78	6	Line 2-3 "There is little or no observational evidence yet that soil erosion and sediment loads have been altered significantly due to changing climate. . ." versus Line 5 "Climate change impacts on soil erosion have been observed over the world. . . .". These two sentences seem to be contradictory. [Erica Head, Canada]	Noted. Line 2-3 is cited from WGII AR5 Ch.3 as starting point and Line 5-8 is new findings since AR5.
3643	78	2	78	8	Section 3.4.4.1.5 ("Soil erosion and sediment load") consists of two short paragraphs. These two paragraphs appear to directly contradict each other. Obviously, this needs to be resolved. [Sean Fleming, United States of America]	Noted. Line 2-3 is cited from WGII AR5 Ch.3 as starting point and Line 5-8 is new findings since AR5.
12390	78	2	78	8	The two paragraphs give different messages - one that there is "little or no observational evidence yet that soil erosion and sediment loads have been altered significantly due to changing climate" and the other that "climate change impacts on soil erosion have been observed all over the world". This is confusing for the reader. [Bill Hare, Germany]	Noted. Line 2-3 is cited from WGII AR5 Ch.3 as starting point and Line 5-8 is new findings since AR5.
3595	78	5		8	is this correlation between climate change impact and soil erosion positive or negative? Please add. [Sylvia Sander, Monaco]	Take into account. Text revised.
19029	78	5	78	5	The authors mentioned that "[...] many studies suggest that "; please, quote these main studies! We're writing a report, some researchers would like to go deeper in this issue. [JACQUES-ANDRE NDIONE, Senegal]	Take into account. Text revised.
2302	78	11	80	45	A number of factors are included in the section" 3.4.4.2 Projected risks and adaptation for a global warming of 1.5°C and 2°C above pre-industrial levels". This expert thinks that besides the included subsections, an additional one ( i.e. section 3.4.4.2.6) dealing with air quality ( in a similar way to the one devoted to water quality) should be included. There are important questions related to temperature or precipitation changes that would affect the atmospheric pollution levels and cannot be omitted. [Begoña ARTIÑANO, Spain]	Noted. No references related including impacts at 1.5 vs 2.0 degree is found.
5892	78	18	78	18	Is there any difference between GMT in L18P78 and GMST in L43P16? Please specify or homogenize them. [Joan A. Lopez-Bustins, Spain]	Accepted. Text revised.
11757	78	19	78	20	I don't understand what this part of the sentence means: "...however socioeconomic condition might be greater than variation between GMT rises." [David Schoeman, Australia]	Accepted. Text revised.
17275	78	25	78	25	Here and in many places throughout the text, Schlessner et al. 2016a,b or c? [Maria Jesus Iglesias Briones, Spain]	Editorial - copyedit to be completed prior to publication
13995	78	29			While more specificity would be useful in other sections text from here onward for the rest of 3.4.4. seems overburdened with detail, recommend clear succinct writing. [Elvira Poloczanska, Germany]	Accepted. Text revised.
2354	78	29	78	31	This "Mean global warming levels of 1.5°C, 2°C, 2.5°C, 3°C, 3.5°C, 4°C, 4.5°C, 5°C (MAGICC6 with 19 GCMs 30 using a pattern-scaling) are projected to expose an additional 4%, 8%, 9%, 10%, 11%, 12%, 12.5%, and 13%" would be better writtedn as " Mean global warming levels of between 1.5-5.0oC (MAGICC6 with 19 GCMs 30 using a pattern-scaling) are projected to expose an additional 4%-13% of the world's...." [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Take into account. Text revised.
16293	78	29	78	32	Do these calculations account for population growth or relate just to amount of water to be divided among whatever the population is? What about for migration of peoples from drying areas? [Michael MacCracken, United States of America]	Noted. SSP provides population scenario and migration of people is considered in the SSP.
9607	78	29	78	39	clearing the effects of 1.5°C above pre-industrial levels [Jianguo Wu, China]	Take into account. Text revised.
3642	78	29	78	43	Great paragraph, but we should really note in here that according to UN estimates, global water demand will increase 55% by 2050, largely due to population growth and economic growth in developing nations. See (and cite) WWAP (United Nations World Water Assessment Programme), 2015, The United Nations World Water Development Report 2015: Water for a Sustainable World. Paris, UNESCO. [Sean Fleming, United States of America]	Noted.
2149	78	29	78	43	Too much detail. Why are you including so many warming levels? This report isnt about 5C warming impacts. Or 3.7C warming. [Neville Nicholls, Australia]	Accepted. Text revised.
12391	78	29	78	43	The language used to describe results of GCMs on water scarcity is not at all reader friendly. [Bill Hare, Germany]	Accepted. Text revised.
2975	78	37	78	37	500 m3 per capita (1,000 m3 per capita) Should these numbers not have units of time, e.g. "500 m3 per capita per year (1,000 m3 per capita per year)?" [Erica Head, Canada]	Noted. Text revised.
3596	78	47			Ensembles project... I have no idea what 'Ensembles' means here. This entire sentence needs to be looked at as it makes no sense at the moment. [Sylvia Sander, Monaco]	Taken into account. Physical impacts are covered in section 3.3.5.
2150	78	49			What are Q5 and Q95? [Neville Nicholls, Australia]	Taken into account. Physical impacts are covered in section 3.3.5.
18021	78	52	78	52	the year of reference "(Karnauskas et al.)" [Wilfran Moufouma Okia, France]	Noted. "Karnauskas et al." was a manuscript at the moment of writing the FOD. It was removed from this section in SOD
15312	78	54	78	54	In line with the changes at the European precipitation, runoff and low flows shown intensification of the water cycle at 2oC even for areas where the average state is not considerably affected (Papadimitriou et al., 2016), with remarkable projected decrease of low flows with exception of the Scandinavian Peninsula and some small areas in central Europe. This favors the formation of extreme hydrological events, thus more droughts compared to the current state could be expected in the future due to the warming climate.  Papadimitriou, L. V., Koutroulis, A. G., Grillakis, M. G., and Tsanis, I. K.: High-end climate change impact on European runoff and low flows – exploring the effects of forcing biases, Hydrol. Earth Syst. Sci., 20, 1785-1808, <a href="https://doi.org/10.5194/hess-20-1785-2016">https://doi.org/10.5194/hess-20-1785-2016</a> , 2016. [Manolis Grillakis, Greece]	Taken into account. Physical impacts are covered in section 3.3.5.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2151	78	56			I can see that water demand would be similar under the two warnings. But surely there is some difference between them? What do the projections say about the magnitude of the increases in the two scenarios? [Neville Nicholls, Australia]	Accepted. Text revised.
19228	78	56	79	10	This paragraph is hard to follow [Rubén Retuerto, Spain]	Accepted. Text revised.
20571	78	56	79	10	Here is a concrete example of a part of the text that is very hard to follow. It is important to understand the audience of this document. In my view, if the aim is to increase those who can engage with this document, efforts should be made to make text easier to understand both by non specialists and specialists alike. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text revised.
2152	78	56	79	10	Too much detail and too many scenarios and models. Summarise briefly. Also the whole paragraph is confusing, because of poor English. [Neville Nicholls, Australia]	Accepted. Text revised.
6519	78	56	79	10	This passage is unreadable. Maybe better put the numbers in a chart, table or graphic, because it is hard to impossible to follow it in text. Or at least break it up into several sentences for the different parts. [Heike Hebbinghaus, Germany]	Accepted. Text revised.
2568	78	56	79	11	Report"Increase of water demand under 2.0°C GMT rises is projected to be similar to 1.5°C GMT rise." but the information show in the text only discuss the irrigation water demand, for industrial water demand, and domestic water demand in China under changing climate is also increasing, see the paper with attachment file "Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China, Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics, Adaptation to climate change impacts on water demand, Forecasting industrial water demand in Huaihe River Basin due to environmental changes" all these papers are very important for water demand under climate change, should also be cited in the text. [Xiaojun WANG, China]	Noted. Projected risks derived from the differences of at 1.5°C and at 2.0°C global warming cannot be found.
2581	78	56	79	11	Report"Increase of water demand under 2.0°C GMT rises is projected to be similar to 1.5°C GMT rise." but the information show in the text only discuss the irrigation water demand, for industrial water demand, and domestic water demand in China under changing climate is also increasing, see the paper with attachment file "Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China, Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics, Adaptation to climate change impacts on water demand, Forecasting industrial water demand in Huaihe River Basin due to environmental changes" all these papers are very important for water demand under climate change, should also be cited in the text. [Xiaojun WANG, China]	Noted. Projected risks derived from the differences of at 1.5°C and at 2.0°C global warming cannot be found.
2542	78	56	79	11	Report"Increase of water demand under 2.0°C GMT rises is projected to be similar to 1.5°C GMT rise." but the information show in the text only discuss the irrigation water demand, for industrial water demand, and domestic water demand in China under changing climate is also increasing, see the paper with attachment file "Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China, Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics, Adaptation to climate change impacts on water demand, Forecasting industrial water demand in Huaihe River Basin due to environmental changes" all these papers are very important for water demand under climate change, should also be cited in the text. [Xiaojun WANG, China]	Noted. Projected risks derived from the differences of at 1.5°C and at 2.0°C global warming cannot be found.
3849	79	1		10	The paragraph is really hard to read. [Woonsup Choi, United States of America]	Accepted. Text revised.
9608	79	1	78	9	clearing the effects of 1.5°C above pre-industrial levels [Jianguo Wu, China]	Accepted. Text revised.
5893	79	1	79	10	The first paragraph in page 79 is too dense. Perhaps it could be rewritten. [Joan A. Lopez-Bustins, Spain]	Accepted. Text revised.
12392	79	1	79	10	Very difficult to read [Bill Hare, Germany]	Accepted. Text revised.
1434	79	1	79	10	hardly readable [Philippe Roudier, France]	Accepted. Text revised.
11758	79	1	79	2	"global irrigation water demand increases by around -1.7% (-1.5%)...surely an increase by a negative amount is a decrease"? Language like this is not helpful... [David Schoeman, Australia]	Accepted. Text revised.
5894	79	9	79	10	I think that year "2000" is not correct here, it might be 2050 or 2100. I could not find the study of Hanasaki et al. (2013) in the list of references in order to check the right year within the content of the study. [Joan A. Lopez-Bustins, Spain]	Noted. We confirmed that it is correct.
3597	79	12			The effectiveness of water use efficiency measures, as adaptation to climate change, is largely determined by...' add comma [Sylvia Sander, Monaco]	Noted. This part is removed from SOD.
3644	79	13	79	13	information technology? Is that what was really meant here? Perhaps omit the word "information". Sure, information technology will play an important role, but so will many other kinds of technological innovation. More broadly, there's a huge literature on social and technological responses to growing water scarcity and how to reduce demand... I suggest consulting that literature. [Sean Fleming, United States of America]	Noted. This part is removed from SOD.
13996	79	20			Physical aspects are also covered above in section 3.3.4 and 3.3.5 – there would be value in bring these sections together [Elvira Poloczanska, Germany]	Taken into account. Physical impacts are covered in sections 3.3.4 and 3.3.5.
9705	79	20	80	6	A paper in revision by Dayon et al. show that in a +2°C scenario, some hydrological impacts are high enough to cause serious problems, hence highlighting the interest to limit the warming well below 1.5°. Under this scenario, snow cover is reduced by 50%, summer flows reduced by 30% in the Garonne catchment in South West of France. Dayon et al. Impact of climate change on the hydrological cycle over France and associated uncertainties. Comptes rendus geosciences, in revision [Eric Martin, France]	Taken into account. Physical impacts are covered in section 3.3.5.
2153	79	21			This seems a very different conclusion than was reached in SREX. Perhaps it is justified, but I think it needs some evidence and explanation. [Neville Nicholls, Australia]	Noted. This part is cited from WGII AR5 Ch.3 as starting point
1156	79	21	79	22	Risk is a complicated concept here because of the multiple factors (e.g. exposure etc) that influence overall flood risk. I agree with parts of this sentence (namely that the non-climate drivers of risk, such as increases in population particularly in developing countries, are likely to cause flood risk to increase), and also agree that for certain the climatic changes are likely to also drive increasing risk. However, given the importance of flood risk in terms of impacts of climate change, I feel that a single sentence here can lead to misinterpretation and the ideas need to be unpacked further. Consideration of both the climatic and non-climatic drivers of flood risk, and that the climate drivers are highly complex (as discussed in some of my previous comments) is warranted here. Finally, what sort of floods are of concern here? I assume the reference is to fluvial and pluvial floods, rather than coastal floods, or are floods treated holistically? [Seth Westra, Australia]	Noted. Line 21-22 is cited from WGII AR5 Ch.3 as starting point.
5895	79	25	79	25	GMT acronym already listed in L18P78. [Joan A. Lopez-Bustins, Spain]	Editorial - copyedit to be completed prior to publication
2154	79	25	79	40	Lines 25-27 are repeated in lines 31-40. Do you need both? Could you simplify the paragraph in lines 31-40? [Neville Nicholls, Australia]	Accepted. Text revised.
3598	79	31			x million of what, what's the unit? People? [Sylvia Sander, Monaco]	Accepted. Text revised.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11759	79	32	79	32	Million what? People? [David Schoeman, Australia]	Accepted. Text revised.
11760	79	33	79	33	Repetitive [David Schoeman, Australia]	Accepted. Text revised.
1435	79	35	79	36	and elsewhere: please write if this is a median (significant change?) or give a range of possible impacts [Philippe Roudier, France]	Noted.
6	79	36	79	36	Please correct the citation to (Alfieri et al., 2017), instead of 2016. [Lorenzo Alfieri, Italy]	Editorial - copyedit to be completed prior to publication
12393	79	36	79	40	It is difficult to understand how all percentage changes in this paragraph relate to each other. E.g. one result suggests an increase in damage from 120% to 170% between 1.5 and 2 degrees, another suggests an insignificant increase in potential economic loss (+0.9%). Can this be explained? [Bill Hare, Germany]	Accepted. Text revised.
17276	79	38	79	40	Full references are missing [Maria Jesus Iglesias Briones, Spain]	Editorial - copyedit to be completed prior to publication
11761	79	39	79	40	Please define terms. What is a "human loss"? Loss of life? And what is welfare loss? [David Schoeman, Australia]	Noted. Definition of terms are added after reference is published.
5	79	40	79	40	The updated reference for Dottori et al. is Dottori F., Szewczyk W., Ciscar J.-C., Zhao F., Alfieri L., Hirabayashi Y., Bianchi A., Frieler K., Betts R.A., Feyen L., Global human and economic losses from river floods under the Paris climate mitigation targets. Nature Climate Change, 2017 (in review) [Lorenzo Alfieri, Italy]	Noted
12394	79	42	79	42	monthly population does not have a clear meaning. [Bill Hare, Germany]	Accepted. Text revised.
19030	79	42	79	44	The authors mentioned that "warming is projected to be 114.3 and 190.4 million people "; please, it would be good to be more precise, by giving more details about the continent that would be more affected. [JACQUES-ANDRE NDIONE, Senegal]	Take into account. Text revised.
7730	79	46	79	48	Does the assertion here that changes in flood risk are statistically insignificant take into account the recent trend (at least the past 10 years) of increase in the frequency of floods in West Africa where 25-year floods are now occurring more frequently? [Hilary Inyang, Nigeria]	Taken into account. Physical impacts are covered in section 3.3.5.
7	79	48	79	48	Please correct the citation to (Alfieri et al., 2017), instead of 2016. [Lorenzo Alfieri, Italy]	Editorial.
8	79	48	79	49	I don't know the ref by Thober et al. (or is it supposed to be Donnelly et al. 2017 here?). In any case "differences in river floods" is not informative. One should specify here if the differences refer to flood risk, economic damage, population affected, peak flow corresponding to a specific return period or other. [Lorenzo Alfieri, Italy]	Taken into account. Physical impacts are covered in section 3.3.5.
6248	79	49			The reference 'Thober et al.' is missing from the Reference list. [Muhammad Mohsin IQBAL, Pakistan]	Taken into account. Physical impacts are covered in section 3.3.5.
2976	79	49	79	52	From "A multimodel ensemble of 45 hydrological" to "rivers between 1.5°C and 3°C, respectively (Andreas et al.)." This sentence is way too long, and virtually incomprehensible. [Erica Head, Canada]	Taken into account. Physical impacts are covered in section 3.3.5.
5896	79	50	79	50	Please review writing. [Joan A. Lopez-Bustins, Spain]	Taken into account. Physical impacts are covered in section 3.3.5.
12395	79	53	79	57	It is not clear where results are referring to (some are for European rivers, but then the last example jumps to China). [Bill Hare, Germany]	Taken into account. Physical impacts are covered in section 3.3.5.
5897	79	56	79	56	Please delete "in the". [Joan A. Lopez-Bustins, Spain]	Editorial - copyedit to be completed prior to publication
19229	79	56	79	56	Remove one "in the" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
3645	79	57	80	2	According to this passage, climate change in the Haihe river basin in China will cause drought to decrease relative to historical levels, and then increase. That seems really odd. Is there a typographical error here? If not, this projected trend reversal requires a little explanation. [Sean Fleming, United States of America]	Accepted. Text revised.
3850	80	1		2	More details should be provided. It is hard to make sense of different signs of drought impacts between 1.5 and 2 degrees scenarios. [Woonsup Choi, United States of America]	Accepted. Text revised.
9	80	7	80	7	Suggested addition here: " Alfieri et al. (2016) evaluated quantitatively the benefits of implementing four different flood adaptation measures in a pan-European flood risk assessment framework. Measures include 1) the rise of flood protections, 2) reduction of the peak flows through water retention, 3) reduction of vulnerability and 4) relocation to safer areas. Their sensitivity is assessed in several configurations under a high-end global warming scenario (EURO-CORDEX, RCP 8.5) over the time range 1976–2100. Results suggest that the future increase in expected damage and population affected by river floods can be compensated through different configurations of adaptation measures. The adaptation efforts for flood risk reduction should favor measures targeted at reducing the impacts of floods (i.e., measures 3) and 4), rather than trying to avoid them (i.e., measures 1) and 2). Adaptation plans only based on rising flood protections have the effect of reducing the frequency of small floods and exposing the society to less-frequent but catastrophic floods and potentially long recovery processes." Reference: Alfieri, L., Feyen, L. and Di Baldassarre, G. : Increasing flood risk under climate change: a pan-European assessment of the benefits of four adaptation strategies, Climatic Change, 1–15, doi:10.1007/s10584-016-1641-1, 2016. [Lorenzo Alfieri, Italy]	Noted. Adaptation is covered in Chapter 4.
12065	80	9	132		Box 3.12 Unable to review as time as runout. Hopefully, there are several other reviewers of this Chapter. [Paul Doyle, Canada]	Noted
5898	80	9	80	35	Why do you mention only some local examples? Please add more studies about bigger regions and local examples from other parts of the world. Please add to IJsselmeer and Qu'Appelle River the name of the region or country where are located in brackets: (Netherlands and Canada, respectively). [Joan A. Lopez-Bustins, Spain]	Taken into account. Text revised.
16294	80	10	80	11	Is it climate change that does this directly, or the conditions that climate change induces that lead people there to draw more water out of the ground? I'd suggest giving a bit of an explanation of what is and is not included. [Michael MacCracken, United States of America]	Noted. Line 10-11 is cited from WGII AR5 Ch.3 as starting point.
3646	80	10	80	21	Section 3.4.4.2.4 ("Groundwater") appears to restrict its scope to expected groundwater declines in dry subtropical regions. What about everywhere else? And is there potential for groundwater resource increases in regions where precipitation is expected to increase under climate change? The passage is inadequate; some additional basic information is needed to provide brief global-scale synopsis. This is particularly important given that groundwater provides a substantial proportion of the water supplies for many countries, including nearly half of the US water supply and over half of the water supply in China, according to estimates I've seen. Start by seeing (and citing) the review article by Green et al. (2011, Journal of Hydrology, 405: 532-560). [Sean Fleming, United States of America]	Noted.
4601	80	11			Italics for "robust evidence, high agreement" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
19031	80	11	80	11	Instead of writing "(robust evidence, high agreement) (AR5 WGII Chapter 3)", please write "(robust evidence, high agreement; AR5 WGII Chapter 3)" [JACQUES-ANDRE NDIONE, Senegal]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4181	80	13		20	The impacts of increased irrigation costs in Bangladesh have had profound socioeconomic impacts. Additionally, most irrigation is powered by diesel which is both costly and bad for climate. Research has shown that a switch to solar powered inverters can help reduce both costs and environmental impacts, highlighting once again the need for low-carbon energy-even to work in tandem with existing energy sources-if we are to improve livelihoods. <a href="https://www.enidaily.com/en/technology_en/sun-pumping-middle-east/">https://www.enidaily.com/en/technology_en/sun-pumping-middle-east/</a> [Michelle Leslie, Canada]	Noted.
11762	80	18	80	21	It isn't clear whether this is a projection or an observation. [David Schoeman, Australia]	Accepted. Text revised.
2569	80	21			Salem et al., 2017 not cited in the literature list, should be check [Xiaojun WANG, China]	Editorial - copyedit to be completed prior to publication
3599	80	21			What does BDT stand for? [Sylvia Sander, Monaco]	Accepted. Text revised.
2582	80	21			Salem et al., 2017 not cited in the literature list, should be check [Xiaojun WANG, China]	Editorial - copyedit to be completed prior to publication
6249	80	21			The reference 'Salem et al., 2017' is missing from the Reference list. [Muhammad Mohsin IQBAL, Pakistan]	Editorial - copyedit to be completed prior to publication
2543	80	21			Salem et al., 2017 not cited in the literature list, should be check [Xiaojun WANG, China]	Editorial - copyedit to be completed prior to publication
4602	80	21			Add explanation of "BDT" [Radim Tolasz, Czech Republic]	Accepted. Text revised.
3647	80	24	80	35	Section 3.4.4.2.4 ("Water quality") is inadequate. Water quality is a far-reaching and diverse question, or in fact, set of questions, one for each water quality parameter (temperature, pH, turbidity, and each of tremendously many possible contaminants, etc). I don't know exactly how this should be addressed in the context of this short summary, but some kind of acknowledgement of how many different issues are really involved here seems necessary. [Sean Fleming, United States of America]	Take into account. Information is added.
9609	80	24	80	35	the effects of climate change on water quality is obvious in some regions, and there are many aspects, such as water N or P content, or loads in river or lake, or hamfur alga break out, pleaseing add content by adding new literatures [Jianguo Wu, China]	Take into account. Information is added.
3851	80	25		40	Lines 25-26 are identical to lines 39-40. [Woonsup Choi, United States of America]	Accepted. Text revised.
17277	80	25	80	40	L25-26 and L39-40 are repeated. [Maria Jesus Iglesias Briones, Spain]	Accepted. Text revised.
4603	80	26			Italics for "medium evidence, high agreement" [Radim Tolasz, Czech Republic]	Accepted. Text revised.
19032	80	26	80	26	Instead of writing "(medium evidence, high agreement) (AR5 WGII Chapter 3)", please write "(medium evidence, high agreement; AR5 WGII Chapter 3)" [JACQUES-ANDRE NDIONE, Senegal]	Accepted. Text revised.
3601	80	29		31	I think it should be said here that the IJsselmeer is below sea level already and that it has been part of the North sea before Flevoland was 'made' arrigivically. I find it would be much more helpful to cite a paper that looks at a more natural freshwater system. Also there are many other parameters determining water quality as chloride concentrations, which is only another way of saying salinity. What about nutrients, or trace metals as a consequence of climate change. [Sylvia Sander, Monaco]	Noted.
2801	80	29	80	40	Delete this sentence because repited [Giacomo Pirlò, Italy]	Accepted. Text revised.
3600	80	30			...duration of the exceedance in Lake IJsselmeer (Andijk, NL) slightly increase to the same degree for GMT rises of 1.5°C and 2.5°C (Bonte and Zwolsman, 2010). [Sylvia Sander, Monaco]	Accepted. Text revised.
4604	80	33	80	34	Add explanation of "DO" [Radim Tolasz, Czech Republic]	Accepted. Text revised.
11763	80	33	80	35	Very poorly constructed sentence [David Schoeman, Australia]	Accepted. Text revised.
3602	80	39		40	This sentence is a full repetition of line 25-26 on the same page. [Sylvia Sander, Monaco]	Accepted. Text revised.
5899	80	39	80	40	Please delete this sentence. This is copied from L25-26P80. [Joan A. Lopez-Bustins, Spain]	Accepted. Text revised.
2155	80	39	80	40	This repeats lines 25-26. [Neville Nicholls, Australia]	Accepted. Text revised.
1436	80	39	80	40	is it linked with "soil erosion"? [Philippe Roudier, France]	Accepted. Text revised.
2977	80	39	80	40	Climate change is projected to reduce raw water quality, posing risks to drinking water quality even with conventional treatment (medium evidence, high agreement) (AR5-WGII Chapter 3). This sentence appears in Lines 25-26 of this page, where it belongs. It should not be repeated here. [Erica Head, Canada]	Accepted. Text revised.
2156	80	42	80	43	Do you mean that the impacts have been increasing (rather than the number of papers)? [Neville Nicholls, Australia]	Accepted. Text revised.
4182	81				Table 3.5 Column: Avoided Risks. Can you please elaborate further on this statement: "changes in socioeconomic conditions might have a stronger influence than the additional half a degree warming." What changes and how could they have a stronger influence? [Michelle Leslie, Canada]	Noted. Table 3.5 is modified.
4605	81				Tab 3.5 - Change "ocean ecosystems" by "freshwater systems" (header) [Radim Tolasz, Czech Republic]	Noted. Table 3.5 is modified.
1157	81	1	81	3	The flood elements are confusing in Table 3.5 - climate drivers to floods are much more complex than "extreme precipitation", as they also interact with soil moisture (thus drying trends), snow melt (thus warming trends) and sea levels. I am also confused by how there is robust evidence and high agreement that floods will increase, but very limited evidence that they have increased up until now - I suspect this is due to over-reliance on climate model projections and the assumptions that extreme precipitation maps directly into increases in flooding. As a result, talking about "the number of people exposed annually to a 20th century 100-year flood is projected to be three times greater for very high emissions than for very low emissions" is quite uncertain, and the subsequent statement that "rises of 1.5C are projected to significantly reduce global exposure to increased flooding compared to impacts under 2.0C..." should not be given robust evidence. I would more confidently say that floods will increase in some places, and decrease in others, depending on the complex intersection of multiple drivers and unique conditions (e.g. climate zones, watershed characteristics) at each location - and that the net global average effect of these factors is still being resolved. [Seth Westra, Australia]	Noted. Table 3.5 is modified.
11070	81	1	81	5	In relation to changes in glaciers, perhaps add that glaciers help to reduce stream warming during periods of hot, dry weather, in addition to their role in sustaining flow, with implications for habitat suitability for cool- and cold-water aquatic species (e.g., salmon). [Robert Daniel Moore, Canada]	Noted. Table 3.5 is modified.
11071	81	1	81	5	An editorial point: this table (3.5) is about freshwater systems, but indicates "key risks to ocean ecosystems" within the table. [Robert Daniel Moore, Canada]	Noted. Table 3.5 is modified.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3648	81	1	81	5	Table 3.5, assessment of renewable surface and groundwater sources: this discussion is limited to supply reductions in dry subtropical regions. What about everywhere else? A key point that's missing from this table (and the report as a whole) is that the increased proportion of wintertime precipitation falling as rain instead of snow under higher temperatures is expected to lead to a significant reduction in manageable water supplies, even if total geophysical water availability remains constant or even increases. Northwestern North America is a great example - the water supply infrastructure is built around the assumption that huge seasonal mountain snowpacks provide an additional natural reservoir for supplies in summer, when it's most needed. But as more winter precipitation falls as rain instead of snow, that natural reservoir is diminished, and thus so too is the total manageable water supply, in spite of the fact that total annual runoff will be constant or increase slightly under climate change in this region. In principle, building more reservoir capacity to carry winter rain inputs over to summer could compensate for this effect, but in practice, such additional dam construction would be costly and exceedingly controversial due to its ecological impacts; in fact, the dominant direction in the US is to decommission existing dams, not to build additional ones. For details, see (and cite) the exhaustive and excellent US Bureau of Reclamation climate change report: Reclamation, SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water, Report to Congress, 2011. For an example of how these changes to reservoir inflows in western Canada have already been occurring, see (and cite) Fleming and Weber (2012, Journal of Hydrology, 470-471: 36-54). Not only will this be a key shift in water resource availability, ecosystem function, and hydroelectric power generation under climate change for much of the western US and western Canada, similar issues will likely be seen in other snow-dominated basins worldwide, so the effect needs to be at least briefly mentioned here. [Sean Fleming, United States of America]	Noted. Table 3.5 is modified.
12396	81	1	81	5	Table 3.5: The first column (updated risk) is a mix of observed and expected impacts, which is a bit confusing - this could be more clearly specified. The practice used in table 3.4 of including updated literature in the first column is not used in table 3.5 - it would be nice if these were consistent. The row on glaciers needs expanding. [Bill Hare, Germany]	Noted. Table 3.5 is modified.
3649	81	1	81	5	Table 3.5, assessment of glacier change impacts on streamflow: I'm really happy to see that this effect has been included in the report, because as mentioned in my comment 3 above, it's so important to the continental "water towers" of the Himalayas, Andes, Alps, Northern Rockies, and so forth. However, the assertion that meltwater yields are expected to increase isn't quite right. Rather, meltwater yields may either increase or decrease, depending on the current state of the particular glacier, which varies on a broad regional basis. For example, warmer temperatures have increased melt generation volume from the giant subarctic glaciers and icefields in the southern Yukon and northwestern British Columbia, producing increasing trends in downstream river flows, whereas the smaller, warmer glaciers in southeastern British Columbia have been gradually producing less meltwater because they have shrunk so much under continued warming trends, leading to negative summer streamflow trends. For a comprehensive review, see (and cite) Moore et al. (2009, Hydrological Processes, 23: 42-61). [Sean Fleming, United States of America]	Noted. Table 3.5 is modified.
10020	82		82		Row 17: Food security is very important subject in this manner. Lobell's study has a very important contribution to the literature but It would be much more helpful to have more studies in this section. Therefore, this section should be more comprehensive. [Nazan AN, Turkey]	The section has been improved
10021	82		82		Row 27: Climate change impacts on crop production and crop yield are globally crucial particularly in some part of the world. This section generally includes crops such as wheat, corn, rice, potatoes. Although these crops are globally very important ,however Mostly local crops and fruits, which have a high share especially for some country's economies such as hazelnut in Turkey, should also be included in this section. Therefore, this section should be more comprehensive and should also include agricultural crops/fruits that are important for some countries. [Nazan AN, Turkey]	Some references have been added. However, almost no studies were found on the impact on fruit production between 1.5 and 2°C.
7170	82	1	82	1	Consider adding a paragraph on energy crops in 3.4.5.1.1 with a reference to 3.7.2.1.1 [Iulain Florin VLADU, Germany]	The paragraph is mainly focused on agriculture for food (i.e. livestock, crops, fisheries). It would be better to describe impact of climate change on energy crops in paragraphs related to land use change or energy
2158	82	4	82	5	I don't think this is extremely difficult. I demonstrated how to do this, using year-to-year differences, back in the mid-1990s. Studies such as Lobell et al have continued to apply this technique. In many ways, it is easier to estimate climate change impacts on food production than on many other sectors. [Neville Nicholls, Australia]	Replaced with "can be"
2157	82	7			Don't know what you mean by "compensation" here. [Neville Nicholls, Australia]	Replaced with "resilience"
12397	82	10			The evidence brought forward in this section is confusing and at times includes contradicting statements side by side. Please revisit and clarify. Furthermore, there is substantial overlap between this section, which should be on observations and the subsequent 3.4.5.2.1. Please avoid repetition:  In addition, key insights from the recent literature that will likely change the conclusions of the section are not included here, e.g. Lesk, C., P. Rowhani, and N. Ramankutty (2016), Influence of extreme weather disasters on global crop production, Nature, 529(7584), 84–87, doi:10.1038/nature16467. Ray, D. K., J. S. Gerber, G. K. MacDonald, and P. C. West (2015), Climate variation explains a third of global crop yield variability, Nat. Commun., 6, 5989, doi:10.1038/ncomms6989. Moore, F. C., and D. B. Lobell (2015), The fingerprint of climate trends on European crop yields, Proc. Natl. Acad. Sci., 201409606, doi:10.1073/pnas.1409606112. Schauberger, B. et al. (2017), Consistent negative response of US crops to high temperatures in observations and crop models, Nat. Commun., 8, 13931, doi:10.1038/ncomms13931. [Bill Hare, Germany]	The section has been rewritten and the references have been added
5111	82	10	82	48	as food security is not a subsection in the section on human systems, this section should address the ways in which socio-economic (and particularly gender) dynamics can influence impacts. i.e. what is the state of scientific literature regarding climate impacts on other crops (those often grown in homestead gardens and intended for household consumption)? The crops cultivated in a household is a very gendered issue -- men usually cultivating crops destined for market; while women often cultivate crops for household consumption. Impacts on other foods -- beyond staples -- will be important to discuss in order to highlight impacts on nutrition. [Tonya Rawe, United States of America]	There is an almost full lack of literature studying the impacts of climate change on crops growth in homestead garden. This is because of the little relevance from an economic point of view and, overall, the lack of clear correlation between plant development and climate due to anthropic interference (i.e. irrigation, greenhouse during winter periods, fertilization, change of soil due to the wide cultivation in pots, etc.).

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16295	82	14	82	14	An aspect that deserves mention here is that only a relatively few nations (6 or so?) generate something like 90+% of the essential grains, etc. that are available on the global market, and that failure in such regions can have important effects on food prices around the world. With the main storm track moving south of Australia's main growing region, with the favorable climate shifting poleward to less adequate soils in the Great Plains of North America, with warming likely to reduce winter snow that is the source of vital soil moisture for grain growing regions of Russia/Ukraine, a growing share of the major grain exporting nations seem to be facing increased stress on their major growing areas as climate extremes tend to increase. This is really a quite nonlinear threat to the world system, especially with world grain stocks being held at quite low levels due to demand and no entity really in charge of maintaining reserves as business pushes to be optimally efficient. I'd suggest that this section simply does not paint the increasingly vulnerable situation the world faces, and this needs to be done. There is really much more to all of this than changes in time averaged per hectare yield, especially with population growth occurring in the importing nations. The Arab Spring and at least some of situation in Syria arose because tightness in the grain markets elevated the cost of food. While what this section covers is valid--it seems to be missing the real significance of what is occurring and could occur. [Michael MacCracken, United States of America]	This is a good consideration. However, only direct data were reported
11764	82	14	82	16	Very poorly constructed sentence [David Schoeman, Australia]	Rewritten
7842	82	14	82	19	More information should be provided to support the statements on the impacts of observed changes in climate on the crop suitability. For example, only one publication was cited for America. Canada plays an important role in crop production. Observed agroclimatic indices showed significant changes in Canada (Qian, B., Zhang, X., Chen, K., Feng, Y. and O'Brien, T. 2010. Observed long-term trends for agroclimatic conditions in Canada. J. Appl. Meteorol. Clim. 49: 604-618. Qian, B., Gameda, S., Zhang, X. and De Jong, R. 2012. Changing growing season observed in Canada. Clim. Change 112: 339-353. doi: 10.1007/s10584-011-0220-8.). [Budong Qian, Canada]	References added
2623	82	14	82	30	link back to the effect on local livelihoods? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Linked added
6250	82	16			The word 'however' is suggested to be deleted. [Muhammad Mohsin IQBAL, Pakistan]	Done
2802	82	18	82	18	A citation referring to Europe is needed [Giacomo Pirlo, Italy]	Citation added
7596	82	21			For this section, it is not clear what emission scenarios these analyses are for. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	All this section is referring to current conditions
12483	82	21	82	24	References on climate and its impacts on rice production must be addressed here. [Jinkyu Hong, Republic of Korea]	Citation added
19230	82	24	82	24	Add "areas" after "high-latitude" [Rubén Retuerto, Spain]	Done
15422	82	24	82	24	Crop productivity enhance under a warmer climate, especially at northern regions as shown in Daliakopoulos et al. (2017). Daliakopoulos, I.N., Panagea, S.I., Tsanis, I.K., Grillakis, M.G., Koutroulis, A.G., Hessel, R., Mayor, A.G., and Ritsema, C.J., 2017. Yield Response of Mediterranean Rangelands under a Changing Climate. Land Degradation & Development. DOI: 10.1002/ldr.2717 [Manolis Grillakis, Greece]	Reference added
11765	82	24	82	24	The sentence is incomplete [David Schoeman, Australia]	Rewritten
12484	82	26	82	37	Kim et al. (2013), which studied rice production and its relationship with climate changes must be addressed here. "Kim et al. (2013) Impacts of climate change on paddy rice yield in a temperate climate, Global Change Biology, 19, 548-562" [Jinkyu Hong, Republic of Korea]	References added
6251	82	27			The word 'suggested' may be replaced with 'reported'. [Muhammad Mohsin IQBAL, Pakistan]	Done
6252	82	30			associated with (not associated to). [Muhammad Mohsin IQBAL, Pakistan]	Done
19231	82	36	82	36	Add "," after "Jiao et al 2016", and after "damage" [Rubén Retuerto, Spain]	Done
7597	82	39			It is important to link this to the argument about what we need to emit to get to 1.5C. The emission pathways is uncertain, which means this section is also a large uncertainty. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Despite the models uncertainties, the results here reported are strongly consistent and mainly based on the higher level of confidence.
20592	82	39	82	42	Some key recent references, as the works by Manderscheid Remy, Durand et al (AgMIP projetc) are worth to be cited. [KENEL DELUSCA, Haiti]	Reference added
20293	82	39	82	48	See also: (1) McGrath and Lobell, 2013, Environ. Res. Lett. 8 (2013) 014054 (9pp); (2) Rosenthal et al., 2014, Plant Science 226 (2014) 136-146; (3) Sakurai et al., Scientific Reports 4, Article number: 4978 (2014). It may also be worth considering the impact of elevated [CO2] on grain quality and human nutrition (e.g. https://elifesciences.org/articles/02245), although of course this impact would be much smaller for pathways consistent with 1.5 deg warming compared to x2 [CO2] scenarios. [Aaron Glenn, Canada]	Reference added
1437	82	40			CO2 effect: depends on the type of crop [Philippe Roudier, France]	Added in the text
12398	82	40	82	41	Can the effect of rising CO2 be expanded upon / quantified? A more detailed discussion of what we know about CO2 fertilization and critical uncertainties should be included in this section. [Bill Hare, Germany]	Done
4359	82	41	82	42	More references. [Gabriel de Oliveira, Brazil]	References added
9263	82	44	82	48	Cite: van Bruggen, AHC. et al. (2015). 'Crop Diseases and Climate Change in the AgMIP Framework', in Rosenzweig, C. and Hillel, D. (eds.), Handbook of Climate Change and Agroecosystems: The Agricultural Model Intercomparison and Improvement Project, Part 1. Imperial College Press, London, pp. 297-330. [Cynthia Rosenzweig, United States of America]	Done
13997	82	51			needs a thorough treatment of heat exposure and thermal limits uin relation to geography, merge with sections below [Elvira Poloczanska, Germany]	We thank the reviewer for the suggestion
12705	82	51	82	55	Both this section and 3.4.5.2.2 need expansion. "Ruminal" means referring to the rumen, not to ruminant species of livestock. Bluetongue is not a disease of the rumen, and in any case, the closely-related African Horse Sickness has also been studied, and is not a disease of ruminants. The references to zoonoses and spread of ticks need citations. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Rewritten and added references
16296	82	51	82	55	And what about the issue of livestock being allocated grain for growth, tightening up the grain markets. That is a trend that will exacerbate overall food production issue. Already there are large amounts of livestock being sold off during dry periods and droughts, so flooding markets at one point and then later very much tightening them. A lot is going on. [Michael MacCracken, United States of America]	Reference added
6253	82	52	82	53	- - - less studied than the food systems.' (instead of '- - - the previous food systems noted.' [Muhammad Mohsin IQBAL, Pakistan]	Corrected as suggested
19033	82	52	82	55	More information can be found in the Special issue Rev. sci. tech. Off. int. Epiz., 27 (2), 2008 [JACQUES-ANDRE NDIONE, Senegal]	More information have been added to the section
19232	82	53	82	53	Add "," after "virus" [Rubén Retuerto, Spain]	Done

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4723	82	53	82	53	ruminant not "ruminal" I think [Nicholas Ogden, Canada]	Corrected as suggested
13998	83	1			this section is not well developed, more specific assessment in relation to temperature needed [Elvira Poloczanska, Germany]	Done
13757	83	1	83	9	in section 3.4.5.1.3 refer to section 3.4.3.1.4 above [Elvira Poloczanska, Germany]	Done
13999	83	4	83	4	suggest oceans in north and south hemisphere as Southern Ocean is a name used for the antarctic ocean [Elvira Poloczanska, Germany]	Done
11766	83	11	83	11	Missing word "on"? [David Schoeman, Australia]	Sentence has been rewritten
1438	83	17			food quality is a part of food security [Philippe Roudier, France]	The section has been rewritten and improved
14000	83	17			link to chapters 4 and 5 for this topic [Elvira Poloczanska, Germany]	Done
17666	83	17	83	22	Food security may not only food supply, but also include distribution and access to food, this causes difficulty as discussed in p.85 line 20-23. Also food diversification may need to be considered. [Perdina Perdinan, Indonesia]	Reference on this topic have been added
9990	83	17	83	22	This is very important part and it should be enriched with more references [Mustafa Tufan Turp, Turkey]	Done
9249	83	17	83	22	In section 3.4.5.1.4 Food security, it might be interesting to add a mention about food security in the Arctic; particularly among indigenous populations who at least partially rely for food on specific traditional animal and plant species, which as mentioned in section 3.4.1 Terrestrial and wetland ecosystems, are experiencing important phenological changes and changes in abundance and range (e.g. declining caribou/reindeer populations). These changes in addition to changes in weather and environmental conditions are causing and are expected to cause difficulties in the procurement of traditional food sources and thus have an impact on food security. [Marie-Jeanne S. Royer, Canada]	Done
19627	83	17	83	22	Have a look at AR5, WGII chapter on food security. When discussing food security good to refer to FAO's four dimensions. Access (price) is just one of those dimensions. [Doreen Stabinsky, United States of America]	References added
5110	83	17	83	22	While quantification of observed impacts on other aspects of food security may not be possible, a discussion of the pathways through which observed climate impacts may then impact other aspects of food security could be useful. i.e. water scarcity and declines in water quality can increase enteropathic disease/illness, reducing utilization of food (and increasing malnutrition); decreases in food production can result in food price rises (this is mentioned briefly) -- negatively impacting access & stability of food supplies; and seen through socio-economic dynamics, these changes in food security can impact certain populations (notably women and children) more heavily. Women are often the last to eat in their households, due to social norms, and children are at greater risk of permanent effects of malnutrition (e.g. stunting) when malnourished at a young age. Alternatively, this discussion may be more appropriate in the section on project impacts on food security. [Tonya Rawe, United States of America]	We thank the reviewer for the suggestion. Many parts of the paragraph have been rewritten
16297	83	18	83	18	This simply is not the case--those previous paragraphs talk about effects on yield, but not at all about cumulative production and changes in demand, much less the resources to pay for food that is needed. This section is wholly inadequate. [Michael MacCracken, United States of America]	The section has been rewritten and improved
12399	83	18	83	22	The food security section is currently very short. Needs to be expanded considerably and updated in particular given the recent imprints of climate related events on crop production such as in 2010. Effects of global trade should be discussed in much greater detail. E.g. Bren d'Amour, C., L. Wenz, M. Kalkuhl, J. Christoph Steckel, and F. Creutzig (2016), Teleconnected food supply shocks, Environ. Res. Lett., 11(3), 35007, doi:10.1088/1748-9326/11/3/035007. [Bill Hare, Germany]	The section has been rewritten and improved
9140	83	18	83	22	This section on food security should also include impacts on fisheries, as these are very important for countries that rely on fish as an important source of protein and nutrients. Food trade should also be considered here (including disruptions from extreme events) - this is particularly important for small islands / countries that import food. [Susanna De Beauville-Scott, Saint Lucia]	The section has been rewritten and improved
12706	83	19	83	19	Phrasing is odd: "to imply quantified effects"? [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	The section has been rewritten and improved
19233	83	20	83	20	Add " " after "Among these" [Rubén Retuerto, Spain]	Done
8837	83	25	83	25	There should be some brief description about the section above. [Lubna Alam, Bangladesh]	The section has been rewritten and improved
13758	83	25	85	47	as this chapter aims to describe risks and adaptations, "adaptation" should also be discussed [Elvira Poloczanska, Germany]	The chapter address impacts on climate change and cannot be too much expanded. Adaptation topic is wide large and vary for different crops.
12400	83	27			Several key references are missing from this section, including on  Effects of temperature increase: Liu, B. et al. (2016), Similar estimates of temperature impacts on global wheat yield by three independent methods, Nat. Clim. Chang., 6(12), 1130–1136, doi:10.1038/nclimate3115. Lobell, D. B., and C. Tebaldi (2014), Getting caught with our plants down: the risks of a global crop yield slowdown from climate trends in the next two decades, Environ. Res. Lett., 9(7), 74003, doi:10.1088/1748-9326/9/7/074003. Müller, C., K. Waha, A. Bondeau, and J. Heinke (2014), Hotspots of climate change impacts in sub-Saharan Africa and implications for adaptation and development., Glob. Chang. Biol., 20(8), 2505–17, doi:10.1111/gcb.12586.  Extreme events: Zhang, Z., Y. Chen, C. Wang, P. Wang, and F. Tao (2017), Future extreme temperature and its impact on rice yield in China, Int. J. Climatol., doi:10.1002/joc.5125. Anderson, C. J., B. A. Babcock, Y. Peng, P. W. Gassman, and T. D. Campbell (2015), Placing bounds on extreme temperature response of maize, Environ. Res. Lett., 10(12), 124001, doi:10.1088/1748-9326/10/12/124001. Furthermore, other anthropogenic impacts relevant in the context of 1.5°C such as the impacts of air pollution on crop yields should be included: Tai, A. P. K., M. V. Martin, and C. L. Heald (2014), Threat to future global food security from climate change and ozone air pollution, Nat. Clim. Chang., 4(September), 817–821, doi:10.1038/nclimate2317. Insar, G. (2014), Reductions in India's crop yield due to ozone, , (October 2013), 799–804, doi:10.1002/2013GL058954.Received. [Bill Hare, Germany]	References added

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7843	83	27	83	47	There are not many published studies on the projected risks and adaptation for a global warming of 1.5 and 2 degree C above pre-industrial levels related to crop production. Most papers cited in this section are more associated with the magnitudes of local temperature changes, thus not necessarily relevant to the 1.5 and 2 degree climate targets. New publications should be used in this section when they become available in coming months. [Budong Qian, Canada]	We thank the reviewer for the suggestion. The most suitable undergoing studies are taken in consideration. However, not many studies can be taken in consideration for this section currently.
1371	83	27	84	2	Sub-section CROP PRODUCTION. Provide confidence levels for statements on 1.5 vs 2 impacts in this section. [GREGORY INSAROV, Russian Federation]	We thank the reviewer for the suggestion. The confidence level used varies depending on the studies reported and the GCM, SSP and crop model used. However, only high level of confidence were considered in order to provide the high level of confidence
5112	83	27	84	2	Again, a socio-economic lens on this section would provide a richer discussion of how climate impacts on food security will manifest. Crop and livestock production among men and women is different; knock on effects of climate impacts on food production will be shaped by socio-economic factors (including gendered differences in access to food at household level). A useful article (with links to further research) on how climate change impacts are filtered through gendered dynamics in agriculture is Krisjanson, et al, "Addressing gender in agricultural research for development in the face of a changing climate" (2017, International Journal of Agricultural Sustainability) - <a href="http://www.tandfonline.com/doi/full/10.1080/14735903.2017.1336411?scroll=top&amp;needAccess=true">http://www.tandfonline.com/doi/full/10.1080/14735903.2017.1336411?scroll=top&amp;needAccess=true</a> [Tonya Rawe, United States of America]	We thank the reviewer for the suggestion.
1439	83	27			this section is all about staple crops: what about cash crops? They contribute to food security as well through securising income. For example, cocoa: see Laderach et al (2013) Predicting the Future Climatic Suitability for Cocoa Farming of the World's leading Producer Countries, Ghana and Côte d'Ivoire [Philippe Roudier, France]	Reference added
11767	83	27	83	47	Lots of material is repeated here [David Schoeman, Australia]	Deleted and rewritten
1372	83	28	83	29	Provide reference for this statement. [GREGORY INSAROV, Russian Federation]	Done
12401	83	28	83	32	Do these impacts on maize and wheat yields include the effects of CO2 fertilization? [Bill Hare, Germany]	Rewritten and specified
9131	83	28	84	2	Since no study on economic impact is referred, I recommend to include the following study about economic impacts of changes in crop production under 1.5 degree C. They found that the differences in economic impacts between the 1.5 and 2.0°C temperature-increase scenarios are not temporally and geographically obvious. Globally, both temperature scenarios show a declining trend, which represents a positive effect. However, importantly, the magnitude of the GDP change is tiny (less than 0.01% eventually).  Fujimori S., Iizumi T., Hasegawa T., Takakura J., Takahashi K., Hijikata Y., Macroeconomic impacts of climate change associated with changes in crop yields. Climatic Change, under review. [Tomoko Hasegawa, Japan]	Paper not published yet
6254	83	30			Please add the word 'are' between 'but significantly'. [Muhammad Mohsin IQBAL, Pakistan]	Done
9325	83	34	83	34	The word "that" should be inserted between words AR5 and "focused" in "There are few studies since AR5 focused" [Siir KILKIS, Turkey]	Done
622	83	34	83	47	Probably the following reference can be a useful input for this section. A modeling study linking the global mean temperature change from preindustrials to global mean yields of major crops (Iizumi et al., 2017) reveals that the negative impacts on yields of maize and soybean under 1.5 degree C warming are smaller than those under 2 degree C. The global mean rice yield under 2 degree C is anticipated to be higher than that under 1.5 degree C (rice would receive more benefits from 2 degree C than from 1.5 degree C). No clear difference in the impacts is detected for wheat on a global mean basis. The differences in yield impact between 1.5 and 2 degree C are comparable in the magnitude to the differences in yield associated with different socioeconomic assumptions (SSP1, 2 and 3).  References: Iizumi, T., Furuya, J., Shen, Z., Kim, W., Okada, M., Fujimori, S., Hasegawa, T., and Nishimori, M., 2017: Responses of crop yield growth to global temperature and socioeconomic changes. Scientific Reports, 7, 7800, doi: 10.1038/s41598-017-08214-4. [Toshichika Iizumi, Japan]	References added
12485	83	34	83	47	Studies on rice production must be addressed because rice is one of important crops for food security. [Jinkyu Hong, Republic of Korea]	Done
9264	83	34	83	57	Heads up, two papers coming from AgMIP on Coordinated Global and Regional Assessments (CGRA) of 1.5 and 2.0 °C: Rosenzweig et al., 2017 and Ruane et al., 2017 AgMIP CGRA results show that at the global scale, mixed areas of positive and negative simulated yield changes, with declines in some breadbasket regions led to overall declines in productivity at both 1.5°C and 2.0°C (Rosenzweig et al., 2017 Submitted). [Cynthia Rosenzweig, United States of America]	Citation added
6255	83	35			[Schleussner et al. 2016c) project - - -' is suggested to be changed to 'Schleussner et al. (2016c) projected - - -'. [Muhammad Mohsin IQBAL, Pakistan]	Done
12402	83	38	83	44	The paragraph could be better introduced to explain how temperature and CO2 have different projected impacts on crop yield, and what might be the combined effect. It should be clearly stated where the different results apply (some specify e.g. Africa, but others do not) [Bill Hare, Germany]	Section as been partly rewritten
4606	83	39			Use "t ha-1" instead of "Mg ha-1". [Radim Tolasz, Czech Republic]	Done
20294	83	43	83	47	Suggest deleting or paraphrase, this is repeated almost word for word from Page 82, line 27 to line 30. [Aaron Glenn, Canada]	Done
6256	83	43	83	47	The phrase 'Abebe et al. (2016) suggested - - of +3C.' under para 3.4.5.2.1 Crop Production is exactly repeated under the Observed impacts and adaptation, under Para 3.4.5.1.1 Crop production. Please reconcile. [Muhammad Mohsin IQBAL, Pakistan]	Deleted
4607	83	43	83	47	The identical text with p. 82, line 27-30. [Radim Tolasz, Czech Republic]	Deleted
4183	83	49		57	Changes in precipitation and wind will also have significant impacts on crop productivity. Warmer winters could allow for the spread of more pests and disease. Extreme heat, drought, cold spells during growing seasons and heavy rainfall during harvest periods could all have a significant impact on the agricultural sector. There are adaptation measures in place and even scientific methods which alter the DNA of plants in order to make them more resistant to climate change. See the IAEA. [Michelle Leslie, Canada]	We thank the reviewer for the suggestion. However, it is really hard to analyse so in detail the several adaptation strategies. Do exist several strategies which consider measures taken in account change in field conditions (mulching, change in sowing date or cultivar), satellite observation, precision agriculture, DNA modification. It would be need a specific Special Issue just for these.
9873	83	49	83	51	The chapters of the TDTH2 and TDTH3 reports have also been updated and published as peer-reviewed papers in Regional Environmental Change (Volume 17 Issue 6). [Christopher Reyer, Germany]	We thank the reviewer for the suggestion.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19034	83	49	84	2	Regarding Sub-saharan Africa, specially West Africa, please Authors can visit papers leaded by Benjamin Sultan [JACQUES-ANDRE NDIONE, Senegal]	Reference added
19234	83	52	83	52	Change "infurther" by "in further" [Rubén Retuerto, Spain]	Done
6257	83	53			The word 'results in a - - ' is suggested to be changed to 'will result in - - ' . [Muhammad Mohsin IQBAL, Pakistan]	Done
623	83	55	83	55	soy yields. Please consider using consist wording, soybean or soy. [Toshichika Iizumi, Japan]	Done
12403	83	55	83	56	This is not correct. Schlessner et al. (2016) emphasize the uncertainty related to CO2 fertilization effects thereby showing results for fertilization and non-fertilization side by side. This should be reflected here. [Bill Hare, Germany]	Corrected and rewritten
5478	84	6		25	Please check language and reduce the paragraphs [Aliyu Barau, Nigeria]	Done
12404	84	6	84	25	The paragraphs on livestock are lacking a mention of 1.5 or 2, or different levels of warming. [Bill Hare, Germany]	Few studies have been reported on the different level of warming
12707	84	6	84	25	A useful additional reference for this section would be Rivera-Ferre, M. G., et al. "Reframing the climate change debate in the livestock sector: mitigation and adaptation options." Wiley Interdisciplinary Reviews: Climate Change 7.6 (2016): 869-892, which makes the point that impacts will take place within livestock systems, which show major variations. The first sentence of the section is taken verbatim from AR5 WG2 Ch.7 - the authors should check their citation practices. An issue not covered here, or to my knowledge in academic writing on climate change, is the risk of damage to industrial livestock production by tropical storms. If one accepts that storms will increase in intensity it is reasonable to project that this risk will increase. An example is pig production in North Carolina, which has been severely affected by hurricanes Fran (1996) Floyd (1999) and Matthew (2016). <a href="http://grist.org/food/why-the-heck-are-there-pig-farms-in-the-path-of-hurricanes/">http://grist.org/food/why-the-heck-are-there-pig-farms-in-the-path-of-hurricanes/</a> is a journalistic account. The 90s hurricanes are covered very much in passing by Brad Weiss, Real Pigs, Duke UP. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Section has been rewritten
14001	84	9	84	9	for which regions?? [Elvira Poloczanska, Germany]	Added in the text
14002	84	11	84	12	This is hold everywhere or just in some regions? [Elvira Poloczanska, Germany]	Added in the text
14003	84	15	84	15	give examples of regions [Elvira Poloczanska, Germany]	Added in the text
14004	84	18	84	20	Link to freshwater resources section here [Elvira Poloczanska, Germany]	Done
9610	84	28	84	56	clearing the effects of 1.5°C above pre-industrial levels [Jianguo Wu, China]	Done
7488	84	28	85	16	This sub-chapter should preferably focus on food production and food security issues of the marine environment, while ecosystem aspects fit better in 3.4.3. Where necessary references to 3.4.3 could be made here. Also check these two sub-chapters for unnecessary overlap/repetition [Øyvind Christophersen, Norway]	We thank the reviewer for the suggestion. Some references have been shifted
19236	84	33	84	33	Insert space before "At" [Rubén Retuerto, Spain]	Done
19035	84	33	84	33	Instead of writing "Hollowed et al. 2013; King et al. 2015).At the global scale, projections suggested that climate change could", please write "Hollowed et al. 2013; King et al. 2015). At the global scale, projections suggested that climate change could". [JACQUES-ANDRE NDIONE, Senegal]	Done
9326	84	35	84	35	The word "to" should be inserted between "lead" and "significant" in "could lead significant" [Sir KILKIS, Turkey]	Done
4608	84	37			Change "Vietnam" by "Viet Nam" - see <a href="https://www.un.org/depts/dhl/unms/vietnam.shtml">https://www.un.org/depts/dhl/unms/vietnam.shtml</a> [Radim Tolasz, Czech Republic]	Done
14005	84	37	84	37	couldn't these sections be merged? [Elvira Poloczanska, Germany]	No
14006	84	44	84	45	Check Deutsch et al. 2015. Science on temperature oxygen interactions on stocks [Elvira Poloczanska, Germany]	Reference added
2159	84	48			Poor English. [Neville Nicholls, Australia]	Rewritten
19237	84	48	84	48	Remove "include risks" [Rubén Retuerto, Spain]	Done
9327	84	48	84	48	There is a missing word "that" in the phrase "Other projected risks include risks are large in the case" [Sir KILKIS, Turkey]	Done
5524	84	48	84	48	Other projected risks include risks are large... makes no sense. [Ismael Nunez-Riboni, Germany]	Rewritten
14007	84	48	84	48	sentance unclear [Elvira Poloczanska, Germany]	Rewritten
11768	84	48	84	48	Typos in the opening words of the sentence [David Schoeman, Australia]	Done
12405	84	51	84	52	Long-term should be defined [Bill Hare, Germany]	Replaced by "Over time"
19235	84	54	84	54	Change "genral" by "general" [Rubén Retuerto, Spain]	Done
14008	84	55	84	56	present or future, provide clarity [Elvira Poloczanska, Germany]	Deleted
2160	85	1			No, understanding the risks does not depend on whether the increases are sudden or gradual. It is the risks themselves that depend on this. [Neville Nicholls, Australia]	Deleted
14009	85	4	85	4	do you mean extreme temperature events? [Elvira Poloczanska, Germany]	Rewritten
7489	85	9	85	16	Please consider including this in the executive summary [Øyvind Christophersen, Norway]	We thank the reviewer for the suggestion
2161	85	9	85	16	the way this paragraph is expressed, as "avoided risks between 1.5 and 2C" will confuse most readers. It sounds like the risks are reduced if we have more warming (2C). Surely there is a better way to frame and answer this question? [Neville Nicholls, Australia]	Rewritten
12406	85	9	85	16	Is there any quantification of the reduced impacts for fisheries? [Bill Hare, Germany]	Unfortunately still few studies are currently well quantifying this issue
19238	85	14	85	14	Change "of from" by "of" [Rubén Retuerto, Spain]	Done
7598	85	19			Consider revising the title of this section. 'Food security' is also the title of section 3.4.5.1.4 [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
14010	85	19			Aspects of food security are dealt with in chps 4 and 5. Also, shouldn't this section be under section 3.5 human systems????? [Elvira Poloczanska, Germany]	Section has been restructured.
1387	85	19	85	47	I miss a mention related to cascading climate impacts, e.g. forest fires in Russia created a ban on exports for a while, what caused major impacts in international food commodity markets. [Roger Cremades, Germany]	In this section it is really hard to do considerations on the several impacts which involve other context than agriculture (i.e. environment, market, socio-economic, etc.). This part is more focused on CC impacts on agriculture. Obviously this would lead to related issues which, however, cannot be addressed in this paragraph.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5113	85	19	85	47	This section could consider how climate change impacts will ripple through food systems and value chains (from production, sale, processing, purchase, and consumption) to have impacts on food security. Several studies and articles may be useful here -- (Springmann, et al, 2016, Lancet -- cited elsewhere in the chapter) "Global and regional health effects of future food production under climate change" ( <a href="http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01156-3/fulltext">http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01156-3/fulltext</a> ) references impacts on crops other than staples and resulting impacts on dietary diversity (utilization, as one other aspect of food security than availability) and (Gillespie and van den Bold, 2017, Global Challenges) "Agriculture, Food Systems, and Nutrition: Meeting the Challenge". If food systems and value chains are considered and are layered with climate impacts, the discussion can be a richer one that addresses the pathways through which climate change impacts on food systems will have further impacts on food security (pathways like impacts on water --> utilization of food; impacts on production --> dietary diversity; impacts on availability + social dynamics at household level --> impacts on access). The UNICEF nutrition framework and the TANDI framework (see Gillespie & van den Bold) also provide a useful frame for considering how climate change will impact other aspects of food security. [Tonya Rawe, United States of America]	We thank the reviewer for the suggestion that would be taken in consideration
12407	85	20	85	23	Repetitive from earlier food security section - can these be consolidated? [Bill Hare, Germany]	Rewritten
17278	85	20	85	47	I think a mention here to trading and regulations about the origin of the food (e.g. horse meat and beef meet, foreign products disguised as local produced, etc.) would be convenient. [Maria Jesus Iglesias Briones, Spain]	Thank you for the suggestion, however investigating this could result a little out of the main topic of the section
20593	85	21	85	23	Review wording: when talking about food security components, it's common to consider: availability, accessibility, utilization and stability. As stated, it's difficult to understand [KENEL DELUSCA, Haiti]	The section has been rewritten and improved
1384	85	22			I would suggest to change "availability to" to "availability, to" for improving readability [Roger Cremades, Germany]	The section has been rewritten and improved
3852	85	22		23	It is difficult to figure out exactly what is due to what. [Woonsup Choi, United States of America]	The section has been rewritten and improved
2162	85	25	85	27	Why are you talking about 4C warming? [Neville Nicholls, Australia]	The section has been rewritten and improved
1669	85	25	85	27	Changes in dietary patterns will make Asian and African food security and self-sufficiency more dependent on international trade in the future which would further be exacerbated due to climate change. Please see Pradhan et al. 2014 ES&T. [Pradhan Prajal, Germany]	Authors agree with the reviewer comment. However this consideration should be more suited for paragraph related to the link between economy and agriculture. It should be open a big issue related all the linkages between several cropping systems, regions and local and global market. This cannot be done in this section focused at summarizing the best findings
12708	85	25	85	27	This sentence concerns a 4oC rise. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	The section has been rewritten and improved
9129	85	25	85	27	It would be better to include adaptation effects on food security. For example, I recommend include this study: Hasegawa et al (2014) assessed effects of climate change and adaptation on the food security and risk of hunger using a set of scenarios of different climate conditions (RCPs) and socio-economic condition (SSPs). Farmers' changes in crop varieties and planting dates are considered as adaptation measures to climate change. They found that i) climate change negatively affects future risk of hunger but the degree of the impacts depends on socioeconomic conditions such as population and economic development rather than climate conditions, and that ii) future adaptation will significantly reduce the effect on hunger regardless of socioeconomic and climate conditions.  Hasegawa T, Fujimori S, Shin Y, Takahashi K, Masui T, Tanaka A. Climate Change Impact and Adaptation Assessment on Food Consumption Utilizing a New Scenario Framework. Environmental Science & Technology 2014, 48(1): 438-445. [Tomoko Hasegawa, Japan]	Reference added
14011	85	25	85	27	AR5 says risks become high above 1.5°C [Elvira Poloczanska, Germany]	This is partly true. For cropping systems the risk are globally higher. However, for some cropping systems it depends on several context such as type of crop, regions, management, etc.
9611	85	25	85	47	clearing the effects of 1.5°C above pre-industrial levels [Jianguo Wu, China]	Magnitude of effects obviously depend on GCM, SSP and crop/an economic models used. In general, for cropping systems the risk are globally higher. However, for some cropping systems it depends on several context such as type of crop, regions, management, etc.
3878	85	27	85	27	The African Sahel is one of the most vulnerable areas in the world to food insecurity. Climate change could make that worse. Please add text that reads something like "Projected substantial decreases in crop yields in the African Sahel, a region where many rural people are subsistence farmers, with warming of 2°C or greater (Sultan and Gaetani 2016) could greatly increase the risk of food shortages and low nutrition." Sultan, B. and M. Gaetani. 2016. Agriculture in West Africa in the Twenty-First Century: Climate change and impacts scenarios, and potential for adaptation. Frontiers in Plant Science 7: 1262. doi: 10.3389/fpls.2016.01262. [Patrick Gonzalez, United States of America]	Reference has been added
6258	85	29			annual rate of change of --- (instead of 'annual rates of changes of ---'. [Muhammad Mohsin IQBAL, Pakistan]	Done
19036	85	29	85	29	The reference "von Lampe et al. (2014)" should be included in References section [JACQUES-ANDRÉ NDIONE, Senegal]	The reference has been deleted
2165	85	29	85	37	The differences between von Lampe and Lotze-Campen results are huge. Why? You can't just cite their results and not comment on why they are so different. [Neville Nicholls, Australia]	The section has been rewritten
9130	85	29	85	37	I recommend include the following study: Hasegawa et al. (2015) compared impacts of climate change and mitigation on food security, and found that the strong mitigation measures aiming at attaining the 2°C target have large negative impacts on the food security or hunger particular in the low-income countries. They showed that total negative impacts on food calorie intake and risk of hunger in a stringent mitigation scenario (RCP2.6) is much larger than that in the scenario where climate change progress the most (RCP8.5). This effects of mitigation is caused mainly by heavy use of bioenergy and mitigation costs. This study shows necessity of taking into account the negative impacts of mitigation measures and the remediation cost of the mitigation impacts. As such, this study provides a new perspective to evaluate future mitigation measures.  Hasegawa T, Fujimori S, Shin Y, Tanaka A, Takahashi K, Masui T. Consequence of Climate Mitigation on the Risk of Hunger. Environmental Science & Technology 2015, 49(12): 7245-7253. [Tomoko Hasegawa, Japan]	Reference added
6259	85	30			(Nelson et al. 2014a) agreed --- is suggested to be changed to 'Nelson et al (2014a) agreed ---'. [Muhammad Mohsin IQBAL, Pakistan]	Done
2163	85	31			What does this sentence mean? I don't understand this: "...whilst Nelson argued as differences in the price effects of climate change are accompanied by differences in land use change." [Neville Nicholls, Australia]	The section has been rewritten



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6260	85	31			The phrase 'as differences in the price effect of - - -' is suggested to be changed to 'that differences in price impacts of - - -'. [Muhammad Mohsin IQBAL, Pakistan]	Done
4609	85	32			Leave out "y" [Radim Tolasz, Czech Republic]	Done
1440	85	32			price change in the future depends completely on if you take CO2 fertilization effect into account or not (as underlined in the AR5), The results that are quoted in this report are for no CF effect, [Philippe Roudier, France]	The section has been rewritten and improved
2164	85	35			Why are you discussing the impacts of demand for bioenergy on food prices? Surely that isnt a result of warming of 1.5 or 2C? [Neville Nicholls, Australia]	Deleted
1385	85	35	85	37	In my opinion, a comparison of percentages of prices and yields in the same sentence might give false impressions, instead, it could be more informative to compare prices with prices, and yields with yields, and when possible based on the same scenarios. [Roger Cremades, Germany]	Several scientific studies reported a comparison between yield and prices. It is really hard to report prices to prices if this has not been reported by the studies included into these studies. If IPCC authors would try to turn price to food or vice versa using an approach dissimilar to that reported by authors of these studies, some mistakes would be possible (i.e. erroneous data).
1441	85	36			Lotze-Campen et al. (2014) by comparing five agro-economic models suggested that the overall 35 impacts of high demand for second-generation bioenergy on global food prices are rather modest... =>please be careful with such statements. As this paper underlines "However, potential future scarcities of water and nutrients, policy-induced restrictions on agricultural land expansion, as well as potential welfare losses have not been specifically looked at in this exercise." Moreover they do not include speculation on futures market; And as demonstrated by lagi et al (2011) (The Food Crises: A quantitative model of food prices including speculators and ethanol conversion) for the 2008 food crisis ethanol conversion and speculative investment are the main drivers of the price shocks. [Philippe Roudier, France]	The section has been rewritten and improved
14012	85	37	85	37	Unclear what the 25% stand for [Elvira Poloczanska, Germany]	Deleted
5479	85	39			west Africa and not Africans [Aliyu Barau, Nigeria]	Deleted
1386	85	39	85	47	I miss a mention to climate-smart agriculture, increasing yields in the context on co-beneficial adaptation and mitigation practices. [Roger Cremades, Germany]	Corrected and rewritten
12709	85	39	85	47	This paragraph is rather clumsily written, not very specific to a 1.5oC rise, and strays rather unsystematically into adaptation. If agricultural adaptation is to be discussed here, this is hardly a full account of the literature. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	The paragraph has been completely rewritten
1670	85	40	85	44	Location specific inputs and management strategies is required to improve the crop yields beyond application of fertilizer and irrigation water. Please see Pradhan et al. 2015, PloS One. [Pradhan Prajal, Germany]	The paragraph has been completely rewritten
2166	85	41			Do you have evidence that in Africa climate change will "unequivocally hurt agriculture"? The use of the word "unequivocally" does not sit well with the word "appears", which you use in the same sentence. For "unequivocally" you need a lot of evidence. [Neville Nicholls, Australia]	Rewritten
11769	85	42	85	44	This sounds very "top-down" [David Schoeman, Australia]	Deleted
1442	85	42	85	47	I don't really see the link with the +1.5C target? [Philippe Roudier, France]	Added in the text
12408	86	1	86	5	Table 3.6: There should be a row in the table for food security / fisheries [Bill Hare, Germany]	Tables are being revised in final draft
5480	86	8			better use MENA - Middle East and North Africa as title of box 3.7 please consider reducing the box word count [Aliyu Barau, Nigeria]	Rejected - not all the MENA is concerned by the box
9991	86	15	86	15	Change "... the Mediterranean basin" with " the Mediterranean Basin" [Mustafa Tufan Turp, Turkey]	Editorial
5900	87	25	87	32	A very interesting paper by a Syrian researcher on recent Syrian droughts and current conflict in the country is coming to light soon in Atmospheric Research: Mathbout et al. (in press), Spatial and temporal analysis of drought variability at several time scales in Syria during 1961-2012 Atmospheric Research [Joan A. Lopez-Bustins, Spain]	Taken into account: reference added at end of §4
1388	87	25	87	53	Since this is subject to major controversy, I would be careful, and avoid expressions and terms like "it cannot be denied" and "significant" (in science this word is reserved for statistical evidence supporting facts). [Roger Cremades, Germany]	Accepted - Replaced by '...relationship, drought played an important role...'
20295	87	26			Delete extra period at end of sentence [Aaron Glenn, Canada]	Editorial
19239	87	26	87	26	Remove one "." [Rubén Retuerto, Spain]	Editorial
19088	87	26	87	26	There is a point too much at the end of this sentence. [Wim Thiery, Switzerland]	Editorial
11770	87	26	87	26	Two full stops [David Schoeman, Australia]	Editorial
2167	87	31			I do not see that the fact that the drought was the longest in 900 years necessarily means it had a "significant role in triggering the crisis". I have no doubt that it did play a role, but not just because it was a severe drought - you need to explain the linkages better. [Neville Nicholls, Australia]	Rejected - it is both the longest and the most intense
11771	87	34	87	35	The comparison of the situation to the fall of civilizations in the Bronze Age could be viewed as a little insulting...? [David Schoeman, Australia]	Taken into account: but I do not understand why
1389	87	34	87	43	Very interesting, still some additional mentions of dates in the timeline would help the less informed reader in these sentences: "Most of the coastal cities of Eastern Mediterranean were destroyed, burned, and often left unoccupied thereafter, putting an end to the elaborate network of international trade that had ensured prosperity in the Aegean and the eastern Mediterranean. The rural settlements that emerged mainly persisted through adapted agro-pastoral activities and limited long-distance trade (Kaniewski et al. 2015b). Drought may have hastened the fall of the Old World by sparking famine, invasions and conflicts, leading to the political, economic and cultural chaos referred to as the 'Late Bronze Age crisis'." [Roger Cremades, Germany]	Taken into account - text has been slightly modified
19240	87	46	87	46	Change "period" by "periods" [Rubén Retuerto, Spain]	Editorial
6261	87	47			- - - 10m-decrease in the water level - - -' (not10m-decrease on the water level - - -). [Muhammad Mohsin IQBAL, Pakistan]	Editorial
1390	87	48			Impact on wheat and barley production was maximum in Iraq and Syria, good, still I would suggest to mention a date. [Roger Cremades, Germany]	Accepted - I propose to write '...was the highest in Iraq and Syria in 2008'
1391	87	48			Beware Euphrates is written with a minor typo (without s). [Roger Cremades, Germany]	Editorial
19241	87	48	87	48	Change "Euphrate" by "Euphrates" [Rubén Retuerto, Spain]	Editorial
11772	87	48	87	48	"Greatest", not "maximum" [David Schoeman, Australia]	Taken into account - see comment 1390

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19242	87	51	87	51	Change "leads" by "lead" [Rubén Retuerto, Spain]	Editorial
2482	88		88		Should begin chapter with Section 3.5–human risks, followed by Section 3.6 or even Box 3.12 and Box 3.13 (scenarios). Again, the point would be to grab readers attention, followed by evidence/data/ justification [Lisa Lucero, United States of America]	Sections 4 and 5 were combined and reorganized
5481	88	1			Observed impacts and projected risks ON human systems replace with ON [Aliyu Barau, Nigeria]	Sections 4 and 5 were combined and reorganized
12409	88	1			A number of examples in this section are very Europe-focused. e.g. for tourism there is no mention of small islands / anywhere in Asia / Africa / Latin America / Central America. It's also not clear why some examples are given, and the text jumps around a lot between examples. [Bill Hare, Germany]	The focus of the chapter is on the risks of warming of 1.5 and 2C. Unfortunately, the literature is limited with this focus.
14013	88	1			writing could be specified by discussing risk changes in relation to projected temperature. [Elvira Poloczanska, Germany]	Time slices were converted to temperature change.
12710	88	1			I declare an interest as one of the CLAs of the relevant AR5 chapter, and I would agree that the chapter is more discursive and has fewer headline findings than neighbouring AR5 chapters, but the absence of a sub-section on rural areas is unfortunate. Many of the AR5 WG2 Ch.9 findings overlap with other chapters (on infrastructure, tourism, migration), but findings on biophysical impacts on important non-food crops, particularly the beverage crops (also covered in some regional chapters), are extremely significant and deserve to be highlighted here. More arguably, Ch.9 findings on the vulnerability of specific rural livelihood niches - pastoralism, mountain farming, artisanal fisheries - are relevant under projected risks. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	These are important points that will be considered in the AR6. The focus of this special report is on the risks of warming of 1.5 and 2C. A statement on the context was added.
13759	88	3			This whole section is totally reliant on just one publication [Elvira Poloczanska, Germany]	The section is a summary of the baseline for the subsequence assessment.
514	88	5	88	7	The human systems assessed in AR5 are not exactly the ones assessed here (e.g. rural areas). Please rephrase. [David Docquier, Belgium]	Changed.
13760	88	5	88	7	Where is assessment of rural areas, and what/where are the subsections 3.5.6 and 3.5.7? [Elvira Poloczanska, Germany]	There is no literature on the risks to rural areas at warming of +1.5 and 2C. A statement was added to this effect.
540	88	5	88	27	This section neglects but should include the impacts of higher temperatures and higher water vapor due to CO2 and other global warming agents on increasing air pollution mortality by increasing ozone in locations where ozone is already high and by increasing wildfires and the emission rates of biogenic gases that turn into particles. Please see the following references and further citations within (1) Jacobson, M.Z. On the causal link between carbon dioxide and air pollution mortality, Geophysical Research Letters, 35, L03809, doi:10.1029/2007GL031101, 2008; (2) Jacobson, M.Z., The enhancement of local air pollution by urban CO2 domes, Environ. Sci. Technol., 44, 2497-2502, doi:10.1021/es903018m, 2010 [Mark Jacobson, United States of America]	Agree that air quality is an important health risk in a changing climate. However, Cramer et al. did not include air quality as a key message.
7323	88	6	88	6	Delete the text "human security". [Eleni Kaditi, Austria]	Changed to migration and conflict.
13761	88	7	88	8	rewrite these sentences, hard to make sense of [Elvira Poloczanska, Germany]	Sentence edited.
9876	88	11	88	28	under this bulleted list of impacts on human systems, I would like to see included some mention of mental health: threats to mental health associated with extreme weather events as well as with migration. I don't know if it fits best in this chapter but I would also like to see some reference to impacts on social relations, such as increases in conflict and inequality. Finally, it may not belong in this list but there is no mention of threats to health from decreases in air quality and expanded disease vectors. [Susan Clayton, United States of America]	Agree that mental health is an important health risk in a changing climate. However, Cramer et al. did not include mental as a key message.
16298	88	11	88	28	Where is mention of disruption of cultural communities, Indigenous communities and cultures, heritage sites, the need for relocation of coastal communities and cities, etc.? Staying alive is important, but so are social connections and linkages. [Michael MacCracken, United States of America]	Cramer et al. did not include a key message on these issues.
13762	88	11	88	28	AR5 WGII report also refers to: psychological/emotional distress, solastalgia, mental suffering including post traumatic stress disorder, heat related violence. These are not mentioned here, why not? [Elvira Poloczanska, Germany]	These were mentioned within the AR report but Cramer et al. did not include any key messages on these issues.
2763	88	17			and in megacities by the island heat effect [Jonathan Gómez Cantero, Spain]	This was not included in the key messages from Cramer et al. 2014
2764	88	29			it would be important to add "a problem for security and international relations" (water, food, wars ...) [Jonathan Gómez Cantero, Spain]	This was not included in the key messages from Cramer et al. 2014
2303	88	29	88	29	A new Risk of increase of human health effects due to urban pollution and changes in the atmospheric dynamics and chemistry should be added. [Begoña ARTIÑANO, Spain]	This was not included in the key messages from Cramer et al. 2014
4925	88	34	88	38	Damage or loss of cultural heritage is another factor of climate change with diverse and intersecting repercussions - including loss of social memory, social identity and cohesion, scientific information, and tourism revenue. Recommend that this concept be incorporated here. Relevant reference is: Markham, A., Ospova, E., Lafrenz, Samuels, K. and Caldas, A. (2016). World Heritage and Tourism in a Changing Climate. United Nations Environment Programme, Nairobi, Kenya and United Nations Educational, Scientific and Cultural Organization, Paris, France. [Marcy Rockman, United States of America]	This was not included in the key messages from Cramer et al. 2014
14014	88	41			The climatic discussion on urban areas in 3.3 (eg UHI, sealevel rise) needs to be linked to text here or sections merged [Elvira Poloczanska, Germany]	Taken into account - text revised. Page 3-27 line 25 to page 3-28 line 15, moved to 3.5.2.2 Projected risks at 3.5.2.2 Projected risks at 1.5°C versus 2°C and adaptive capacity
2355	88	41	90	14	Urban Areas. This whole section is very important to policy makers and end-users. From an end-user perspective, especially that of practitioners who are designing and building the urban space through infrastructure design this section lacks real world practical examples. Also there needs to be some estimates of the cost of building resilience into the urban space as well as any projected losses from climate events. Issues such as asset system design have not been included as well as how responses to climate impacts are being included into urban design. In its current form this section lacks any sense of usefulness or provides any coherent estimates of losses and gains. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Take into account - (1) Adaptation cost-benefit estimates are addressed in Chapter 4; (2) buildings, and urban design and green urban areas as adaptation options are addressed in Chapter 4 (4.3.4)
9612	88	44	88	55	give some examples related to observed changing in flood in city or heat island effects in some regions. [Jianguo Wu, China]	Example of New York City coastal flooding during Hurricane Sandy added.
2343	88	48	88	49	heat island effects [Trypolska Galyna, Ukraine]	That is not an extreme weather and climate event, and the consequences are captured later in the sentence.
19243	88	49	88	49	Insert ", " after "quality" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
7559	88	51	88	51	I propose to include clay soils issues that have strong impact on urbanized areas ? These can be compounded by geo-hydrological hazards, such as landslides, expansion and retraction of clay soils and saltwater intrusion [Julia Hidalgo, France]	Mention of soil composition added.
2168	89				How was Fig 3.20 derived (or is it 3.21, since the figure numbers in the captions are often different to the ones you use in the text)? [Neville Nicholls, Australia]	Taken into account and corrected figure numbers included.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19083	89		89		Resolution of figure 3.20 page 3-89 [Fathy Elbehiry, Egypt]	Editorial - higher resolution graphic replaced and graphic design to be updated with copyedit prior to publication
20674	89		89		Fig. 3-20 is too blurry, needs better quality [Deborah Ley, Guatemala]	Editorial - higher resolution graphic replaced and graphic design to be updated with copyedit prior to publication
2765	89	4			will increase mortality in cities in extreme heat episodes (+ 38 ° C) [Jonathan Gómez Cantero, Spain]	Take into account - combined with 2727
2766	89	4			The population is getting older, there is more vulnerability. During waves of extreme heat, the supermortality rises 55% [Jonathan Gómez Cantero, Spain]	Taken into account - covered in human health section 3.5.4, for example p 3-94, lines 34-35
7067	89	5		11	One could explain methodological uncertainties in downscaling results from GCM using RCMs (cf. Nik VM, Hydrothermal simulations of buildings concerning uncertainties of the future climate (2012), for a study of the implications for the Swedish building sector), and even provide recommendations on established climate scenarios per region for an homogeneous assessment of the 1.5C pathways. [Erika Mata, Sweden]	Reference added.
11774	89	8	89	8	Here and elsewhere, use the degree sign, rather than the word [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
1373	89	14	89	14	Should it be Figure 3.20, not Figure 3.21? [GREGORY INSAROV, Russian Federation]	Corrected (Editorial - additional copy edit to be completed prior publication).
8838	89	14	89	14	Figure 3.21 is wrong should be Figure 3.20. [Lubna Alam, Bangladesh]	Corrected (Editorial - additional copy edit to be completed prior publication).
13763	89	14	89	14	revise numbering of Figure in the text [Elvira Poloczanska, Germany]	Corrected (Editorial - additional copy edit to be completed prior publication).
11775	89	18	89	18	Is "non-poor" really the best term here? [David Schoeman, Australia]	Taken into account - text revised to remove 'non-poor' reference.
9267	89	22	89	24	Expand section on SRL risks. Cite Bader et al., 2018 [Cynthia Rosenzweig, United States of America]	Added to observed impacts
1197	89	24			This is a great graphic and could form the basis of a series of graphics that summarise key messages in sections examining differential impacts and avoided risks between 1.5C and 2C (i.e. 3.4, 3.5 and 3.6). [Petra Tschakert, Australia]	Accepted.
9265	89	25			Cite sources in Figure 3.20 [Cynthia Rosenzweig, United States of America]	Figure source is cited on page 3-89 in-text line 13 and line 28
19037	89	25	89	25	The quality of the Figure 3.20 should be improved. Please, clip the original title, it's no need to keep it. [JACQUES-ANDRE NDIIONE, Senegal]	Editorial - higher resolution graphic replaced and graphic design to be updated with copyedit prior to publication
1516	89	25	89	25	Resolution of the figure (not only this but also others) is too low. [Ken'ichi Matsumoto, Japan]	Editorial - higher resolution graphic replaced and graphic design to be updated with copyedit prior to publication
9088	89	26	89	28	The figure showing direct urban risk of 'annual water availability percentage' may be more appropriate if expressed in water availability per capita, which should be particularly critical for urban areas of developing nations. [Suchandra Bardhan, India]	Noted. Original source has annual percentage not per capita.
10022	90		90		Row 33: Energy is very important subject in this manner. This section should be supported with more references. [Nazan AN, Turkey]	Thank you for your comment, more references were included
6832	90		90		a more comprehensive assessment is needed since more studies are available now in the literature on the future heat stress for future development of cities with different climate background around the world. The upcoming book: Climate Change and Cities Second Assessment Report of the Urban Climate Change Research Network. Edited by Cynthia Rosenzweig, William D. Solecki, Patricia Romero-Lankao, Shagun Mehrotra, Shobhakar Dhakal, Somayya Ali Ibrahim, 09/2017; ISBN: 9781316603338. [Rafiq Hamdi, Belgium]	Thank you for your comment. The tourism section was revised based on a more comprehensive assessment. It is not possible to cite a book without a copy.
2169	90	1			I don't see the logic. Cities already suffer from the urban heat island effect. So adding 1.5C warming regionally will just add 1.5C warming in the city and outside the city. Unless you reckon that global warming will enhance the UHI effect? If so, you need to explain how this will happen. [Neville Nicholls, Australia]	Taken into account - covered in FOD section 3.3.2.1 and 3.3.2.2
9266	90	1	90	10	Cite Bader et al., 2018 in Press [Cynthia Rosenzweig, United States of America]	SLR impact cited taken into account with earlier comment 2741. Bader et al., do not have 1.5 versus 2 degree SLR projections
2624	90	1	90	11	mention specific hot spots/cities? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and text revised to include reference to specific megacities (also in response to comment 2727)
12410	90	1	90	11	The paragraph does not follow a logical flow and mixes different issues (land-use effects, heat island effects and other factors affecting warming) without introducing the purpose of the paragraph or why these factors are related. [Bill Hare, Germany]	Taken into account - text revised to cluster UHI followed by other factors such as urban morphology and land use.
9328	90	1	90	2	The statement, "There is growing evidence that cities are likely to experience greater heat stress 1 than the regional warming under 1.5°C and 2°C scenarios because of urban heat island effects" may be supported by additional references, including the study by Tapia et al. (2017) An indicator-based vulnerability assessment for European cities, Ecological Indicators, Vol. 78, pp. 142-155, 2017. [Siir KILKIS, Turkey]	Taken into account - text revised and additional references to UHI added. Tapia not specific to 1.5 versus 2.
11776	90	3	90	4	Over what time period is this projection (i.e., when do we expect to see this effect)? [David Schoeman, Australia]	Taken into account - text revised to add mid-century
5145	90	8	90	8	Yu and Zhai is missing the year of reference [Winston Chow, Singapore]	Taken into account - text revised to include accepted paper (Yu, Zhai, and Lu, 2017)
2304	90	11	90	11	Air quality decreases in big metropolitan areas. [Begoña ARTIÑANO, Spain]	Taken into account - covered in FOD Section 3.5.2.1
6831	90	11	90	11	A paragraph is missing on the need for downscaling technique valid at the urban scale and methods for propagating the uncertainties from global-regional, and urban scale for impact model studies for cities. [Rafiq Hamdi, Belgium]	Taken into account - reference to Nick (2012) and Yu, Zhai, and Lu (2017) added in SOD. FOD section 3.2.2, page 3-11-15 addresses methods in detail, including downscaling (i.e.g. CORDEX, Giorgi and Gutowski 2015; Jacob et al. 2014a; Cloke et al. 2013; Erfanian et al. 2016; Barlow et al. 2016; Kendon et al. 2014; Ban et al. 2014; Prein et al. 2015).

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9268	90	14			It's unclear whether the urban sector and services should be described here or in the urban section above. Cite: Marcotullio, P. J., Sarzynski, A. Sperling, J., Chavez, A., Estiri, H., Pathak, M., and Zimmerman, R. (2018). Energy transformation in cities. In C. Rosenzweig, W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, and S. Ali Ibrahim (eds.), Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge University Press. In Press. Mehrotra, S., Zusman, E., Bajpai, J. N., Jacob, K., and Replogle, M. (2018). Urban transportation. In C. Rosenzweig, W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, and S. Ali Ibrahim (eds.), Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge University Press. In Press. Vicuña, S., Redwood, M., Dettinger, M., and Noyola, A. (2018). Urban water systems. In C. Rosenzweig, W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, and S. Ali Ibrahim (eds.), Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge University Press. In Press. Barata, M. M. L., P. L. Kinney, K. Dear, E. Ligeti, K. L. Ebi, J. Hess, T. Dickinson, A. K. Quinn, M. Obermaier, D. Silva Sousa, D. Jack (2018). Urban Health. In C. Rosenzweig, W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, and S. Ali Ibrahim (eds.), Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge University Press. In Press. [Cynthia Rosenzweig, United States of America]	Taken into account - FOD 3.5.2 urban and 3.5.3 key economic sectors have been combined into one section in SOD. Energy, water, transport, and health citations to be added to SOD merged section.
4926	90	16	90	26	Two additional concepts and references that are relevant to include here are: 1.) climate change will affect the integrity of both natural and cultural heritage, which in turn will affect its pull and capacity to support tourism; relevant reference is: Markham, A., Osipova, E., Lafrenz, Samuels, K. and Caldas, A. (2016). World Heritage and Tourism in a Changing Climate. United Nations Environment Programme, Nairobi, Kenya and United Nations Educational, Scientific and Cultural Organization, Paris, France., and 2.) changing temperatures are likely to directly affect overall quantity and seasonality of visitors to parks and protected areas, such as this study conducted for the US National Park Service; relevant reference: Fisichelli NA, Schuurman GW, Monahan WB, Ziesler PS (2015) Protected Area Tourism in a Changing Climate: Will Visitation at US National Parks Warm Up or Overheat? PLoS ONE 10(6): e0128226. doi:10.1371/journal.pone.0128226. [Marcy Rockman, United States of America]	Thank you for your comment. The tourism section was revised based on a more comprehensive assessment, focusing on the risks of warming of 1.5 and 2C. An assessment of how climate change could affect tourism will be included in the AR6.
19038	90	20	90	20	Instead of writing "et al. (2014) (AR5) concluded", please write "et al. (2014) concluded" [JACQUES-ANDRE NDIONE, Senegal]	Changed
1392	90	25			Overall, the impacts of climate change will be small relative to other drivers of economic sectors and services. I am not convinced by this sentence, particularly in the touristic sector in relation to winter sports and beach resorts in lower latitudes. [Roger Cremades, Germany]	Deleted
2349	90	25	90	26	The statement that climate change will be small relative to other drivers needs to be supported with at least one reference. The statement may be correct, but needs validation. Otherwise the issues addressed with climate change impacts on tourism may be overlooked by policy makers. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Deleted
2722	90	25	90	26	Important point, needs further discussion and substantiation. [Penny Urquhart, South Africa]	Deleted
14015	90	25	90	26	Do you have justification for this sentence?? [Elvira Poloczanska, Germany]	Deleted
12486	90	33	90	38	Hong and Kim (2015) quantified the relationships of electric power load and climate variables such as temperature, humidity, wind, and insolation. We need to address such impacts of climate change on energy consumption with intensified urbanization addressed in Hong and Hong (2012). "Hong, J. and W. S. Kim (2015) Weather impacts on electric power load: Partial phase synchronisation analysis, Meteorological Applications, 22, 811-816." "Hong, J.-W. and J. Hong (2016) Changes in the Seoul metropolitan area urban heat environment with residential redevelopment, Journal of Applied Meteorology and Climatology, 55, 1091-1106" [Jinkyu Hong, Republic of Korea]	It was decided that the recommended studies were out of the scope of the section
4184	90	34		38	Water availability could directly impact the operations of nuclear, hydro and fossil energy systems directly and have indirect impacts on solar and wind as water is required in the production of these energy sources and extreme weather raises further questions on grid resiliency. A 2013 U.S. Department of Energy study indicated that power outages thanks to extreme weather events cost upwards of 33 billion (2003-2012). <a href="https://energy.gov/sites/prod/files/2013/08/f2/Grid%20Resiliency%20Report_FINAL.pdf">https://energy.gov/sites/prod/files/2013/08/f2/Grid%20Resiliency%20Report_FINAL.pdf</a> [Michelle Leslie, Canada]	It was decided that the recommended study were out of the scope of the section based on timeframe and relationship to 1.5 and 2C warming
6995	90	34	90	38	The impacts of extreme weather events on the operation and infrastructure of the energy sector should be discussed in this paragraph (Schaeffer et al., 2012; IEA, 2015). Relevant references: 1. International Energy Agency, 2015 : Making the energy sector more resilient to climate change <a href="https://www.iea.org/publications/freepublications/publication/COP21_Resilience_Brochure.pdf">https://www.iea.org/publications/freepublications/publication/COP21_Resilience_Brochure.pdf</a> 2. Schaeffer et al., 2012 : Energy sector vulnerability to climate change: A review, Energy, 38 (1), 1-12. [Sai Ming Lee, China]	Thank you for your recommendation, but it was decided that these studies were out of the scope of this section based on timeframe and relationship to 1.5 and 2C warming
12797	90	34	90	36	A few examples of weather-energy links are mentioned, but several important are missing. I think in this introductory section, the quasi-full list should be mentioned, removing "e.g.". Temperature affects above all heating and also air conditioning (please mention heating), I would replace "water runoff" by "river flow and temperature" (hydropower and powerplant cooling), solar radiation (solar power), wind and storms (wind energy and network infrastructure risk), and all weather variables linked to agriculture and forestry for biofuel production. Finally it could be interesting to mention that combination of all weather variables together is important for balancing electricity load in transmission network. One can cite the U.N. GFCS exemplar for the energy sector <a href="http://www.wmo.int/gfcs/sites/default/files/Priority-Areas/Energy/GFCS_Energy%20Exemplar_JN17453.pdf">http://www.wmo.int/gfcs/sites/default/files/Priority-Areas/Energy/GFCS_Energy%20Exemplar_JN17453.pdf</a> ; [Robert Vautard, France]	The recommendations were incorporated into the section
19039	90	36	90	36	Instead of writing "(e.g. solar power) (Arent et al. 2014)", please write "(e.g. solar power; Arent et al. 2014)" [JACQUES-ANDRE NDIONE, Senegal]	Changed
1393	90	36	92	5	It would be good to include more references (if available, sorry) besides Arent et al. (2014) [Roger Cremades, Germany]	The sentences referring to Arent et al. (2014) are from the AR5, which was the baseline for the assessment in this special report.
2344	90	38	90	39	Extremely high temperatures and adverse weather conditions negatively affect gas pipelines integrity and operation. [Trypolska Galyna, Ukraine]	There was limited literature on the impacts on gas pipelines at 1.5 and 2C.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16299	90	42	90	42	Agreed, climate change tends to increase demand, but also, climate change mitigation, particularly efficiency, will be aiming to reduce demand by using energy more efficiently. Might it be that the latter actually wins out? [Michael MacCracken, United States of America]	There was limited literature focusing on this topic
14016	90	45	90	45	Plus impacts on thermal efficiency of buildings?? [Elvira Poloczanska, Germany]	Literature on energy demand for space heating and cooling was included in the section, though specific literature on thermal efficiency of buildings at 1.5 and 2C was limited.
12798	90	45	90	45	In parallel to air conditioning demand increasing, heating demand decreasing should be mentioned in extra-tropical regions [Robert Vautard, France]	Changes in heating demand were included in this section
2345	90	45	90	47	In Eastern Europe, average winter temperature is going to grow, thus reducing the demand for energy for heating. [Trypolska Galyna, Ukraine]	Changes in energy demand for heating and cooling were addressed in the section
11777	90	49	90	49	Hydropower cannot fall [David Schoeman, Australia]	Unsure of the request of the comment
2346	90	53	90	53	focus on [Trypolska Galyna, Ukraine]	Changed
19244	90	53	90	53	Change "focuseon" by "focused on"91 [Rubén Retuerto, Spain]	Changed
18022	90	53	90	53	focuseon should be focused on [Wilfran Moufouma Okia, France]	Changed
1517	90	53	90	53	focuseon should be "focuses on" [Ken'ichi Matsumoto, Japan]	Changed
2530	90	53	90	55	Over what timescale? [Robert Koppu, United States of America]	Timescale was include
2531	90	53	91	10	See energy system damage function for US from Hsiang et al. (2017). S. Hsiang, S., R. Kopp, A. Jina, J. Rising, M. Delgado, S. Mohan, D. J. Rasmussen, R. Muir-Wood, P. Wilson, M. Oppenheimer, K. Larsen, and T. Houser (2017). Estimating economic damage from climate change in the United States. Science 356(6345), 1362–1369. doi: 10.1126/science.aal4369. [Robert Koppu, United States of America]	Thank you. This was added
10023	91		91		Row 13: It is expected that the extreme events will affect the demand for tourism. Therefore it would be much more helpful to have more studies in this section. For example: "Future Tourism Related Climate of Ski Resorts in Northern Finland", O. Cenk Demiroglu, Kamil Collu, M. Tufan Turp, Nazan An, M. Levent Kurnaz, The 1st Workshop on the Future of Winter Tourism (FWT2017), Rovaniemi-Finland, 3 – 5 April (2017). "A Model Assessment on the Technical Climate Change Adaptation Options of the Major Ski Resorts in Bulgaria", Osman Cenk Demiroglu, Mustafa Tufan Turp, Tugba Ozturk, Nazan An, Mehmet Levent Kurnaz, International Conference "Sustainable Mountain Regions: Make Them Work", Sofia-Bulgaria, 14-16 May (2015). [Nazan AN, Turkey]	Thank you for your comment. The tourism section was revised based on a more comprehensive assessment, focusing on the risks of warming of 1.5 and 2C. An assessment of how climate change could affect tourism will be included in the AR6, considering peer-review literature.
19040	91	2	91	2	Instead of writing "in summer (-14%) (Chilkoti et al. 2017)", please write "in summer (-14%; Chilkoti et al. 2017)" [JACQUES-ANDRE NDIONE, Senegal]	Changed
12799	91	5	91	7	One could add : there are large uncertainties on the effect of climate change on wind power which will likely be dominated by natural variability (Tobin et al., 2014, Climatic Change). [Robert Vautard, France]	Changed
12800	91	7	91	9	There are recent studies showing a general pattern for Europe: Hueging et al. (2013) and Tobin et al. (2015, Climatic Change, using ENSEMBLES and 2016, ERL, using EURO-CORDEX) showing robust patterns of CC impacts with increase in Northern Europe and decrease in Southern Europe. In most scenarios these changes however do not exceed 10-15%. Articles from Pryor and Barthelme should also be mentioned. [Robert Vautard, France]	Thank you for your comment, Tobin et al. 2015 and Tobin et al. 2016 were included in this section
12801	91	9	91	9	Recent studies also assess changes in solar PV power, that should be mentioned: globally, 78. Crook et al., 2011 (Energ. Environ. Sci.); Wild et al., 2015, Solar Energy, which used CMIP5 projections; Over Europe, Jerez et al. (2015, Nature Comms.) showed a general decline (but limited to 10-15%) of solar PV potential in most Europe, but large uncertainties exist as RCMs and GCMs do not agree on projections and clouds in this area (Bartok et al., Clim. Dyn.) [Robert Vautard, France]	Thank you for your comment, Wild et al. 2015 and Jerez et al. 2015 were included in this section
12803	91	11	91	11	In the energy section a suggestion is also to mention somewhere that in a highly mitigated option leading to 1.5°C or 2°C warming energy systems will have an increased exposure to weather and climate variability and changes, due to a much larger share of renewables. This should be taken into account when estimating future impacts on energy supply and security. There is recent literature on this topic, but it is still a poorly covered area. [Robert Vautard, France]	You are correct that there is limited literature on this topic, but impacts of extreme weather on energy systems were included in the section
9992	91	13	91	17	This part is very short and insufficient, it must be enriched with more references. For example: "Impact of Climate Change on Ski Resorts in Northeast Turkey: A Dynamical Downscaling Approach", Osman Cenk Demiroglu, Mustafa Tufan Turp, Tugba Ozturk, Mehmet Levent Kurnaz, Atmosphere, 7, 52 (2016); "Technical Climate Change Adaptation Options of the Major Ski Resorts in Bulgaria", Demiroglu, O. C.; M. T. Turp, T. Ozturk, N. An & M. L. Kurnaz, In Sustainable Mountain Regions: Challenges and Perspectives in Southeastern Europe; Koulou, B., Zhelezov, G., Eds.; Springer: Basel, Switzerland, pp. 77–88 (2016). [Mustafa Tufan Turp, Turkey]	The tourism section was substantially increased to reflect the scope of impacts work in this sector. The review paper of climate change and ski tourism by Steiger et al (2017) discusses the geographic patterns of impacts, adaptation options, and the limitations of studies that do not physically incorporate snowmaking adaptive capacity. Studies that do not include current snowmaking capacity do not represent current operating realities and overestimate impacts.
4736	91	13	91	17	The current information for tourism is neither sufficient, nor comprehensive. Perhaps since this chapter refers to the environment, ecotourism should be introduced and analyzed. Although it is a type of tourism as a general term, ecotourism could be explained in order to highlight the importance of the 1.5oC since it is related with multiple areas such as the environment, tourism, culture and history. [Spyros Schismenos, China]	The tourism section was substantially increased to reflect the scope of impacts work in this sector. The review paper (Scott et al. 2015) provides post AR5 overview of key impacts and knowledge gaps (previous comprehensive reviews of this sector in WIRE-climate change were published in 2012 and not eligible for this report). There are no publications that are specific to ecotourism impacts under 1.5 or 2 degree scenarios. Available work on coral reef/diver tourism and UNESCO World Heritage sites (environment) are included.
2350	91	13	91	32	This section is weak and could draw upon evidence used in the AR5, in particular the section does not refer to any given physical drivers that produce change. The AR5 and AR4 both made reference to the Tourism Comfort Index. See papers such as: Amelung B. and Viner D. 2006 The sustainability of tourism in the Mediterranean: Exploring the future with the Tourism Comfort Index Journal of Sustainable Tourism Vol 14 Nos. 4 and Viner D. and Nicholls S. 2006 Climate Change and its Implications for International Tourism. In Tourism Management Dynamics, Elsevier. The changes in the TCI can be used to explain potential causality. Also one of the papers refers to Tunisia, unfortunately, impacts from terrorism may mean that this paper's arguments are no longer valid. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	The tourism section was substantially increased to reflect the scope of impacts work in this sector. The review paper (Scott et al. 2015) provides post AR5 overview of key impacts and knowledge gaps. The climate driver, typically represented using a climate index for tourism, was added. Only post-AR5 work using the 'tourism climate index' is included. The major critiques of this (TCI) approach is also included and new index work (with foundations in tourist climate preferences) and alternate approaches are discussed.
18023	91	15	91	17	This subsection is rather short and my be incomplete [Wilfran Moufouma Okia, France]	The tourism section was substantially increased to reflect the scope of impacts work in this sector.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2723	91	15	91	17	Insufficient detail, needs more references added. Could look at climate change related sea level rise impacts leading to coastal erosion and damage to coastal tourism resorts e.g. in The Gambia and Senegal; must be many studies of SIDS [Penny Urquhart, South Africa]	The tourism section was substantially increased to reflect the scope of impacts work in this sector. The only tourism specific SLR study for SIDS (from the Caribbean region) is now included. A new book is coming out in early 2018 on SLR and tourism that may have additional new empirical work on SLR risks in other destinations, but it was not yet available. New work is also expected to quantify impacts on major tourism beaches in Hawaii and California in early 2018. These will be added as available.
13764	91	15	91	17	section 3.5.3.2.1 needs some more details [Elvira Poloczanska, Germany]	The tourism section was substantially increased to reflect the scope of impacts work in this sector.
4927	91	15	91	32	Re-stating comment above regarding references and concepts for climate change and tourism, as they should/could also be incorporated here: 1.) climate change will affect the integrity of both natural and cultural heritage, which in turn will affect its pull and capacity to support tourism; relevant reference is: Markham, A., Osipova, E., Lafrenz, Samuels, K. and Caldas, A. (2016). World Heritage and Tourism in a Changing Climate. United Nations Environment Programme, Nairobi, Kenya and United Nations Educational, Scientific and Cultural Organization, Paris, France., and 2.) changing temperatures are likely to directly affect overall quantity and seasonality of visitors to parks and protected areas, such as this study conducted for the US National Park Service; relevant reference: Fischelli NA, Schuurman GW, Monahan WB, Ziesler PS (2015) Protected Area Tourism in a Changing Climate: Will Visitation at US National Parks Warm Up or Overheat? PLoS ONE 10(6): e0128226. doi:10.1371/journal.pone.0128226. [Marcy Rockman, United States of America]	The UNESCO and UNEP report and the peer-reviewed work it draws on are included in the much expanded section. The US parks study is also included. Both build on previous work, but as these are pre-AR5 these studies are not included.
19245	91	16	91	16	Remove "demand" [Rubén Retuerto, Spain]	Deleted
2170	91	16	91	17	This is pretty obvious - I don't think you need to rely on a citation to support such an obvious statement. [Neville Nicholls, Australia]	Thank you.
4185	91	16		17	As reported by The Globe and Mail, the tourism industry in Florida and the Caribbean is a major economic driver. Irma could have devastating consequences (like other extreme events) directly to tourism and more widely to other industries as the losses will have ripple effects. <a href="https://beta.theglobeandmail.com/report-on-business/international-business/latin-american-business/caribbean-islands-fear-grim-tourist-season-in-wake-of-hurricane-irma/article36222141/?ref=http://www.theglobeandmail.com">https://beta.theglobeandmail.com/report-on-business/international-business/latin-american-business/caribbean-islands-fear-grim-tourist-season-in-wake-of-hurricane-irma/article36222141/?ref=http://www.theglobeandmail.com</a> & [Michelle Leslie, Canada]	There are limited analyses of the impact of the two category 5 hurricanes on tourism the Caribbean (or Florida, Texas). Further information may develop in 2018. The early estimate of the Caribbean Tourism Organization is included. These impacts are representative of impacts anticipated to happen more frequently under warming.
14017	91	20			Tourism and coral reef ecosystems not included here [Elvira Poloczanska, Germany]	Most work on the impact of bleaching/coral decline on tourism is pre-AR5 and ineligible (see Scott et al. 2012 sector review in WIRE-climate change). Reef closures resulting from recent bleaching events are included in the observed impacts section.
9993	91	20	91	20	In the heading of "Projected risks at 1.5 vs 2.0°C", 0 should be omitted and °C should be added: "Projected risks at 1.5°C vs 2°C" [Mustafa Tufan Turp, Turkey]	Changed
11778	91	21	91	32	There might also be impacts on tourism resulting from the impacts on beaches of sea-level rise and coastal armouring...after all, a significant proportion of coastal Mediterranean tourism is associated with coastal leisure activities... [David Schoeman, Australia]	SLR impacts on coastal tourism is a major impact for tourism, but one that remains poorly quantified. Discussion was added, but see previous comment on availability of post-AR5 studies.
12411	91	21	91	32	There is much focus on the US and Europe, with no mention of other parts of the world that rely heavily on tourism (e.g. small islands, parts of Asia, Latin America...) [Bill Hare, Germany]	Work on specific impacts from around the world are included in the expanded text. In addition, newly available work that uses an index approach to examine the relative risk and adaptive capacity of the tourism sector in 181 countries provides a global perspective on the geography of impacts in this sector.
2172	91	21	91	37	This seems to suggest that warming is bad for tourism everywhere and at all times. Is this credible? Surely tourism will increase in some areas? [Neville Nicholls, Australia]	There are risks and opportunities associated with climate altered competitiveness of destinations (including uncertainties associated with transnational impacts in this highly integrated global sector). This is discussed in the post-AR5 work review paper (Scott et al. 2015) and also as it pertains to changing climate resources in temperate regions and within each regional ski tourism market.
2171	91	23	91	24	How does the warming "impact" tourism? Does it increase it or decrease it? By how much? Is this credible? [Neville Nicholls, Australia]	The impact on tourism, like all sectors, is complex. There is no single answer that warming 'increases or decreases' tourism globally, as the impacts are diverse at the region and destination scale and even differ at the sub-sector/market scale at a single destination (e.g. ski tourism vs 'green season' impacts in mountain regions). The complexity of impacts and some comparative impacts (as examined through vulnerability indices) are discussed in the expanded section.
15311	91	24	91	24	The results of Grillakis et al., 2016 are supported in a deeper analysis in the following publication. Please add it to the (Grillakis et al. 2016; Damm et al. 2016). Grillakis, M.G., Koutroulis, A.G. and Tsanis, I.K., 2016. The 2° C global warming effect on summer European tourism through different indices. International journal of biometeorology, 60(8), pp.1205-1215. [Manolis Grillakis, Greece]	Damm et al. was added as has a broader discussion of the use (and limitations) of climate index work. See also previous comments on climate as a driver o spatial and temporal tourism patterns.
2767	91	25			The availability of water may limit consumption and tourism. (Iberian peninsula) [Jonathan Gómez Cantero, Spain]	The only large scale analysis of tourism and water futures was published pre-AR5 and is not eligible for this report: Gössling, S., Aall, C., Ceron, J.P., Dubious, G., Hall, M.C., Lehmann, L.V., Peeters, P., Scott, D. (2012). Tourism and Water Use: Supply, Demand and Security – An International Review. Tourism Management, 33, 1-15.
2768	91	25			The weather extremes will affect infrastructures as well as sea level rise.(Iberian peninsula) [Jonathan Gómez Cantero, Spain]	Weather extremes, in combination with SLR, will indeed increase impacts on coastal tourism infrastructure and more immediately and widespread on beach assets. As indicated in previous comments, there is limited post-AR5 (and pre-AR5) work that quantifies the extent of this potential impact in major tourism regions of the world (including Spain).

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2769	91	25			Beaches that tourists are going to disappear(Iberian peninsula) [Jonathan Gómez Cantero, Spain]	Weather extremes, in combination with SLR, will indeed increase impacts on coastal tourism infrastructure and more immediately and widespread on beach assets. As indicated in previous comments, there is limited post-AR5 (and pre-AR5) work that quantifies the extent of this potential impact in major tourism regions of the world (including Spain).
2770	91	25			The number of snowfalls has been reduced and the number of days that ski can be reduced (Iberian peninsula) [Jonathan Gómez Cantero, Spain]	The review work of Steiger et al (2017) on impacts to ski tourism is included in the expanded section. The work on Pons et al. in the Pyrennes is also cited.
4610	91	32			Add explanation or definition of "climate comfort days". [Radim Tolasz, Czech Republic]	This was removed from the section as it is not a concept / indicator used in the literature beyond a single study. Studies that used a common 'tourism climate index' are compared, and the critique of this approach touched on.
1518	91	32	91	32	such is should be "such as" [Ken'ichi Matsumoto, Japan]	Changed
2347	91	33	90	34	Black Sea region countries might benefit from climate change, as summer daytime temperature is expected to remain tolerable, as opposite to the costs of Turkey and Greece. [Trypolska Galyna, Ukraine]	The geography of changing climate resources for tourism is broadly discussed in the expanded section. See also previous comments on climate resources as a driver of spatial and temporal patterns of tourism. The impacts (+/-) for all regions cannot be discussed with limited space, but can be found in the multiple citations added to the section.
2356	91	35	91	51	Reference to extreme wind speed needs to be included into impacts on transportation. Wind is a major factor when designing transport infrastructure. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	There was no literature found on the impact of extreme wind speeds on transportation at 1.5 and 2C warming
3853	91	37		49	In the midlatitude, road pavement deteriorates every year with freeze-thaw cycles. This may be included in the section. [Woonsup Choi, United States of America]	The impact of freeze-thaw cycles was included in the AR5 and referenced in this section
4611	91	38			Add water transport: "Road, air, rail, water and pipeline ..." [Radim Tolasz, Czech Republic]	Added
13450	91	42	91	42	It would be good to mention here about being a direct impacts due to climate change, while indirect impacts might be due to temperature extremes, drought, landslides. [Vidynmala Veldore, Norway]	Both direct and indirect impacts were addressed in the section
11779	91	52	92	7	What about benefits associated with an ice-free, or nearly ice-free Arctic. Of course, this in itself will have impacts, but it IS a benefit...at least in some respects [David Schoeman, Australia]	The AR5 addresses the ice-free and nearly ice-free Arctic and the increase in shipping in the North Sea Route was added in this section.
18024	91	53	91	55	See also Williams et al. 2017 about global warming-flight turbulence. Williams, P. D., 2017: Increased light, moderate, and severe clear-air turbulence in response to climate change. Adv. Atmos. Sci., 34(5), 576–586, doi: 10.1007/s00376-017-6268-2. [Wilfran Moufouma Okia, France]	Thank you for your recommendation, but it was deemed out of scope for the section due to the lack of association with economic impact
12412	91	54	91	55	What magnitude of temperature increase is this referring to (impacts on weight restrictions for aircraft takeoff)? [Bill Hare, Germany]	The magnitude of temperature increase was added in the section
6294	91	55	92	2	I was one of the reviewers for the Yumashev paper and it is a valuable addition to the literature. however i feel that the Melia et al 2016 paper is more appropriate for the questions being asked here.  Melia et al. (2016) 10.1002/2016GL069315 <a href="http://onlinelibrary.wiley.com/doi/10.1002/2016GL069315/full">http://onlinelibrary.wiley.com/doi/10.1002/2016GL069315/full</a> Used RCP2.6 specifically to assess the potential future of Arctic shipping with respect to the Paris Agreement. For RCP8.5, by late century trans-Arctic shipping may be potentially commonplace, with a season ranging from 4 to 8?months. For RCP2.6, with global mean temperature stabilization of less than 2°C above preindustrial, the frequency of open water vessel transits still has the potential to double by midcentury with a season ranging from 2 to 4?months.  Average transit times from East Asia to Europe may decline going through the 21st century to 22?days under the low-emissions RCP2.6 scenario or down to 17?days under high-emissions RCP8.5, compared to 30 days via the Suez canal.  A key innovation is that these results originate from GCMs calibrated with current state-of-the-art SIT data, and so the projections of future transit availability, route choices, and frequency should be more robust. Despite these trends, interannual variability will remain a significant factor in route availability throughout the 21st century. [Nathanael Melia, New Zealand]	Thank you for your recommendation, Melia et al. 2016 was added to the section
20572	92				The topic on human health comes in this page. More detail would be important on the impact of climate change on tropical diseases. I came across the work of Mark Booth (Newcastle University), that targets this in detail in a paper entitled: Climate Change and the Neglected Tropical Diseases (accepted for publication). In this paper Mark reviews current evidence on how climate change may affect future transmission of NTDS. In this paper he includes 30 infections (WHO NTD list & WHO blueprint list of priority diseases). Would be important to look into this paper in order to further substantiate the claims made in this report on this specific issue. [Vera Barbosa Araujo Soares Sniehotta, United Kingdom (of Great Britain and Northern Ireland)]	Paper will be added once it is available.
19387	92				Section 3.5.4 on Human health completely neglects air pollution. There have been studies addressing the impact of climate change on air pollution mortality (Silva et al. 2017 Nature Climate Change) even if they didn't explicitly assess the impact of 1.5 degrees. Perhaps more importantly, aggressive climate mitigation policies are likely to have a significant co-benefit in terms of air quality (Stohl et al. ACP 2015; Rao et al. Global Environmental Change 2016). Thus 2.0 and 1.5 degree climate scenarios will bring large reductions in air pollution mortality even if that isn't their main focus. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph on air quality added.
4612	92	1			The expression of temperature rise in percent is very unusual. [Radim Tolasz, Czech Republic]	Changed
5482	92	10			Do you consider water as human system? Do you mean water infrastructure? [Aliyu Barau, Nigeria]	Sections 3.4 and 3.5 were merged and reorganized
1394	92	10			In my humble opinion, it could be more informative to include two separate sub-sections for floods and droughts, instead of a section for "Water". [Roger Cremades, Germany]	Sections 3.4 and 3.5 were merged and reorganized
14018	92	10			How does this differ from the flood and droughts section in 3.3 and water resources sections in 3.4.4??? is this specifically water infrastructure, and supply??? However projected sections only considers flood risks [Elvira Poloczanska, Germany]	Sections 3.4 and 3.5 were merged and reorganized

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5114	92	10	92	36	the discussion of water focuses on extreme events rather than changes in the hydrological cycle and how that will impact on human systems -- as water becomes more scarce or too abundant, meaning either women in developing countries have to walk further to fetch water or that access to clean water is more difficult (leading to negative health and nutrition impacts). A discussion of the impact of climate change human systems would appear to require inclusion of social dynamics that are part and parcel of that system and are the pathways through which climate change impacts individuals. [Tonya Rawe, United States of America]	Changes in the hydrological cycle were covered in another section
12414	92	23	92	36	How are examples chosen? There seems to be a strong focus on Europe. [Bill Hare, Germany]	The examples are from the published literature on the risks of 1.5 and 2C.
12413	92	24	92	25	The damages in continental U.S. from floods are for what magnitude of temperature increase? [Bill Hare, Germany]	Magnitude of temperature increase added
1443	92	29			this is the third section with results about runoff change (although I think this section is about the costs). Please try to avoid such repetitions. It makes it difficult to understand the general structure of the draft, [Philippe Roudier, France]	Thank you; this was moved to elsewhere in the chapter.
3854	92	30		31	Section 3.5.3 is about economic impacts, but the sentence talks only about runoff changes, thus looks out of place. [Woonsup Choi, United States of America]	Thank you; this was moved to elsewhere in the chapter.
2348	92	37	92	38	In Ukraine, small river floods in Western Ukraine are going to be observed more often, while in Dnipro river water quality deteriorates, and the river itself turns into a cascade of backwaters due to flow limitations. [Trypolska Galyna, Ukraine]	A reference focusing on the impact of flooding in Ukraine at 1.5 and 2C was not found
14019	92	39			the temperature driven redistribution of disease vectors could be included here [Elvira Poloczanska, Germany]	This is an important point that will be included in the AR6. There was limited literature on changes in the geographic range of vectors at warming of 1.5 and 2C
13765	92	39			Human health refers to both physical and mental/psychological health. But it is only being discussed in this chapter in terms of physical aspects. A better title would be 'Human health and wellbeing' to be more consistent with AR6 [Elvira Poloczanska, Germany]	Good point, but there is no literature on the changes in mental health and other indicators of wellbeing at warming of 1.5 and 2C.
14022	92	39			The human health section may be better placed considering different categories of health risk: eg physiological, mental and wellbeing, vector borne disease, water borne disease, food borne, nutrition [Elvira Poloczanska, Germany]	The sections include climate-sensitive health outcomes for which there is literature on the potential consequences of warming of 1.5 and 2C.
13766	92	39	93	12	AR5 WGI report also refers to: psychological/emotional distress, solastalgia, mental suffering including post traumatic stress disorder. These are not mentioned here, why not? Other impacts in the literature include psychosocial impacts such as impaired sense of place/identity, loss of cultures – these have implications for psychological wellbeing as well as community resilience. Recommend bringing in Susan Clayton for contributing author here - see Clayton et al (2017) Mental Health and Our Changing Climate: Impacts, Implications, and Guidance. Washington, D.C.: American Psychological Association, and ecoAmerica. [Elvira Poloczanska, Germany]	These are important points that will be included in the AR6. No literature on these issues was identified at warming of 1.5 and 2C
9877	92	46	93		These bullets do not include all the potential for inequities, particularly the vulnerability of children, the elderly, and indigenous communities. They also do not include the ways in which gradual changes in climate (increased heat, and changing patterns of precipitation that can include drought) may affect human health. [Susan Clayton, United States of America]	These are important points but were not included in the observed impacts assessed in the AR5.
12418	92	46	93	12	The section on conclusions from AR5 includes nothing on vector-borne diseases [Bill Hare, Germany]	Surprisingly, the AR5 key messages did not include anything on vector-borne diseases.
4613	92	47			Italics for "high confidence" [Radim Tolasz, Czech Republic]	Changed
4614	92	48			Italics for "medium confidence" [Radim Tolasz, Czech Republic]	Changed
4615	92	49			Italics for "high confidence" [Radim Tolasz, Czech Republic]	Changed
16300	92	51	92	55	Does there not need to be mention of how the interconnected global economic system and international travel system really carry problems that arise anywhere to populations everywhere--or nearly so? Everyone is now exposed to risks that arise around the world--though the quality of health systems varies so risks vary as well. And this is not to mention that citizens of virtually every country are represented virtually everywhere, so those of all nations can be impacted, and all it takes is a few cases to create scares that affect international tourism choices and patterns and so affect key parts of economies, which can be a health risk as well. [Michael MacCracken, United States of America]	These are important points that will be included in the AR5. No literature was identified on the potential risks of warming of 1.5 and 2C.
4616	92	53	92	54	Italics for "medium to high confidence" [Radim Tolasz, Czech Republic]	Changed
4617	92	55			Italics for "medium confidence" [Radim Tolasz, Czech Republic]	Changed
20521	93	1	93	3	interaction between high temp, dry weather and high air pollution levels are also important. One of the very first epi studies are from Katsouyanni et al 1993: <a href="https://www.ncbi.nlm.nih.gov/pubmed/8357272">https://www.ncbi.nlm.nih.gov/pubmed/8357272</a> . I could not find a review article on this topic. A study on heart conditions: <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3121221/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3121221/</a> and on COPD: <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4878829/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4878829/</a> [Janine Wichmann, South Africa]	Thank you for the references. There is no literature on the combined risks of heat and air quality at different levels of warming.
4618	93	7			Italics for "medium confidence" [Radim Tolasz, Czech Republic]	Changed
11780	93	7	93	10	This is a strong statement that suggests there is evidence...why not cite some of it? [David Schoeman, Australia]	The citation is Cramer et al. 2014. This is a summary of key messages from the AR5.
19041	93	10	93	10	Instead of writing "Cramer et al. (2014) concluded that", please write "Cramer et al. (2014) concluded that" [JACQUES-ANDRE NDIONE, Senegal]	Changed
14020	93	15			why is this a separate setion and not under observed impacts above? [Elvira Poloczanska, Germany]	The previous section on observed impacts was a summary of key findings from the AR5. This section is on new literature.
9994	93	15	24	15	I think beside the common diseases, some not well-known diseases should also be mentioned which can be popular in society in recent years. For instance: Caminade, C., Turner, J., Metelmann, S., Hesson, J. C., Blagrove, M. S., Solomon, T., ... & Baylis, M. (2017). Global risk model for vector-borne transmission of Zika virus reveals the role of El Niño 2015. Proceedings of the National Academy of Sciences, 114(1), 119-124. [Mustafa Tufan Turp, Turkey]	This is an important point that will be further explored in the AR6. The paper does not project the health risks of 1.5 and 2C.
2724	93	15	94	3	The examples provided of detected impacts are largely focused on northern countries. It would be preferable to balance with examples from the southern hemisphere / global South as well. [Penny Urquhart, South Africa]	As would we; however there is no literature on detected impacts in the global South.
14021	93	26			Would benefit from assessment in relation to specific temperature change [Elvira Poloczanska, Germany]	Changes made
9995	93	26	93	31	More references can be added including different outputs around the world. I suggest checking Sarah Perkins-Kirkpatrick's studies. [Mustafa Tufan Turp, Turkey]	This section focuses on detection and attribution studies for health.
20519	93	26	93	31	Please also cite studies from Africa. Cite review by Amegah et al: <a href="https://www.ncbi.nlm.nih.gov/pubmed/26949867">https://www.ncbi.nlm.nih.gov/pubmed/26949867</a> and also cite a study from South Africa: <a href="https://www.ncbi.nlm.nih.gov/pubmed/?term=wichmann+south+afrika+temperature">https://www.ncbi.nlm.nih.gov/pubmed/?term=wichmann+south+afrika+temperature</a> [Janine Wichmann, South Africa]	Thank you for the references. These will be included in the AR6 health assessment. This report focuses on the risks of warming of 1.5 and 2C.
7008	93	26	93	31	Can include the 2015 deadly heat waves in India and Pakistan. Reference: 1. Herring, S. C., A. Hoell, M. P. Hoerling, J. P. Kossin, C. J. Schreck III, and P. A. Stott, Eds., 2016: Explaining Extreme Events of 2015 from a Climate Perspective. Bull. Amer. Meteor. Soc., 97 (12), S1–S145. [Sai Ming Lee, China]	These are important detection and attribution studies of weather and climate extreme events, but do not include the health impacts.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6996	93	26	93	31	Suggest also include relevant studies for Hong Kong and China in the sub-tropical region. References: 1. Chan, EYY, Goggins WB, Kim JJ, et al, 2012 : A study of intracity variation of temperature-related mortality and socioeconomic status among the Chinese population in Hong Kong, J Epidemiol Community Health, 66, 322-327. 2. Chan EYY, Goggins WB, Kim JJ, Griffiths S and Ma TKW, "Help-seeking behavior during elevated temperature in Chinese population," Journal of Urban Health: Bulletin of the New York Academy of Medicine, vol. 88, no. 4, pp. 637-650, 2011. 3. Lee, K. L., Y. H. Chan , T. C. Lee, William B. Goggins, Emily Y. Y. Chan, 2016 : The development of the Hong Kong Heat Index for enhancing the heat stress information service of the Hong Kong Observatory, International Journal of Biometeorology, 60(7), 1029-39. 4. Ho, H.C., K.K.L. Lau, C. Ren, E. Ng, 2017 : Characterizing prolonged heat effects on mortality in a sub-tropical high-density city, Hong Kong, International journal of biometeorology, doi: 10.1007/s00484-017-1383-4 5. Wong, H. T., Y. L. Chiu, S.T. Wu, T. C. Lee & SCHSA, 2014 : The influence of weather on health-related help-seeking behavior of senior citizens in Hong Kong, Int. J. Biometeorol., 59(3), 373-6. [Sai Ming Lee, China]	Thank you for the references. These will be included in the AR6 health assessment. This report focuses on the risks of warming of 1.5 and 2C.
19246	93	29	93	29	Insert "," after "Sweden" [Rubén Retuerto, Spain]	Changed
7599	93	32			I think there needs to be a section on cold-related deaths as well. The Paris Agreement is in a strange position, in that 2C is about the mark where the increase in heat related deaths will outway the decrease in cold related deaths. This is still uncertain, but see the Gasparrini et al, 2017 (in review in PNAS) paper. Also see Vicado-Cabrella paper, currently in review (Kris Ebi is an author). [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	The statements on cold-related mortality with additional climate change were moved to a separate paragraph and updated.
16301	93	33	93	33	Why is discussion of Lyme disease limited to Canada—it started in the US and has widely spread across the US, potentially exposing far more people than in Canada. It is there as well, but why identify a location in the section title? And why is this section separate from the paragraph on page 96, lines 3-7? [Michael MacCracken, United States of America]	This paragraph cites the published literature on the risks associated with warming of 1.5 and 2C. The earlier paragraph focused on detection and attribution of observed impacts, not on projected risks.
11781	93	55	93	55	"for every increase"...is there something missing from this phrase? [David Schoeman, Australia]	Sentence edited.
7731	94		96		Add to the treated examples increase in water-borne diseases in West Africa due to washout of wastes into surface and groundwater resources. [Hilary Inyang, Nigeria]	This is an important point that will be included in the health chapter of the AR6. This report focuses on the health risks of warming of 1.5 and 2C; no literature was identified on these topics within this context.
2978	94	6	94	21	3.5.4.3 Projected risk at 1.5°C and 2°C In addition to the risks included as bullet points, I thought there should be recognition of the risks associated with flooding due to sea level rise and/or extreme precipitation events and associated high river discharge. [Erica Head, Canada]	We identified no published literature on the health risks of warming of 1.5 and 2C on these topics.
2305	94	6	94	6	Health effects due to changes in air quality patterns. A paragraph dealing with this issue could be added in this section. Some References on the impact of climate change on air quality: Characterizing the impact of projected changes in climate and air quality on human exposures to ozone. By: Dionisio, Kathie L.; Nolte, Christopher G.; Spero, Tanya L.; et al. JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL EPIDEMIOLOGY Volume: 27 Issue: 3 Pages: 260-270 Published: MAY-JUN 2017  Impact of global climate change on ozone, particulate matter, and secondary organic aerosol concentrations in California: A model perturbation analysis . By: Home, Jeremy R.; Dabdub, Donald. ATMOSPHERIC ENVIRONMENT . Volume: 153 Pages: 1-17 Published: MAR 2017  Changes in future air quality, deposition, and aerosol-cloud interactions under future climate and emission scenarios. By: Glotfelty, Timothy; Zhang, Yang; Karamchandani, Prakash; et al. ATMOSPHERIC ENVIRONMENT . Volume: 139 Pages: 176-191 Published: AUG 2016  Impact of emissions and +2 degrees C climate change upon future ozone and nitrogen dioxide over Europe. By: Watson, Laura; Lacressonniere, Gwendoline; Gauss, Michael; et al. ATMOSPHERIC ENVIRONMENT . Volume: 142 Pages: 271-285 Published: OCT 2016 [Begoña ARTIÑANO, Spain]	Paragraph on air quality added
6997	94	6	96	13	The possible impacts of climate change on influenza and respiratory infections should also be discussed in this section. Some relevant references: 1. Towers S, Chowell G, Hameed R, Jastrebski M, Khan M, Meeks J, Mubayi A, Harris G., 2013 : Climate change and influenza: the likelihood of early and severe influenza seasons following warmer than average winters, PLOS Currents Influenza. 2013 Jan 28. Edition 1. 2. Kamigaki T, Chaw L, Tan AG, Tamaki R, Alday PP, et al. (2016) Seasonality of Influenza and Respiratory Syncytial Viruses and the Effect of Climate Factors in Subtropical–Tropical Asia Using Influenza-Like Illness Surveillance Data, 2010 –2012. PLOS ONE 11(12): e0167712. 3. Chan, Paul K.S., H.Y. Mok, T.C. Lee, Ida M.T. Chu, W.Y. Lam and Joseph J.Y. Sung, 2009 : Seasonal Influenza Activity in Hong Kong and its Association With Meteorological Variation, Journal of Medical Virology 81:1797–1806 [Sai Ming Lee, China]	Thank you for the references. These will be included in the AR6 health assessment. This report focuses on the risks of warming of 1.5 and 2C.
13767	94	6	96	13	Again – this subsection is missing all the literature on psychosocial impacts (see previous comments p92), it is only focusing on morbidity and mortality. This needs to be addressed [Elvira Poloczanska, Germany]	We identified no published literature on the psychosocial risks of warming of 1.5 and 2C
4619	94	10	94	11	Italics for "very high confidence" [Radim Tolasz, Czech Republic]	Changed
4620	94	12	94	13	Italics for "high confidence" [Radim Tolasz, Czech Republic]	Changed
4621	94	14			Italics for "high confidence" [Radim Tolasz, Czech Republic]	Changed
4622	94	15			Italics for "very high confidence" [Radim Tolasz, Czech Republic]	Changed
4623	94	16			Italics for "medium confidence" [Radim Tolasz, Czech Republic]	Changed
4624	94	18			Italics for "low confidence" [Radim Tolasz, Czech Republic]	Changed
4625	94	19			Italics for "medium confidence" [Radim Tolasz, Czech Republic]	Changed
4626	94	21			Italics for "high confidence" [Radim Tolasz, Czech Republic]	Changed
14023	94	22	94	23	Information available on impacts in a 1.5° world? [Elvira Poloczanska, Germany]	Information added.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14024	94	25			Recent projections for areas close to thermal limits in some regions (e.g. Arabian peninsula, Pal and Eltahir, NCC 2016) and globally (Mora et al., NCC 2017) need to be included in the assessment. [Elvira Poloczanska, Germany]	Added
20520	94	25	94	41	Please also cite studies from Africa. Cite review by Amegah et al: <a href="https://www.ncbi.nlm.nih.gov/pubmed/26949867">https://www.ncbi.nlm.nih.gov/pubmed/26949867</a> and also cite a study from South Africa: <a href="https://www.ncbi.nlm.nih.gov/pubmed/?term=wichmann+south+africa+temperature">https://www.ncbi.nlm.nih.gov/pubmed/?term=wichmann+south+africa+temperature</a> [Janine Wichmann, South Africa]	Unfortunately, there are not projections of health risks of warming of 1.5 and 2C in Africa.
2532	94	25	94	51	See temperature-related mortality damage function for the US from Hsiang et al. (2017). S. Hsiang, S., R. Kopp, A. Jina, J. Rising, M. Delgado, S. Mohan, D. J. Rasmussen, R. Muir-Wood, P. Wilson, M. Oppenheimer, K. Larsen, and T. Houser (2017). Estimating economic damage from climate change in the United States. <i>Science</i> 356(6345), 1362–1369. doi: 10.1126/science.aal4369. [Robert Koppu, United States of America]	Included in the section on key economic sectors.
14025	94	33	94	33	Can you give order of magnitude? [Elvira Poloczanska, Germany]	The diversity of underlying exposure-response relationships precludes an overall estimate of the order of magnitude.
2979	94	34	94	34	average temperatures (e.g. risks are higher in regions with cooler average temperatures) The meaning of the phrase in brackets is not clear. [Erica Head, Canada]	Heat-related mortality risks are higher in regions with average cooler temperatures.
11782	94	36	94	37	If the relationship is non-linear, then would "disproportionate" not be a better word than "greater"? [David Schoeman, Australia]	Change made
2173	94	36	94	38	Is there an estimate for the likely increase in heat-related mortality from 2C warming relative to 1.5C warming? I would have thought that this is one impact where we could work out an estimate of the likely increased impact from going to 2C, because there have been so many studies. [Neville Nicholls, Australia]	The diversity of underlying exposure-response relationships precludes an overall estimate of the order of magnitude.
20522	94	43	94	46	Also cite the article by Hanna and Tait (2015): Limitations to Thermoregulation and Acclimatization Challenge Human Adaptation to Global Warming. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4515708/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4515708/</a> [Janine Wichmann, South Africa]	Added
14026	94	43	94	46	Statement on adaptation methods and limits to adaptation would be useful if available. [Elvira Poloczanska, Germany]	There is limited information on the limits to adaptation. Adaptation methods will be covered in the AR6.
12415	94	44	94	45	Assumptions of additional adaptation reduce the projected magnitude of risks under different warming scenarios - this should be expanded upon [Bill Hare, Germany]	This topic is covered in Chapter 4
16302	94	48	94	48	Occupational health is already being affected--there are all sorts of outdoor construction that has to be stopped now on very hot days (and humidity/heat index may be really what to be talking about). I would also note that it can be too hot for customers to go out to various businesses, children to go to school, etc., so just referring to occupational aspects is a bit limiting. [Michael MacCracken, United States of America]	Current impacts are stated in the section; the rest of the section focuses on the health risks of 1.5 and 2C warming.
11783	94	48	94	55	There are plenty of statements of change here, but it is not clear whether these are for warming of 1.5°C, 2.0°C, or some other degree of warming [David Schoeman, Australia]	It is difficult to convert WBGT to ambient temperature change because of the number of factors included in the metric and the interactions across factors.
11784	94	50	94	51	2050 mentioned twice in the same sentence [David Schoeman, Australia]	The second reference to 2050 was deleted.
12416	94	50	94	53	It is unclear from the text what the studies cited assume for their temperature projections (i.e. what is the global temperature increase) [Bill Hare, Germany]	It is difficult to convert WBGT to ambient temperature change because of the number of factors included in the metric and the interactions across factors.
2533	95	3	95	12	See labor productivity damage function for the US from Hsiang et al. (2017). S. Hsiang, S., R. Kopp, A. Jina, J. Rising, M. Delgado, S. Mohan, D. J. Rasmussen, R. Muir-Wood, P. Wilson, M. Oppenheimer, K. Larsen, and T. Houser (2017). Estimating economic damage from climate change in the United States. <i>Science</i> 356(6345), 1362–1369. doi: 10.1126/science.aal4369. [Robert Koppu, United States of America]	This is included in the section on key economic sectors.
2174	95	8			Excellent! This chapter needs more of this sort of number, if it is to be as useful as it should be, for decisionmakers. Once we have this sort of estimate from a number of impact sectors, we can start to work out an overall cost of going from 1.5 to 2C. [Neville Nicholls, Australia]	These numbers are included where available.
4627	95	10			Use "yuan yr-1" instead of "yuan/year". [Radim Tolasz, Czech Republic]	Changed
4628	95	11			Use "yuan yr-1" instead of "yuan/yr" (2x) [Radim Tolasz, Czech Republic]	Changed
12417	95	11	95	11	1000 billion yuan/yr in 2011 is presumably an error - should be a later year? [Bill Hare, Germany]	Thank you; that should be 2100. Change made.
2175	95	14	95	25	This paragraph has to reflect the earlier section on food security. I don't think it does this. The earlier section is less obviously pessimistic about food production than you are here. [Neville Nicholls, Australia]	Sections 3.4 and 3.5 were merged and reorganized
5115	95	14	95	29	The discussion here of impacts on undernutrition is useful and addresses to some extent previous comments about a need for this discussion in other sections. Consideration of resulting micronutrient deficiencies, how social dynamics will interact with climate change impacts on food production, or how impacts on (clean) water availability will interact with health and as a consequence nutrition in children would further enhance this section. [Tonya Rawe, United States of America]	These are important topics that will be considered in the AR6. This report focuses on the health risks of warming of 1.5 and 2C.
19042	95	17	95	18	Instead of writing "(Ishida et al. 2014; Hasegawa et al. 2016; Springmann et al. 2016) (Table 3.6 in Annex 3.1)", please write "(Ishida et al. 2014; Hasegawa et al. 2016; Springmann et al. 2016; Table 3.6 in Annex 3.1)" [JACQUES-ANDRE NDIONE, Senegal]	Changed
4629	95	23			Use "kcal person-1 day-1" instead of "kcal/person/day" (2x) [Radim Tolasz, Czech Republic]	Changed
4724	95	31	96	13	In this section on vector-borne diseases there is a general assumption that effects of climate change on vector-borne diseases (if they occur) will be of a generally linear nature (e.g. increases in range, altitude and incidence). However, the caveat that climate change may allow vector-borne diseases to jump at present unrecognized climatic barriers to produce more widespread epidemics in new regions (effectively unpredictable tipping points for vector-borne disease as was seen with the climate change-driven spread of bluetongue virus into Europe: see publications of Purse B.) needs to be included somewhere in this section. [Nicholas Ogden, Canada]	Sentence added to clarify that the relationships between temperature and vectorborne disease incidence is not always linear.
7009	95	43	95	52	Can include this study: Nils B. Tjaden, Jonathan E. Suk, Dominik Fischer, Stephanie M. Thomas, Carl Beierkuhnlein, Jan C. Semenza, Modelling the effects of global climate change on Chikungunya transmission in the 21st century, <i>Scientific Reports</i> (2017). [Sai Ming Lee, China]	Added
19043	95	49	95	49	Instead of writing "WILLIAMS et al. 2016", please write "Williams et al. 2016" [JACQUES-ANDRE NDIONE, Senegal]	Changed

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2725	95	50	95	52	Is this because studies have only been done in Tanzania, and not elsewhere in Africa? Need to clarify why only one country in Africa is being mentioned here, when many countries are affected by these diseases - and presumably would also be affected by expansion of the range of Aedes. [Penny Urquhart, South Africa]	Correct; the only study was done in Tanzania.
10024	96		96		Row 16: This section is inadequate in every sense because it is one of the biggest difficulties in reaching healthy data in migration. Thus, it is necessary more field study to find appropriate data and to contribute to the literature. [Nazan AN, Turkey]	The section was reorganized and revised to incorporate comments from the reviewers.
4725	96	3	96	7	Climate change may increase the season of risk of Lyme disease in most of its range, but only northward range expansion in North America and Europe would be expected by climate change. Range expansion in other directions is occurring but this is probably not associated with climate change. [Nicholas Ogden, Canada]	Clarification added.
19044	96	9	96	13	Instead of writing "Other vectorborne diseases", please write "Other vector borne diseases" [JACQUES-ANDRE NDIONE, Senegal]	Changed
19045	96	9	96	13	Please regarding "Other vectorborne diseases", Authors can include in their analysis what's expected with Rift Valley Fever (RVF), taking into account economic losses and implication when an outbreak occurred. West Africa, East Africa and South Africa are really affected by recent outbreaks. [JACQUES-ANDRE NDIONE, Senegal]	Literature was not identified on the risks of warming of 1.5 and 2C.
12802	96	14	96	14	Impacts of climate change on air pollution with health effects could be mentioned; there are a number of studies, global and regional on this topic. Currently it is only mentioned in urban area section but should be mentioned. There are many such studies including the results of the ClimateCost project <a href="http://www.climatecost.cc/">http://www.climatecost.cc/</a> ; there are several recent papers on the topic. Also the impact of increased pollen seasons, and allergenic pollen loads could be mentioned. [Robert Vautard, France]	Paragraph on air quality added.
5483	96	16			conflicts missing and better use forced population displacement and conflicts arising from climate change as subheading. Please try to explain how climate change indices and increases natural disasters and link that to displacement of people [Aliyu Barau, Nigeria]	The section was reorganized and revised to incorporate comments from the reviewers.
1444	96	16			whole section: this section is interesting but where is the 1.5C target vs 2C? For me it is 'just' an update of the AR5 [Philippe Roudier, France]	The section was reorganized and revised to incorporate comments from the reviewers.
13768	96	16			Why is this subsection titled 'migration and conflict' when that is a subtopic of human security – as is stated in the first paragraph below? Confusing [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
5726	96	16	102	3	This section is too general and not directly related to 1.5C warming. Also the text in many sub-sections is too brief. More information and elaboration is needed. [Hong Yang, Switzerland]	The section was reorganized and revised to incorporate comments from the reviewers.
1198	96	16	102	3	See above comment on delineation between Ch3 and Ch5 on sub-regional risks. Several refs used in the section on Africa may fit better in 5.2 (sub-regional). In the sub-sections on livelihoods and human security, highlight what new insights have emerged since the AR5, esp. observed. [Petra Tschakert, Australia]	The section was reorganized and revised to incorporate comments from the reviewers.
4726	96	16	99	6	There is no mention of the potential importance of migration on the spread of infectious diseases in this section and I think it should be included here, or somewhere else in (for example) cascading effects sections. [Nicholas Ogden, Canada]	This is an excellent point for which there isn't literature comparing the risks at warming of 1.5 and 2C.
16303	96	18	96	18	Is there a section on how extreme weather and storms are requiring relocation, etc.? Just consider the recent severe tropical cyclones that have devastated whole island nations. [Michael MacCracken, United States of America]	Paragraph on displacement added.
13769	96	22			But the paragraphs below do NOT summarise the findings for each of the 5 issues. Where is the assessment of literature on impacts on cultures? Where is state integrity & geopolitical rivalry? [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
9874	96	25	96	32	The chapters of the TDTH2 and TDTH3 reports have also been updated and published as peer-reviewed papers in Regional Environmental Change (Volume 17 issue 6). They provide detailed assessments of the effects of climate change impacts on natural and human systems and the implications for development, livelihoods and poverty. [Christopher Reyer, Germany]	Thank you. References are included.
2625	96	26	96	32	mention in particular the disproportionate impact on ethnic minorities? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	This is an excellent point for which there isn't literature comparing the risks at warming of 1.5 and 2C.
13770	96	29	96	29	How does loss of sense of place affect livelihoods? Loss of actual places, yes. Sense of place is about identity, and probably better discussed in terms of wellbeing and community connectedness under the issue of 'cultures' [Elvira Poloczanska, Germany]	This is an excellent point for which there isn't literature comparing the risks at warming of 1.5 and 2C.
7324	96	35	107	39	Delete section 3.5.5.1.2 "Human security" and the text "Cramer et al. (2014) assessed the literature on the connection between climate change and human security, focusing on conflict and involuntary migration. Each is multi-causal, with multiple drivers and embedded social processes. Overall, evidence of a climate change signal was limited, with more evidence of impacts of climate change on the places where indigenous people live and on traditional ecological knowledge". [Eleni Kaditi, Austria]	The section was reorganized and revised to incorporate comments from the reviewers.
13771	96	35	96	39	Why is this a sub-subsection when human security is the metatheme? This is very confusing - this whole section 3.5.5 needs rethinking and rewriting [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
1519	96	35	96	39	Definition of "human security" is not clear here. This term has various meanings, thus it is nice to have the definition in this report. [Ken'ichi Matsumoto, Japan]	The section was reorganized and revised to incorporate comments from the reviewers.
13772	96	36			There is also more up to date literature on the topic of human security! [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
19046	96	36	96	36	Just one question: why quoting Cramer et al (2014)? It's better to quote Adger et al. 2014 (Adger, W.N., J.M. Pulhin, J. Barnett, G.D. Dabelko, G.K. Hovelsrud, M. Levy, U. Oswald Spring, and C.H. Vogel, 2014: Human security. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Billir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 755-791.) [JACQUES-ANDRE NDIONE, Senegal]	Changed
9878	96	42			This section underestimates the impact on migration. This may be inadvertent, since the section on page 98 line 28 ff emphasizes migration as an issue. [Susan Clayton, United States of America]	The section was reorganized and revised to incorporate comments from the reviewers.
9113	96	42	98	45	This entire section is muddled and needs reorganization. Migration is certainly an aspect of Human Mobility but Conflict is only sometimes related to mobility. By classifying them together under Mobility and mentioning them together early in this section, the section leaves the impression that these two are inevitably related. Furthermore, the writing is poor (for example, see lines 48-53, p.96). New migration literature relevant to this report is rather large and additional citations could help round out the presentation which is rather sparse at this point. [Michael Oppenheimer, United States of America]	The section was reorganized and revised to incorporate comments from the reviewers.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11452	96	42	98	45	Sections 3.5.5.1.3 Human Mobility and 3.5.5.1.5 Migration could be integrated. [Stewart Lockie, Australia]	The section was reorganized and revised to incorporate comments from the reviewers.
20783	96	43	97	1	Human mobility may lead to change in the map of the diseases and the needs for special adaptation measures such as certain types of vaccines or treatments, ... so on. [Amal Hussein, Egypt]	This is an excellent point for which there isn't literature comparing the risks at warming of 1.5 and 2C.
19247	96	44	96	44	Cange "risk Oppenheimer et al. (2014)" by "risk (Oppenheimer et al. 2014)" [Rubén Retuerto, Spain]	Changed
13773	96	45	96	46	This is written in past tense. Is this this conclusion still valid? [Elvira Poloczanska, Germany]	Changed
1445	96	49			conflicts: I guess this section is more about "mobility". Maybe put this sentence before this section. [Philippe Roudier, France]	The section was reorganized and revised to incorporate comments from the reviewers.
7325	96	51	96	51	Delete the text "and threats to human security" [Eleni Kaditi, Austria]	The section was reorganized and revised to incorporate comments from the reviewers.
7326	96	53	96	56	Delete the text "Some studies even warn against deterministic positivist approach toward linking extreme wheather or climate change directly with human security issues in general (Selby 2014; Raleigh et al. 2014). A study by Gleditsch and Nordås (2014) suggested that the IPCC through its previous Assessment Reports are found to express unclear and". [Eleni Kaditi, Austria]	The section was reorganized and revised to incorporate comments from the reviewers.
17279	96	55	97	1	I do not think this sentence is relevant to what it is exposed here. [Maria Jesus Iglesias Briones, Spain]	Deleted
7327	97	1	97	1	Delete the text "sometimes conflicting messages on the relationships between climate change with human security in general". [Eleni Kaditi, Austria]	The section was reorganized and revised to incorporate comments from the reviewers.
5484	97	4			conflicts [Aliyu Barau, Nigeria]	Changed
13774	97	4			Heat related violence should be covered in this subsection [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
9879	97	4	97	38	The discussion on conflict appears to be limited to intergroup and even international conflict. There is evidence for an impact on interpersonal aggression and violence, which should be included in some place. [Susan Clayton, United States of America]	The section was reorganized and revised to incorporate comments from the reviewers.
4928	97	4	97	12	This section regarding relationships between development/devolvement of civilizations and conflict in relation to drought or other prolonged environmental stress is extremely underdeveloped and should be expanded and reconsidered. There is a great deal of study and analysis available for the prehistoric American Southwest, two key references include: Schwindt, D. M., Bocinsky, R. K., Ortman, S. G., Glowacki, D. M., Varien, M. D., & Kohler, T. A. (2016). The social consequences of climate change in the central Mesa Verde region. American Antiquity, 81(1), 74-96., and Schoon, M., Fabricius, C., Anderies, J. M., & Nelson, M. (2011). Synthesis: Vulnerability, traps, and transformations-long-term perspectives from archaeology. Ecology and Society, 16(2). Patterns of civilization stress and regeneration in relation to flooding in China is developed here: Kidder, Tristram R., Haiwang Liu, Michael J. Storzum, and Zhen Qin (2016) New Perspectives on the Collapse and Regeneration of the Han Dynasty. In Beyond Collapse: Archaeological Perspectives on Resilience, Revitalization, and Transformation in Complex Societies, edited by Ronald K. Fauseit, pp. 70-98. Proceedings of the 29th Annual Visiting Scholar Conference, Center for Archaeological Investigations, Southern Illinois University in Carbondale. [Marcy Rockman, United States of America]	This is an excellent point for which there isn't literature comparing the risks at warming of 1.5 and 2C.
16304	97	5	97	7	Sentence seems to be backwards--I'd urge putting the conclusion up front so it is more visible. [Michael MacCracken, United States of America]	The section was reorganized and revised to incorporate comments from the reviewers.
4630	97	7			Italics for "low confidence" [Radim Tolasz, Czech Republic]	Changed
1448	97	14	97	26	I find weird that you write previously that overall there is no agreement about the link between weather shocks and conflicts and this section aims typically to demonstrate the opposite, Or maybe I did not get something. [Philippe Roudier, France]	The section was reorganized and revised to incorporate comments from the reviewers.
1446	97	15			are you sure this is "causal"? Because finding a good correlation does not mean that there is a causal link. [Philippe Roudier, France]	The section was reorganized and revised to incorporate comments from the reviewers.
1447	97	20			could you explain what a coincidence rate is? Again coincidence and causal effect are different things. Right now, I am reviewing the IPCC report and the sun is shining, this is a coincidence but I don't think there is a causal link... [Philippe Roudier, France]	The section was reorganized and revised to incorporate comments from the reviewers.
19248	97	25	97	25	Change "find" by "finds" [Rubén Retuerto, Spain]	Changed
19249	97	34	97	34	Change "vulnerability" by "vulnerable" [Rubén Retuerto, Spain]	Changed
9329	97	34	97	34	The phrase "in turn lead to people become vulnerability" should read, "in turn lead to people becoming vulnerable" [Siir KILKIS, Turkey]	Changed
4631	97	35			Use "and/or" instead of "and or". [Radim Tolasz, Czech Republic]	Changed
7328	97	36	97	37	Delete the text "strong institutions reduce violent conflict and improve human and social security, and last,". [Eleni Kaditi, Austria]	The section was reorganized and revised to incorporate comments from the reviewers.
13775	97	40			why focus on Africa, Mediterranean, South Asia – what is rationale for just these parts of the world and not others? [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
4632	97	42			Change "Sudam" by "Sudan" [Radim Tolasz, Czech Republic]	Changed
11785	97	46	97	47	"Provides", not "provide"; and "like", not "line" [David Schoeman, Australia]	Changed
19250	97	46	97	47	Weird sentence, also change "provide" by "provides" [Rubén Retuerto, Spain]	Changed
1449	97	51			there are two Buhaug et al(2015) references in your bibliography. Please indicate the good one [Philippe Roudier, France]	Changed
1450	97	51	97	53	I really do not understand this sentence, and I am wondering where you found this result. Don't you say exactly this opposite in the previous sentence (with the same reference)? [Philippe Roudier, France]	The section was reorganized and revised to incorporate comments from the reviewers.
2980	97	55	97	55	Lastly hunger can trigger migration which can in-turn lead to non-state conflict. What is "non-state conflict" in this context? [Erica Head, Canada]	The section was reorganized and revised to incorporate comments from the reviewers.
19251	97	56	98	1	Please, rephrase [Rubén Retuerto, Spain]	The section was reorganized and revised to incorporate comments from the reviewers.
19252	98	2	98	2	Change "periods" by "period" [Rubén Retuerto, Spain]	Changed
1451	98	3			about syria, please have a look at a recent paper: selby et al (2017) Climate Change and the Syrian Civil War Revisited [Philippe Roudier, France]	Referenced used
2176	98	8	98	13	The possible link between climate change and the Syrian conflict is also discussed elsewhere in this draft chapter, in two separate places. I suggest that the various discussions should reach similar conclusions. They do not do this, at the moment. The CLAs need to decide what the story is regarding Syrian conflict and climate change. [Neville Nicholls, Australia]	The section was reorganized and revised to incorporate comments from the reviewers.
19253	98	9	98	9	Insert before "A" [Rubén Retuerto, Spain]	Changed
4327	98	9	98	9	space between 2°C.A -> 2°C. A [teodoro georgiadis, Italy]	Changed
12804	98	12	98	13	The claim that "the conflict in Syria is 2 to 3 times more likely" is not what Kelley et al demonstrated, so the full sentence is wrong. They showed that the drought is 2-3 times more likely. There are many other factors involved in the conflict itself than the drought. [Robert Vautard, France]	The section was reorganized and revised to incorporate comments from the reviewers.
19254	98	13	98	13	Change "is" by "was" [Rubén Retuerto, Spain]	Changed

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19255	98	22	98	22	Insert "." after India or insert "and" before "they find..." [Rubén Retuerto, Spain]	Changed
14027	98	28			The human mobility subsection above also addresses migration [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
7322	98	33	98	33	Delete the text "circular or voluntary". [Eleni Kaditi, Austria]	Deleted
4633	98	43			Change "at average of 25 degree C" by "at yearly average temperature of 25 °C" ? [Radim Tolasz, Czech Republic]	Changed
19256	98	43	98	43	Is it correct? "25 degree C" ?? [Rubén Retuerto, Spain]	Changed
4328	98	43	98	43	25 degree C or 25 degrees Celcius or 25°C [teodoro georgiadis, Italy]	Changed
9485	98	43	98	44	Does the "average of 25 degrees C" described in the discussion of migration refer to an ANNUAL average of 25 degrees C? If so, please say so. Also the text after the comma could be more clearly expressed by saying (if I have understood it correctly) "... which means that any increase WHILE MEAN ANNUAL TEMPERATURE REMAINS BELOW 25 degrees C reduces outmigration, but an increase above it increases outmigration. [David Wratt, New Zealand]	The section was reorganized and revised to incorporate comments from the reviewers.
14028	98	43	98	44	Wonder what role humidity plays here? Temperature cannot be the only indicator? [Elvira Poloczanska, Germany]	The section was reorganized and revised to incorporate comments from the reviewers.
4329	98	44	98	44	add °C and the sentence it is unclear [teodoro georgiadis, Italy]	Changed
4330	98	56	98	56	a reference is needed [teodoro georgiadis, Italy]	Reference added
3855	99	1		6	I cannot understand why this paragraph is placed here. [Woonsup Choi, United States of America]	Deleted
2357	99	1	99	2	The use of % to show increase is rather dubious, the figures here are so small that the % rise can seem overtly large when the original baseline is low. Just use the exact numbers [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Changed
1199	99	1	99	6	This paragraph seems out of place. Either relocate or delete. [Petra Tschakert, Australia]	Deleted
11453	99	1	99	6	Opportunities to expand Arctic cruise shipping sit uncomfortably in a section on risks from 1.5 and 2 degrees of warming. They are not, themselves, a risk. [Stewart Lockie, Australia]	Deleted
19257	99	5	99	5	Change "new" by "new" [Rubén Retuerto, Spain]	Changed
9330	99	5	99	5	The typos "new-and medium-term" may be corrected as "near-and medium term" [Sir KILKIS, Turkey]	Changed
2726	99	8	99	10	It is good that this box is to be developed, as an initial reading of Chapter 3 does give the impression that Africa is not that well covered. It is not clear whether the box will focus on drylands, or cover humid areas as well - but it may be worth considering a focus on drylands, given the previously mentioned higher temperature increases in drylands. [Penny Urquhart, South Africa]	Thanks. Box has been further develop in SOD
12893	99	13		30	I am not sure about the contribution of the subject in Box 3.9 [Jorge Carrasco, Chile]	Thank you. There is very limited information on the interacting and cascading risks of warming; this is an example.
2727	99	13	99	30	Box could benefit from introductory statements to locate this within the chapter. [Penny Urquhart, South Africa]	Noted. An introductory statement will be added.
11454	99	13	99	30	I do not see the relevance of this example (Box 3.9). The authors should identify a case that illustrates cascading and interactive impacts arising from climate change, not arising from poor planning and pollution regulation. [Stewart Lockie, Australia]	As noted in the box, climate change interacted with the vulnerabilities arising from poor planning and pollution.
13776	99	13	99	30	1. Here, a very good example is presented. But are there more?; 2. species names in italics [Elvira Poloczanska, Germany]	This is a particularly well described example that illustrates the principles; page length precludes others. Change made on species names.
4943	99	18	99	19	..., toxic blooms of Pseudochattonella marina resulted ... should be: "..., toxic blooms of the dinoflagellate Pseudochattonella marina resulted ..." in order to inform about the taxonomic nature of this organism [Alejandro Cearreta, Spain]	Editorial - copyedit to be completed prior to publication
4634	99	19			Italics for "Pseudochattonella marina" [Radim Tolasz, Czech Republic]	Changed
19258	99	19	99	19	Italicize "Pseudochattonella marina" [Rubén Retuerto, Spain]	Changed
11786	99	19	99	24	Generic and specific epithets are not italicised [David Schoeman, Australia]	Changed
4635	99	21			Use US\$ currency format [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
4636	99	24			Italics for "Alexandria catenella" [Radim Tolasz, Czech Republic]	Changed
4944	99	24			..., a bloom of Alexandria catenella, an organism ... should be "..., a bloom of the dinoflagellate Alexandrium catenella, an organism ..." in order to correct the generic name and to inform about the taxonomic nature of this species [Alejandro Cearreta, Spain]	Editorial - copyedit to be completed prior to publication
19259	99	24	99	24	Italicize "Alexandria catenella" [Rubén Retuerto, Spain]	Changed
3604	99	32			The topic of this box is unclear. The first issue, is why should a box be on US only avoided climate damages. Assuming this is relevant, why are the first 30 lines devoted to the issues of emissions pathways and their cost (a whole chapter deals with mitigation pathways). The discussion that follows is unclear and unfocused. [Valentina Bosetti, Italy]	Noted. Boxed will be revised in next draft.
14029	99	32			The writing in this box is unclear and full of jargon, please write in common language. [Elvira Poloczanska, Germany]	Noted. Boxed will be revised in next draft.
12419	99	32	100	28	This box is not very reader-friendly, and does not discuss any of the limitations or uncertainties around estimating climate damages. Who is the work by? [Bill Hare, Germany]	Noted. Boxed will be revised in next draft.
11455	99	32	101	2	The summary of research in Box 3.10 is extremely poorly written. [Stewart Lockie, Australia]	Noted. Boxed will be revised in next draft.
2177	99	32	102	2	This important box will be unintelligible to nearly all readers. It needs to be simplified. At least restrict the trajectories to the median-median one (and make a comment about uncertainty in trajectories causing uncertainty in the results. The spelling and grammar also need to be improved, to make it readable. [Neville Nicholls, Australia]	Noted. Boxed will be revised in next draft.
2534	99	32	102	2	This box is hard to follow. [Robert Koppu, United States of America]	Noted. Boxed will be revised in next draft.
2728	99	32	102	3	Box needs an introductory statement - preferably the key take-home message stated upfront, for greater clarity. [Penny Urquhart, South Africa]	Noted. An introductory statement will be added.
12272	99	32	102	3	I think Box 3.10 has useful and relevant material, but I suggest the authors put some efforts into improving the presentation. Simplification and different wordings may help to convey the content to a wider audience. [Jan Fuglestedt, Norway]	Noted. Boxed will be revised in next draft.
4637	99	48			Change "trajectories" by "trajectories" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
11787	99	48	99	48	"Trajectories" is misspelled [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
19260	99	48	99	48	Remove first "r" in "trajectories" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
10674	99	48	99	48	Typo - trajectories [Kristin Campbell, United States of America]	Editorial - copyedit to be completed prior to publication
19060	99	49	99	49	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Editorial - copyedit to be completed prior to publication
12270	99	49	99	51	Something seems to be missing in this sentence at the end. [Jan Fuglestedt, Norway]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12269	99	50	99	51	to maximize the discounted logarithmic derived utility is not clear to many of the readers and could be explained better. [Jan Fuglestedt, Norway]	Noted. Boxed will be revised in next draft.
12271	99	51	99	56	This text should, in my view, be reworded to make it more accessible to the readers (who come from different backgrounds) [Jan Fuglestedt, Norway]	Noted. Boxed will be revised in next draft.
12273	100	3	100	3	Is "temperature reaction functions" the same as "damage functions" ? I think "temperature reaction functions" should be explained (quadratic/cubic, regional, physical parameter used etc). [Jan Fuglestedt, Norway]	Noted. Boxed will be revised in next draft.
1566	100	14	100	16	Uncertainties should be discussed, as damage from crossing tipping points are very difficult to estimate, and might lead to underestimation of economic losses [Noé Lecocq, Belgium]	This is a good point, but other comments requested simplification
19261	100	27	100	27	Rephrase [Rubén Retuerto, Spain]	Noted. Boxed will be revised in next draft.
14988	102	6	109	28	In updating the reasons for concern discussion to address warming of 1.5 deg C the authors should also include specific discussion of their findings to the degree of scientific understanding available. In other words, if the conclusions are drawn upon very recent and limited numbers of studies, it should be noted that this may affect the robustness of the authors claims. If expert judgement is used to determine levels of risk, that should be noted as the opinions of the particular experts and not represented a broad scientific consensus. Finally, in such cases the authors include information on the sensitivity of their findings to the underlying uncertainty regarding the emission pathway, transient climate response, and the impact modeling. [Farhan Akhtar, United States of America]	Such a discussion has been added. It should also be noted that the discussion of the reasons of concern strongly relies on the foundation provided by AR5, with the new insights around impacts at 1.5 degrees C and 2 degrees C relying largely on a new body of peer-reviewed research.
11456	102	10	102	17	This text should be re-written so that it makes sense without cross-referencing another report (AR5). Given this is an introduction, it would be useful if it more clearly established the aims, or problem, addressed in what is to follow. [Stewart Lockie, Australia]	The text has been rewritten so that the RFC discussion is now self-consistent and does not rely referring back to AR5 for the key definitions.
13777	102	11	102	11	add abbreviation: "Reasons for Concern (RFC)" [Elvira Poloczanska, Germany]	RFC abbreviation now defined when used first
14030	102	21	102	25	Write these out fully as per AR5 WGII chp 19 or they are misleading eg RISKS ASSOCIATED WITH extreme weather events [Elvira Poloczanska, Germany]	The RFCs are fully defined and described in the latest text.
2178	102	36			I don't know why this section will also look at 3C and 4C. Isn't the report just about 1.5 and 2C warming? [Neville Nicholls, Australia]	Correct. The discussion is now largely focussed on distinguishing between avoided risks at 2 degrees C vs 1.5 degrees C of warming.
14031	102	36			Please focus on going beyond the AR5 assessment rather than repeating the content. Authors should assess going beyond the five reasons of concern, see additional embers in O'Neill et al., 2017 and synthesis report [Elvira Poloczanska, Germany]	The discussion has been considerably extended in the SOD with new peer-reviewed research outputs that still builds on AR5 but also extends it to new results in terms of the RFC at 1.5 degrees vs 2 degrees C of global warming.
2729	102	36	109	28	There is a lot of repetition in this section from preceding sections. Suggest that this is largely removed from this section, with cross-referencing to preceding sections used instead. [Penny Urquhart, South Africa]	These repetitions have been removed and the section 3.6 text is now more fluent with clear transitions from one section to the next.
1200	102	36	109	28	Shorten insights from the RFC from the AR5. Again, anything at the sub-regional level with relevant to poverty, inequalities and equity, please resolve with Ch5 (section 5.2). [Petra Tschakert, Australia]	Section on hot-spots and regional tipping points are now developed more completely, and these deal also with sub-regional impacts.
4638	102	38			Add explanation of RFC [Radim Tolaz, Czech Republic]	Added.
16305	102	38	102	38	For general reader it would be good to spell out what RFC is here. Well, what is needed is to insert "(RFC)" on line 11. [Michael MacCracken, United States of America]	The acronym is now defined when used first and the RFC text is more self-consistent.
14032	102	46	102	47	unclear wording [Elvira Poloczanska, Germany]	The section has been largely rewritten.
1303	103				Given the diversity of impacts dealt with in Chapter 3 and the need to maximise its policy relevance, would it be possible to evolve the "burning embers diagram" to include additional reasons for concern that bring out a stronger focus on changes in human systems e.g. health, food security, infrastructure? [Debra Roberts, South Africa]	These aspects are discussed in some detail under "global aggregated risks, with section 3.4 in the SOD also dealing in great deal with impacts on human systems.
19047	103	1	103	2	The quality of the Figure 3.21 should be improved. [JACQUES-ANDRE NDIONE, Senegal]	The figure has indeed been updated.
9620	103	22	103	31	clearing differences of the effects of 1.5°C and 1.6 °above pre-industrial levels,only 0.1?difference ? [Jianguo Wu, China]	The relevant studies used here quoted impacts for specifically 1.6 degrees C of global warming, and is indeed used as an approximation for impacts at 1.5 degrees C.
14033	103	23	103	23	what are these unique and threatened systems? [Elvira Poloczanska, Germany]	These systems are now listed and discussed in more detail in the SOD.
14034	103	26	103	26	Arctic sea ice ecosystems and coral ecosystems [Elvira Poloczanska, Germany]	Avoided risks at 1.5 degrees C of global warming are now discussed extensively in section 3.5 of the SOD for both sea-ice ecosystems and coral reefs
16306	103	26	103	26	Given that model results lag observations with respect to the rapid thinning and melting back of Arctic sea ice now occurring at a global warming of 1 C, it seems to me that it will not take anything like a global warming of 2.6 C (so, in the Arctic, over 5 C) for Arctic sea ice to be endangered. Indicating that there is "high confidence" that it will take this much warming, which is unlikely to occur into the second half of the 21st century, to endanger Arctic sea ice seems way out of touch with what has actually been happening. Similarly for coral being endangered, given the losses already occurring, such as at the Great Barrier Reef and given that ocean acidification will also be occurring. I would suggest there is a likelihood of very high risk at a considerably lower level of warming. [Michael MacCracken, United States of America]	Agreed. The latest peer-reviewed evidence indicates high-risks for the Arctic to be ice-free in summer under 2 degrees C of global warming, with similar high risks for coral reefs. The discussion has been carefully updated using the latest peer-reviewed papers.
7600	103	34			The Lewis et al, 2017 (accepted) paper should be discussed here. They find a significant difference in temperature extremes over the great barrier reef. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	This paper will be considered carefully towards the next version of the Chapter.
7490	103	34	104	3	Please check for unnecessary overlap and repetition compared to previous sections on tropical coral reefs [Øyvind Christophersen, Norway]	Section 3.6 has been stream-lined to discuss specifically avoided risks at 1.5 degrees C and overlaps with previous sections, including for coral reefs, have been reduced.
5727	103	34	104	6	The impact on coral reefs is already given in Box 3.6. [Hong Yang, Switzerland]	Noted, but it is still needed to summarize the impacts relevant to coral reefs in the section on unique and threatened systems and in terms of tipping points.
7491	103	36	103	40	It is unclear whether the estimated number of bleaching events per decade is a global estimate where not every region will be hit each time, or if it is an estimate of bleaching events expected per region. [Øyvind Christophersen, Norway]	The relevant statistics are now discussed in Box 3.6 of SOD, and care has been taken to avoid confusion between global and regional statistics of bleaching. The FOD text has largely been rewritten and the new section 3.5.2 now focused only on the avoided risks for bleaching under 1.5 vs 2 degrees C of global warming.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16307	103	37	103	37	When one says "about 10 bleaching events per decade"--is this not every year? Does "bleaching event" refer to a global scale event or a regional one? If it takes a couple of years to recover, does not an event every year mean they will be wiped out. [Michael MacCracken, United States of America]	The relevant statistics are now discussed in Box 3.6 of SOD, and care has been taken to avoid confusion between global and regional statistics of bleaching. The FOD text has largely been rewritten and the new section 3.5.2 now focused only on the avoided risks for bleaching under 1.5 vs 2 degrees C of global warming.
14035	103	37	103	37	a broader reference base is needed [Elvira Poloczanska, Germany]	This section has been significantly extended and now also has a stronger reference base.
14036	103	39	103	40	avoid repeating text from earlier and avoid describing the colours of the RFC figure rather than discussing the risks [Elvira Poloczanska, Germany]	Noted. The text has been considerably revised and now focuses strongly on avoided risks under 1.5 degrees C of warming.
16308	103	40	103	40	How about saying "prevent the total global loss of coral reefs"? Though I would note that I understand there are some deep water corals in relatively cool waters--not discussed in this report. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16721	104	9	104	21	Comparison of impacts of climate warming at +1.6 and +2.6 of Arctic marine ecosystems are here introduced very quickly. Nothing about continental arctic (socio-) ecosystems. A note (starting l.19) explain that "discussion is expected to follow, pending the available literature, analyzing impacts at 1.5 °C vs 2°C in the Arctic". If needed, I could give it a try, such as a review of the literature on the topic (as a PhD working on effects of climate change and vegetation shifts on Saami/reindeer herders landscapes; romain.courault@paris-sorbonne.fr // courault.romain@gmail.com) [Romain Courault, France]	Some of the socio-economic impacts of warming in the Arctic is now discussed in Section 3.4 of the SOD, with a focus on livelihoods, food systems including fisheries and trade. At the time of finalizing the SOD there was still relatively little information available on differential impacts at 1.5 vs 2 degrees C of global warming.
16309	104	10	104	11	When this says "nearly ice-free Arctic Ocean", is this for the whole year, or just the summer. Clarification is needed. [Michael MacCracken, United States of America]	This refers only to the summer period, and this is now stated in the text more clearly.
19262	104	12	104	12	Remove "a" after with [Rubén Retuerto, Spain]	Correction made
18025	104	12	104	12	with a the sea ice -- with the sea ice [Wilfran Moufouma Okia, France]	Correction made
16310	104	12	104	13	What does "sea ice persisting throughout the year for global warming less than 1.5 C" mean? Presumably that one has not gotten to any month with sea ice less than 1M km2. First, I think it highly questionable that this will be the case given trends of thinning and retreat. However, to seemingly suggest that not reaching the minimum is somehow reassuring seems really off base--there are large effects going on now affecting marine species, Indigenous harvesting, and permafrost thawing. This needs to indicate how far from what used to exist will be the case at 1.5 C--the region will be very different, losing glacial mass, the Greenland Ice Sheet likely headed toward destruction. This statement about 1.5 C conditions is just far too positive--going below 1M km2 has been suggested as some transition, but the real albedo transformation is when the surface of the sea ice goes from unmelted to melted--once this happens the surface albedo is way down and the region is on track to melting, etc. I just think the framing here about impacts is wrong--all reductions in sea ice are having ecological and social consequences. [Michael MacCracken, United States of America]	Many thanks for the valid concerns raised. Firstly, indeed with sea-ice persisting throughout the year is meant that there is not a single month that becomes ice-free. The discussions has been significantly extended to make it clear that the risks of an ice-free Arctic is substantially higher at 2 degrees C of warming compared to 1.5 degrees C of warming. We have taken note of the point that there will nevertheless be negative impacts related to reduced sea-ice extent at 1.5 degrees C of warming, and these are discussed across sections 3.4 and 3.5.
7492	104	16	104	17	Does this mean that less thawing of permafrost is expected at 2 degrees warming compared to at 1.5 degrees warming? Please consider rewriting this sentence, and consider to link this information with the carbon budget. [Øyvind Christophersen, Norway]	Yes, correct. The entire section has been rewritten and benefits in maintaining permafrost at 1.5 degrees C vs 2 degrees C of global warming is now more clearly described. The authors expect that more detail on the differential impacts at 1.5 vs 2 degrees C of warming will become available towards the next draft and that this section will be extended.
12420	104	16	104	17	Reduced thawing of permafrost would be expected to occur at 2 deg vs. 1.5 deg - should this be "at 1.5 vs. 2 deg" [Bill Hare, Germany]	Yes, correct - many thanks for pointing out this oversight.
4737	104	24	104	33	the impacts on flora and fauna should also be mentioned. Since unique ecosystems involve unique populations of living organisms. Here the impact on "symbiosis" could be further explained as well [Spyros Schismenos, China]	Those are valid points. Impacts on fauna and flora are discussed in some detail in section 3.4. The authors have made a note to monitor the peer reviewed literature of further publications in this field, including symbiosis as a further aspect to consider in terms of vulnerable ecosystems.
9613	104	24	104	33	climate change may result in appearing new ecosystem type or change the distribution of biome, and climate change in future may increase the risk of extinction of rare or endangered species. In addition, climate change may increase the alien species invasion. [Jianguo Wu, China]	Agreed. Risks for extinction is discussed in some detail in section 3.4.
1374	104	25	104	30	Repetition from section 3.1.2.4. See comments to p. 58 line 11 on "Siberian ecosystems" [GREGORY INSAROV, Russian Federation]	The section 3.5 text has been revised to avoid these repetitions.
4639	104	32			Change "N America" by "North America" or "N. America" to be consistent in whole Report [Radim Tolasz, Czech Republic]	Noted. This change will be implemented in the next draft.
12421	104	40	104	44	SIDS and RFC: will this analysis include consideration of limits to adaptation [Bill Hare, Germany]	Yes. We do expect that more literature will be available beyond the SOD to discuss to some extent the limits to adaptation.
9142	104	40	104	44	This section on small islands in the "reasons for concern" is very brief and misses a lot of important detail. In particular, it should include consideration of adaptation limits and residual impacts. [Susanna De Beauville-Scott, Saint Lucia]	The section has been developed further in the SOD.
11457	104	41	104	44	Avoid conflating the cultural diversity of small island states (which is valuable in its own right) with biological diversity. While they are certainly inter-dependent it should be clear that people are not being treated as mega-fauna. [Stewart Lockie, Australia]	Point taken. We have carefully further developed the discussion around small island states.
14037	105	1			please ensure a focus on ecosystems and human systems in this section [Elvira Poloczanska, Germany]	The section has been further developed within the context of reducing impacts on ecosystems in particular.
12422	105	1	106	26	Not all extreme events are covered, e.g. tropical cyclones, ocean heat waves, storm surges [Bill Hare, Germany]	The section has been extended considerably to include the mentioned extreme events. It should be noted that at the time of preparing the SOD there was no peer-reviewed outputs available on the avoided risks for the case of ocean heat waves, at 1.5 vs 2 degrees of global warming.
9141	105	1	106	26	The section on extreme events is limited to a small number of extreme events, and thus needs to be expanded. Tropical cyclones, storm surges and ocean heat waves are not included. [Susanna De Beauville-Scott, Saint Lucia]	This section has indeed been considerably extended to include, amongst others, a discussion on avoided risks for the extreme event case of tropical cyclones, storm surges and heat waves
14038	105	10	105	11	nature of risk, e.g. for ecosystems or humans unclear. [Elvira Poloczanska, Germany]	The section has been extended and now offers a more elaborate description of risks.
2774	105	17			in the southern part of Europe, rainfall associated with storms has increased. Heavy rain with hail. [Jonathan Gómez Cantero, Spain]	The peer-reviewed literature is indicative of generally drier conditions in southern Europe under global warming, with heavy precipitation increasing across the continent, except over southern Europe in summer.
14039	105	19			This comes back to initial problem in the chapter that climate information is not directly linked to the discussion of impacts and adopts too much space. [Elvira Poloczanska, Germany]	Chapter 3 has been largely rewritten and changes in the physical climate system are now linked more clearly to impacts

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12487	105	19	105	32	In addition to El Nino-like events, Urbanization increases air temperature significantly and their impact can exceed such El-Nino events. [Jinkyu Hong, Republic of Korea]	Urban heat island effects are discussed in some detail in section 3.4, but little peer-reviewed evidence is available to distinguish between impacts at 1.5 degrees C vs 2 degrees C of global warming.
17448	105	19	105	57	Recommended reference: Cai, W., S. Borlace, M. Lengaigne, P. V. Rensch, M. Collins, G. Vecchi, A. Timmermann, A. Santoso, M. J. McPhaden, L. Wu, M. H. England, G. Wang, E. Guivardi, and F. F. Jin, 2014: Increasing frequency of extreme El Nino events due to greenhouse warming. Nature Climate Change, 4, 111-116. [Xiaolin Zhang, China]	This reference is now being used in section 3.4.
8839	105	27	105	29	Figure 3.3.2 is not exist. [Lubna Alam, Bangladesh]	Figures have been renumbered and updated in the SOD, and in this latest version the relevant figure is 3.4 - which exists.
7005	105	34	105	45	To balance the view, there should be a discussion on the decrease of mortality due to reduction of extremely cold events. [Sai Ming Lee, China]	At the time of preparing the SOD, peer-reviewed guidance on reduced mortality at 2 degrees C vs 1.5 degrees C within the context of extreme cold events did not exist. This issue will be monitored towards the preparation of the next draft.
3856	105	38		39	The same content (mortality in Stockholm) appeared before (page 93) [Woonsup Choi, United States of America]	The revised section 3.5 now only summarizes the main text in section 3.4 relevant to heat and mortality in Stockholm.
19263	105	38	105	38	Insert "," after "Sweden" [Rubén Retuerto, Spain]	The text has been rewritten.
14040	105	48			Incremental impacts and risks unclear. [Elvira Poloczanska, Germany]	Even at the time of the SOD there are many sectors for which the peer reviewed literature do not clearly distinguish between differential risks at 1.5 vs 2 degrees C of global warming. Yet, some advanced were made since the FOD, and further improvements will be made towards the next draft.
2179	105	48	109	1	Although climate projections suggest an intensification of extreme precipitation events, the magnitude of this intensification, even over the 21st century, is quite small. The magnitude of the projected change in extreme precipitation for the 1.5C and 2C warnings needs to be discussed. Because a small increase in heavy rains occurring over a century need not justify strong mitigation action. [Neville Nicholls, Australia]	These aspects are now discussed in more detail. Towards preparation of the SOD new peer-reviewed evidence has emerged of reduced risks for extreme precipitation under 2 degrees C vs 1.5 degrees C for certain regions of the world, and these have been clearly described.
10025	106		106		Row 21: This is the part that should be given the most place in the report. In particular, extreme weather events need to be assessed in detail in the context of global economic risks in terms of their costs for developing and developing countries. [Nazan AN, Turkey]	Agreed - this is a key aspect of the report. Please see the revised section 3.5.3 which discussed economic impacts in more detail.
9996	106	4	106	11	Insufficient number of reference [Mustafa Tufan Turp, Turkey]	The reader is referred to the more extensive discussion in section 3.3.4
2180	106	4	106	11	The link between droughts and global warming is contested. Therefore, I do not see how you can so confidently conclude that the effects of 2C warming on droughts, relative to 1.5C warming, would "substantially reduce the risk of experiencing extreme reductions in regional water availability". You need to be more circumspect when the subject (droughts) is so complex. [Neville Nicholls, Australia]	See section 3.3.4. There is substantial evidence of a direct link between global warming and drought in the subtropics (Southern Hemisphere) and Mediterranean, and some evidence of reduced risks at 1.5 vs 3 degrees of global warming.
5901	106	7	106	10	The year of Greve et al. is missing. I suppose that this is submitted. It could be written as follows: "Greve et al. submitted". [Joan A. Lopez-Bustins, Spain]	Year (2017) added.
13778	106	7	106	10	add publication year to Greve et al. [Elvira Poloczanska, Germany]	Year (2017) added.
2181	106	14	106	26	This is a confusing paragraph. I'm not sure it addresses the question appropriately. [Neville Nicholls, Australia]	The paragraph has been rephrased.
2626	106	15	106	26	add reference to positive feedback effects? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	There is currently no literature available on changes in fire feedback mechanisms in terms of differential impacts under 1.5 vs 2 degrees C of global warming.
4640	106	16			Change "N America" by "North America" or "N. America" to be consistent in whole Report [Radim Tolasz, Czech Republic]	This change will be implemented in the next draft.
2771	106	27			prolonged droughts help to make the fires much larger. [Jonathan Gómez Cantero, Spain]	Agreed, but the purpose of this section is to report on differential impacts of fires under 1.5 vs 2 degrees C of global warming.
2772	106	27			Fires affect much more surface area [Jonathan Gómez Cantero, Spain]	This is noted in the revised section 3.5.2.2.4
17667	106	36	107	11	Additional information on how climate change impacts on different age groups or sexes such as children and women will help further efforts in combating climate change. Children is the agent of change and Indonesia we have started working on climate change and children as described in www.apifa.or.id. [Perdinan Perdinan, Indonesia]	Agreed. However, at the time of completing the SOD little information was available on the differential impacts across age groups, under 1.5 degrees C versus 2 degrees C of global warming.
4641	106	53	106	54	In the sentence "400 million people could be living in 23 coastal megacities, 370 million in Asia, Africa and South America" the 30 million people is missing. [Radim Tolasz, Czech Republic]	The sentence indicate that of the 400 million people in 23 coastal megacities, 370 million will be living in Asia, Africa and South America.
16311	106	53	106	54	This is a very strange sentence--it sounds as if sea level has to rise by this amount for this many people to be in these cities. I presume the intent is to say that by 2030, these will be the populations in these areas living within 0.3 m of SL and potentially displaced by sea level rise. In any case, sentence needs reworking [Michael MacCracken, United States of America]	Thank you for pointing out this point of potential confusion.
5902	106	55	106	55	The first sentence of this line must be enlarged. What does "subsidence" mean in this sentence? Please specify it. [Joan A. Lopez-Bustins, Spain]	It means to the lowering of the coastline in the presence of erosion, as is now described more clearly in the text.
16313	106	55	106	56	This sentence is very misleading. First, is this all related to baseline sea level, so by 2000 we have already had 15-20 cm of rise and this is suggesting that we'll only have 70% greater than 0.2 m by the time we get to 2 C--well, maybe some areas are low, but a significant fraction will be experiencing much, much more. I just do not understand why the framing is as done here unless it is scientists just wanting to give the very, very lower bound so they won't possibly be wrong, but what decision makers need is a realistic estimate of what is plausible--and how it will continue in the future. Indeed, what also needs to be presented here is an estimate of the plausible upper bounds that can be used in risk analyses and the type of due-diligence studies that businesses are supposed to be doing. Thus, the results presented in this sentence (and the next) are just not what needs to be conveyed. [Michael MacCracken, United States of America]	Agreed that estimates of sea-level rise should have as much resolution as possible to be of value to decision making, rather than mere lower boundaries of projected change. The authors have decided to carefully revise these aspects, and the latest peer-reviewed evidence in the next and final draft of the Chapter.
16312	106	56	106	57	This sentence must be wrong--by the time we get to 4 C warming in a high emission scenario, global sea level rise could be of order 2 m and rising rapidly--perhaps 20% of coastlines will have less than 0.6 m, but the rest is likely to be much higher and committed to far, far higher in the ensuing decades. This sentence just seems to greatly understate the situation that is faced--going into the 22nd century, even the 20% less than 0.6 m will be much, much higher. I just think this a very misleading sentence. [Michael MacCracken, United States of America]	Agreed that estimates of sea-level rise should have as much resolution as possible to be of value to decision making, rather than mere lower boundaries of projected change. The authors have decided to carefully revise these aspects, and the latest peer-reviewed evidence in the next and final draft of the Chapter.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16314	106	57	107	1	So, what are the highest levels? The estimates need to be provided (and this means mean/plausible estimates as well as upper plausible amounts for risk studies--and then perhaps lower bounds if scientists really want to be cautious and safe from criticism). I really think much more useful information for decision makers needs to be described here. [Michael MacCracken, United States of America]	Agreed that estimates of sea-level rise should have as much resolution as possible to be of value to decision making, rather than mere lower boundaries of projected change. The authors have decided to carefully revise these aspects, and the latest peer-reviewed evidence in the next and final draft of the Chapter.
2182	107	21	107	52	This is a confusing discussion. As well, Fig 10.1 in AR5 indicated little evidence of negative impact of warming until 2.5C is reached. This strongly suggests that there is little evidence supporting the conclusion that constraining warming to 1.5C rather than 2C will have an impact on aggregate economic impact. This needs to be stated very clearly in this section. At the moment the confusing discussion in this section does not allow a reader to see this clearly. If later work clearly demonstrates that the AR5 figure is wrong then that work should be included here. But the starting point is the AR5 figure. [Neville Nicholls, Australia]	Accepted, the text will be revised as more literature appears and this content will be emphasized.
7329	107	21	107	52	Delete general arguments on global economic impacts arising from a single regional analysis. [Eleni Kaditi, Austria]	The text will be revised for the final draft, but the regional statement will not be removed unless a large amount of global studies are published, because the literature on this topic is so very limited, and the USA is significant proportion of the global economy. However the fact that it is only one regional study will of course mean that it only has possible implications, as stated here.
16315	107	22	107	23	To suggest that the changes to be expected at 1.6 C are only moderate seems to me to be a serious understatement. Given, for example, the Hansen et al. analysis of impacts above 0.5 C, including likely triggering very significant mass loss from the Greenland and Antarctic ice sheets and resulting sea level rise, it is very hard to understand how these changes can be viewed as moderate, except perhaps compared to what is projected for 4 C. The way the results are stated here, it sounds as if global warming of 1.5 C is a new acceptable level, and that simply should not be indicated--that level was chosen for reasons of political convenience, not by scientists and there is no way this report should be indicating that that level will not have many very serious onsequences. [Michael MacCracken, United States of America]	We agree that a full description of the issues associated with the global economic impacts literature, in terms of its consistency with what is now known about climate change impacts, deserves coverage here. This text reflects only the very limited literature reporting economic calculations, and we agree that it would be good to emphasize more its limitations.
16316	107	23	107	27	Is this really suggesting that negative economic consequences are not occurring now (or at least that there is not a commitment to negative consequences now as a result of loss of ice sheet mass, biodiversity loss, etc.)? And this characterization of 3 C warming as just a "further increase" is simply unacceptable--the world at 3 C would involve terrible disruption along coastlines, abandonment and loss of quite a number of low-lying island nations, tremendous biodiversity loss, and more--and to be suggesting there is only low confidence that there will be further impacts is totally unjustified. [Michael MacCracken, United States of America]	The problem is that the economic literature that underpins these studies does not reflect the issues which you mention. It is for that reason that in AR5, aggregate impacts on biodiversity were included in this ember for the first time, because it is very clear that they are excluded from economic analyses. We agree that this issue of what is excluded from the economic analyses needs to be emphasized more in the final draft
18026	107	29	107	30	This statement needs to be substantiated with relevant literature references [Wilfran Moufouma Okia, France]	To be completed in final draft
16317	107	29	107	30	This seems a totally obvious statement with no real content at all. If this is coming from the Social Cost of Carbon studies, those are bottom-up minimum estimates of impacts with many types of impacts left out. This whole paragraph about a single region study seems inappropriate for a chapter where broader conclusions are being drawn (after all, the chapter is about global economic impacts). Also, just comparing 2 C to 1.5 C impacts needs context by explaining what 1.5 C impacts are--and the implication of 1.5 C warming as time plays out (so, for example, sea level rises). [Michael MacCracken, United States of America]	This section will be revised for the final draft, emphasizing the limitations of these kinds of studies and including newly emergent literature. Although we agree the regional study seems out of place, in view of the very limited literature and the importance of the USA to the global economy, we may need to leave this statement here.
12423	107	29	107	35	What is the source? [Bill Hare, Germany]	Editorial - copyedit to be completed prior to publication
13779	107	29	107	35	provide reference [Elvira Poloczanska, Germany]	To be completed in final draft
19264	107	31	107	31	Change "xx" by the actual temperature value [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
9331	107	31	107	31	The numerical values may be inserted in the phrase "Further, the avoided risks compared to a 'no policy' baseline in which temperatures reach xx are greater..." [Siir KILKIS, Turkey]	Editorial - copyedit to be completed prior to publication
1520	107	31	107	31	What is "xx"? [Ken'ichi Matsumoto, Japan]	Editorial - copyedit to be completed prior to publication
13780	107	40	107	43	The cut off date for literature for AR5 was 2012/2013, so why is a reference of 2006 being used to support this statement? [Elvira Poloczanska, Germany]	This section will be revised for the final draft, emphasizing the limitations of these kinds of studies and including newly emergent literature.
11788	107	41	107	41	"Aggregate" is misspelled [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
19265	107	43	107	43	Change "(Stern 2006." by "(Stern 2006)." [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
13781	107	43	107	43	add ) after Stern 2006 and replace , by . [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
19266	107	45	107	45	Insert "which" before "is in line..." [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
2535	107	46	107	52	Aren't the dollar values here entirely driven by modeling assumptions? [Robert Koppu, United States of America]	This section will be revised for the final draft, emphasizing the limitations of these kinds of studies and including newly emergent literature.
4642	107	49			Change "\$15/tCO2" by "US\$ 15 tCO2-1" and "\$116/tCO2" by "US\$ 116 tCO2-1". [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
16319	107	50	107	52	This is a really meaningless statement--obvious on its face with no quantitative content of any kind. [Michael MacCracken, United States of America]	This section will be revised for the final draft, emphasizing the limitations of these kinds of studies and including newly emergent literature.
16318	107	50	107	50	This notion that 1.5 C is a level that will somehow be acceptable seems a real reach--for how long will this be the case? In that the equilibrium sea level sensitivity to warming based on Earth's climatic history is likely something like 10-15 m or per degree warming (and there is now 70 m of sea level tied up in land ice that is unlikely to have been anywhere near this high the last time the global average temperature was 4+ C above present), the 1.5 C equilibrium might mean an eventual sea level rise (perhaps over a millenium or two) of 20 m or so, so quite possibly a meter or two or more per century, disrupting many of the world's coastal cities, etc. How is this acceptable unless one uses a discount rate in a situation where there is very serious disagreement that this is appropriate (does it really matter that it is your great grandchild that would be displaced instead of your grandchild??) It is really important to be explaining the impacts at 1.5 C and implications (biodiversity as well) and there should be no scientific acceptance that 1.5 C is acceptable--it is not scientist's role to do so--we need to be explaining impacts and their significance. Just because negotiators focus on this level does not mean that science should help them justify this value. [Michael MacCracken, United States of America]	This section will be revised for the final draft, emphasizing the limitations of these kinds of studies and including newly emergent literature. This section does not, as far as I can see, state anywhere that 1.5C warming is acceptable. Please note that this section and the one following, are combined together in the AR5 into a single ember to provide global aggregate impacts (on the economy and biodiversity, please see O'Neill et al. 2017).
5903	107	55	107	55	Please substitute "riks" with "risk". [Joan A. Lopez-Bustins, Spain]	Editorial - copyedit to be completed prior to publication
1375	107	55	107	55	Sub-section "Biome shifts, riks of species extinction and ecosystem functioning and services". Check sub-section 3.4.1.2.1 for repetitions. [GREGORY INSAROV, Russian Federation]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20862	107	55	108	2	emerging or re-emerging of some infectious diseases due to change in the annual temperature and humidity, such as Fungal keratitis (Ref: Saad-Hussein A, El-Mofly HM, and Hassani MA (2011). Climate Changes and Fungal Keratitis Trend: In Egypt. Eastern Mediterranean Health Journal (EMHJ); 17 (6): 468-473. [Amal Hussein, Egypt]	This section will be revised for the final draft, thank you for the additional citations.
20934	107	55	108	32	other example of biome shifts, shift of snails the intermediate host for bilharzia, that leads to change in the distribution of infections and it's complications, such as Bilharzial bladder cancer. (Ref: Ahmed, S.A., Saad-Hussein A, El Feel, A., Hamed, M.A.(2014). Time series trend of Bilharzial bladder cancer in Egypt and its relation to climate change: A study from 1995-2005. International Journal of Pharmaceutical and Clinical Research; 6(1): 46-53) [Amal Hussein, Egypt]	This section will be revised for the final draft, thank you for the additional citations, some of which will be passed to another section of this chapter which considers human health.
3879	107	55	108	2	The text needs to include other published biome shift research. Edit it so that it reads something like "Approximately 5-10% of global ecosystem area is highly vulnerable to biome shifts under 1.5°C warming (Betts et al. 2015, Warszawski et al. 2013.) This could increase to 10-40% under 3°C warming (Betts et al. 2015, Gonzalez et al. 2010, Warszawski et al. 2013)." Betts, R.A., N. Golding, P. Gonzalez, J. Gornall, R. Kahana, G. Kay, L. Mitchell, and A. Wiltshire. 2015. Climate and land use change impacts on global terrestrial ecosystems and river flows in the HadGEM2-ES Earth system model using the representative concentration pathways. Biogeosciences 12: 1317-1338. Gonzalez, P., R.P. Neilson, J.M. Lenihan, and R.J. Drapek. 2010. Global patterns in the vulnerability of ecosystems to vegetation shifts due to climate change. Global Ecology and Biogeography 19: 755-768. [Patrick Gonzalez, United States of America]	This section will be revised for the final draft, thank you for the additional citations.
9875	107	56	107	56	Warszwaszki et al was using only the five ISIMP GCMs. [Christopher Reyer, Germany]	Agree, this section will be revised for the final draft
11789	107	56	108	2	This is repetitive of information already presented [David Schoeman, Australia]	Agree, this section will be revised for the final draft
19267	107	57	107	57	Change "(Warszawski et al. 2013)" by "Warszawski et al. (2013)" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
13782	107	57	107	57	revise position of parentheses [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
7493	108	4	108	18	Please check for unnecessary overlap and repetition compared to previous sections on species range shifts and extinction [Øyvind Christophersen, Norway]	Agree, this section will be revised for the final draft
14041	108	4	108	18	Does the discussion in this paragraph include marine species? [Elvira Poloczanska, Germany]	Agree, this section will be revised for the final draft
19268	108	6	108	6	Change "(Fischlin et al. 2007)" by "Fischlin et al. (2007)" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
13783	108	6	108	6	revise position of parentheses [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
19269	108	18	108	18	Please, provide year for Smith et al. [Rubén Retuerto, Spain]	Done
13784	108	18	108	18	add publication year to Smith et al. [Elvira Poloczanska, Germany]	Done
1521	108	18	108	18	Not only here but also in the other parts, years of some references are missing. [Ken'ichi Matsumoto, Japan]	Editorial - copyedit to be completed prior to publication
14042	108	24			Fish stocks or fisheries productivity not necessarily fishery businesses [Elvira Poloczanska, Germany]	Agree, this section will be revised for the final draft
11790	108	29	108	29	"Lower" is the wrong word here [David Schoeman, Australia]	Editorial - copyedit to be completed prior to publication
7494	108	29	108	32	Please consider including in the executive summary [Øyvind Christophersen, Norway]	Done, we will continue to ensure this in the final draft
7495	108	29	108	32	Please consider including such a clear summary for all topics [Øyvind Christophersen, Norway]	Thank you, we will
16320	108	29	108	32	This seems a rather obvious statement-I would think that concluding statements have to be a good bit more substantive making clear that 1.5 C already has significant impacts and 2 C will be much more. [Michael MacCracken, United States of America]	Agree, this section will be revised for the final draft
7276	108	30	108	30	add 'rather' before 'than' [Butt Nathalie, Australia]	Editorial - copyedit to be completed prior to publication
9114	108	35	108	50	early warning signs on line 46 is from Chapter 19 WGII AR5 where it refers to Arctic and coral reef systems. Neither of these is mentioned in the line 39-43 list. They should be. To make the relevance of the subsequent ice sheet discussion clear in this context, lines 45-50 should note which singular event is tied to which risk characterization. [Michael Oppenheimer, United States of America]	Coral reefs and Arctic sea-ice are discussed as a unique and threatened system under the RFC section.
21161	108	35	108	50	include also ecosystem tipping points. see Leadley P, et al. 2014a. Interacting regional-scale regime shifts for biodiversity and ecosystem services. Bioscience. And Leadley, P., Pereira, H.M., Alkamade, R., Fernandez-Manjarrés, J.F., Proença, V., Scharlemann, J.P.W., Walpole, M.J. (2010) Biodiversity Scenarios: Projections of 21st century change in biodiversity and associated ecosystem services. Secretariat of the Convention on Biological Diversity, Montreal. Technical Series no. 50, 132 pages available at: <a href="https://www.cbd.int/doc/publications/cbd-ts-50-en.pdf">https://www.cbd.int/doc/publications/cbd-ts-50-en.pdf</a> [David Cooper, Canada]	This section will be revised for the final draft, thank you for the additional citations.
16321	108	36	108	36	Earth is a planet--please capitalize in that you are not talking about the dirt on our continents. No other planet's name is given in lower case--give the planet the respect of capitalization. [Michael MacCracken, United States of America]	Noted.
17725	108	44	108	44	Add Amazon dieback in the list in 3.2.6.5? [Ana Bastos, France]	Forest dieback is discussed in the tipping points section.
7277	108	45	108	45	risk' not 'risks' [Butt Nathalie, Australia]	Noted.
9118	108	45	108	56	See comment on p.108, line 48-50 [Michael Oppenheimer, United States of America]	The section has been largely rewritten.
9116	108	48	108	50	The increase in risk between 1.6 and 2.6C... refers to a judgment based on paleo-climate evidence from the LIG and is especially relevant to the 1.5/2C question. WAIS may have played a role and if so, the rise may have been rapid. Yet the story line gets lost in here. The difficulty is that material relevant to the sea level rise/ice sheet/tipping point/singular event issue occurs in Box 3.5, p.108 lines 45-56, p.109, lines 1-9, and p.122, lines 9-14. However, it is never pulled together into a coherent story of the differential risk of sea level rise between 1.5 and 2C with coherent explanations of why the risk may change in that range and the related physical processes that could lead to a short timescale. DeConto and Pollard is indeed relevant but is not the only evidence and is not the last word on the subject so RCP2.6 may or may not represent a "safe" scenario from this perspective. This issue is critically important and needs its own section. [Michael Oppenheimer, United States of America]	Thank you, these are valid points. The section will be rewritten towards the final draft, pending new peer-reviewed evidence on sea-level rise under 1.5 degrees C vs 2 degrees C.
9115	108	53	108	53	The title refers two GIS and WAIS but section 3.6.2.5.1 I all about Greenland. [Michael Oppenheimer, United States of America]	The discussion has been extended to the WAIS, but note that at the time of finalising the SOD, little evidence was available in terms of reduced risks for the West-Antarctic ice-sheet under 1.5 degrees C vs 2 degrees C of global warming.
12894	108	53	109	9	Nothing is said about West-Antarctic ice sheet [Jorge Carrasco, Chile]	See Box 3.5. At the time of finalising the SOD, little evidence was available in terms of reduced risks for the West-Antarctic ice-sheet under 1.5 degrees C vs 2 degrees C of global warming.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7496	108	54	109	9	Does this text refer only to the Greenland ice sheet or also to West-Antarctic ice sheets as indicated in the title of the sub-chapter? And is this text identical to the text on page 40 line 23 to 34? Please consider avoiding overlap. [Øyvind Christophersen, Norway]	The discussion has been extended to the WAIS, but note that at the time of finalising the SOD, little evidence was available in terms of reduced risks for the West-Antarctic ice-sheet under 1.5 degrees C vs 2 degrees C of global warming.
12424	108	54	109	9	Should this section include recent research that shows that parts of the West Antarctic Ice Sheet may have already passed a tipping point (Feldmann and Levermann, 2015) [Bill Hare, Germany]	This study will be considered in the final version of the chapter.
9117	109	1	109	9	see comment on p.108, line 48-50 [Michael Oppenheimer, United States of America]	The section has been rewritten for the SOD.
2730	109	3	109	7	Consider bringing in recent work by Rignot, suggesting that the loss of Greenland ice sheet could be more rapid. [Penny Urquhart, South Africa]	Rignot's work will be considered for the final version of the chapter.
16322	109	3	109	9	These values would seem to be associated with Antarctica rather than also Greenland. This needs to be clarified. The notion that it might take tens of millennia for most of the ice sheet to disappear in particular seems most relevant to Antarctica. I would also suggest that in addition to suggesting how long a process might take, it also needs to be said how rapidly some large fraction of the change could occur. It is important for the scientific community to understand that business leaders (among others--and governments should be doing as well) are responsible for doing risk/due-diligence studies that require considering plausible worst case situations. The results here, and throughout, need to be providing not just how beneficial situations might be but also how deleterious, and the text in this section is simply not doing this. [Michael MacCracken, United States of America]	Please also see Box 3.5. This section will be rewritten in the final draft pending the latest research on impacts at 1.5 vs 2 degrees C of global warming.
19270	109	5	109	5	Change "(Robinson et al. 2012)" by "Robinson et al. (2012)" [Rubén Retuerto, Spain]	Correction made.
7497	109	12	109	20	Please check for unnessesary overlap and repetition between this sub-chapter and earlier sections on thermohaline circulation. This is the exact same text as previously in the chapter (page 37 line 13-21). [Øyvind Christophersen, Norway]	The text has been rewritten to avoid repetitions.
11791	109	13	109	20	Parts of this text seem to have been cut and paste from material presented previously...this seems to be a feature of the last 50 pages or so of this Chapter [David Schoeman, Australia]	The text have been rewritten to in 3.6 only highlight avoided risks under 1.5 vs 2 degrees C of global warming.
3976	109	13	109	20	Repeated from Box 3.5 [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	The text has been rewritten to summarize the risks avoided under 1.5 degrees C vs 2 degrees C of global warming.
16323	109	13	109	20	There is no mention of why anyone should care that these changes are happening--the "So What?" question has simply not been mentioned--what would such changes mean and why should I care at all? At least some discussion of meaning just has to be included. [Michael MacCracken, United States of America]	Point taken. Such a discussion will be added to the final draft.
7006	109	22	109	22	As ENSO is a major source of climate variability over many parts of the world, a session on the current state of science should be included here. [Sai Ming Lee, China]	Rejected - this is beyond the scope of the report and belongs in AR6.
16324	109	23	109	25	Again, the significance of this sink needs to be described. [Michael MacCracken, United States of America]	Noted - this will be done in the next draft.
12488	109	23	109	29	Global warming may be able to reduce cold wave related mortality and energy consumption during winter. [Jinkyu Hong, Republic of Korea]	Agreed. At the time of finalising the SOD no peer reviewed literature existed on these benefits under 2 degrees of global warming vs 1.5 degrees. The issue will be reconsidered in the final draft.
25	109	23	109	39	I agree that the net physical CO2 sink may reduce under global warming as written is the present version. However, in a warmer nutrient-rich Southern Ocean, diatoms (which play a major role in this ocean as regard the export of carbon to depth) might increase their growth-rates in response to rising temperatures and iron-availability (e.g. Boyd et al 2016, Hutchins & Boyd 2016). Consequently, an increase in diatom abundance (Dutkiewicz et al. 2015), in primary production and very likely in carbon export to depth can be expected. So, in a warmer Southern Ocean, there will a decrease in the CO2 physical pump but very likely an increase of the biological pump. What will be the net result remains an open question. [Paul TREGUER, France]	These aspects will receive careful consideration in the final version of the report.
19271	109	24	109	24	Change "may reduce" by "may be reduced" [Rubén Retuerto, Spain]	Noted.
14044	109	31	109	31	is this the correct wording for title, I cannot see discussion of cost-benefit analysis [Elvira Poloczanska, Germany]	Regional economic benefits of restricting global warming to 1.5 degrees C are listed, but a full cost-benefit analysis is not undertaken.
2183	109	31	110	42	This section does not include much evidence of decreased risks associated with 1.5C relative to 2C, and misuses words such as "significantly", without justification. For instance, 3.6.3.2 says that the increased numbers of intense storms with the higher sea levels, will cause "significantly higher" inundation and storm damage. There is no evidence of this presented here. Yes, there is evidence available suggesting an increase in the most intense hurricanes, and extra warming will lead to higher sea levels. But before you conclude that this means "significantly" worse conditions you need to calculate the numbers on this. [Neville Nicholls, Australia]	The section has been largely rewritten using new peer reviewed outputs available for the SOD but not available at the time of the FOD.
1522	109	33	110	16	Literature to support these paragraphs are missing. [Ken'ichi Matsumoto, Japan]	The section has been large rewritten.
16325	109	35	109	36	That section really does not do well at all in describing the global economic impacts--would be nice if it did. [Michael MacCracken, United States of America]	Global aggregated risks are discussed in the section on RFC, 3.5.3 focuses on regional impacts.
14045	109	38			This section repeats earlier sections - and has no economic analysis. [Elvira Poloczanska, Germany]	The section has been largely rewritten for the SOD and now relies on a number of new studies on economic benefits of attaining the 1.5 degrees C goal.
18027	109	38	110	43	These three subsections seem inbalanced in lengh/sizet and some adjustments may be needed [Wilfran Moufouma Okia, France]	The section has been largely rewritten for the SOD.
16326	109	39	109	39	Achieving an increase sounds to me as if this is a level that one is working up to rather than something like "Keeping the increase below 1.5 C". In this paragraph, probably should change "will" to "would" as this is speculative. [Michael MacCracken, United States of America]	Noted. The section has been largely rewritten.
4331	109	39	110	16	a do not see any kind of references. Too many processes without references [teodoro georgiadis, Italy]	The section has been largely rewritten based on new peer reviewed output available for the SOD, but not available at the time of the FOD.
4643	109	43			Italics for "medium evidence to high crtainity" [Radim Tolasz, Czech Republic]	Thank you for the suggestion.
13785	109	43	109	43	high "certainty"? Guess you mean "agreement" or "confidence"? [Elvira Poloczanska, Germany]	This was a statement of confidence, yes, but note that the section has been largely rewritten.
7498	109	45	109	56	Please check for unnessesary overlap and repetition between this sub-chapter and earlier sections on fisheries. This is sub-chapter should preferably focus on the economic benefits of the 1.5 degree goal compared to the 2-degrees goal [Øyvind Christophersen, Norway]	Noted - the section has been rewritten to avoid repetitions and now focus entirely on listing benefits at 1.5 vs 2 degrees C of global warming.
4644	109	49			Italics for "low confidence" [Radim Tolasz, Czech Republic]	Noted.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16327	109	51	109	56	It seems to me that the paragraph needs to be indicating what the impacts of 1.5 C would be as well as the change from 1.5 to 2 C—the way it is, somehow 1.5 C is portrayed as somehow not harmful when this is just not the case. [Michael MacCracken, United States of America]	Point taken. Note however that the section has been largely rewritten for the SOD.
17430	110	1	110	7	The exact economic effects of ocean warming and OA will depend on the trophic ecosystem at the regional level. For example in the Northern of Norway, sea urchins prey on the kelp forests and create barren grounds along the coastline. Sea urchins are sensitive to the temperature change. Urchin larvae will die when sea water temperature increase over 10-12.6 degree. Higher water temperature may help the natural recovery of kelp forest and species depending on the kelp forest such as coastal cod. Achieving an increase in average global temperature of 1.5°C instead of 2°C may lead to less natural recovery of kelp forest. [Wenting Chen, Norway]	These points will be considered for the final draft of the chapter.
16329	110	1	110	7	For context, the paragraph needs to be indicating what the impacts will be at 1.5 C, not just the change from 1.5 to 2 C. [Michael MacCracken, United States of America]	Noted- peer-reviewed evidence the "baseline" impacts at 1.5 degrees C of warming was sparse at the time of drafting the SOD but will be further explored in the final draft.
16328	110	2	110	2	There is really only one global average CO2 concentration--so plural is not appropriate. [Michael MacCracken, United States of America]	Noted.
6402	110	4	110	6	Intertidally grown aquaculture species (oysters, mussels etc) will suffer the double impact of increased heat-waves events coupled with ocean acidification effects. [Brendon Dunphy, New Zealand]	The authors will explore the existence for peer-reviewed evidence for this statement towards the final chapter draft.
2536	110	4	110	7	See Von Euw et al. (2017) on the possible resilience of aragonite mineralization by corals to ocean acidification. Von Euw, S., Zhang, Q., Manichev, V., Murali, N., Gross, J., Feldman, L. C., ... & Falkowski, P. G. (2017). Biological control of aragonite formation in stony corals. <i>Science</i> , 356(6341), 933-938. [Robert Koppu, United States of America]	Noted - will be considered for the final draft of the chapter.
11792	110	18	110	18	"Impacts of hypoxia would impact"...revise wording [David Schoeman, Australia]	The section has been largely rewritten.
7007	110	25	110	28	It is unclear whether "intense storms" here refers to mid-latitude cyclones or tropical cyclones. Please also make reference to a scientific paper how the conclusion (medium confidence) is drawn. [Sai Ming Lee, China]	The section has been largely rewritten and this point has been addressed.
6815	110	25	110	28	This section requires more than a reiteration that storms and impacts in coastal areas are likely to be higher in a 2.C compared to 1.C. Recent literature on the costs of coastal protection, economic impacts of extreme storm events should be presented to properly highlight the magnitude of the economic impacts, as this is the focus of this section. [Carlos Loureiro, United Kingdom (of Great Britain and Northern Ireland)]	The authors will consider the latest body of peer-reviewed evidence in this context towards the final draft of the chapter.
19061	110	27	110	27	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasouny, Egypt]	Noted.
14046	110	31	110	31	what about loss of human habitat from a temperature perspective? ie when areas become too hot for human habitation [Elvira Poloczanska, Germany]	These aspects are discussed in section 3.4, but little information is available on differential impacts at 1.5 degrees C vs 2 degrees C of global warming.
13786	110	31	110	39	Same issue as previously noted: focus is all on morbidity and mortality with no mention of psychological health [Elvira Poloczanska, Germany]	At the time of the SOD, little peer-reviewed evidence was available on differential impacts on psychological health at 1.5 vs 2 degrees C of global warming.
9880	110	31	110	43	Perhaps the fact that heat disproportionately affects some groups (children, the elderly, the poor) should be included. [Susan Clayton, United States of America]	Point taken, but this section reports on differential impacts at 1.5 degrees C vs 2 degrees C of global warming. At the time of preparing the SOD, peer-reviewed literature on differential impacts across age groups was not available.
12425	110	32	110	42	RCP4.5 is implied to be consistent with the "Paris targets", which is not an interpretation that everyone would share. [Bill Hare, Germany]	Point taken, the revised text is not creating this impression.
16330	110	45	110	45	Rather strange phrasing for title--why not say "as opposed to higher emission futures" or something similar that is clearer in indicating what is being talked about. [Michael MacCracken, United States of America]	Low mitigation is qualitatively equivalent to higher emissions.
16332	110	45	110	49	I think have a section covering this is important. However, it also needs to be paired with a section comparing 0.5 C warming with 1.5 to 2 C warming. While it may not be possible to get down to 0.5 C by just mitigation, both CDR and SRM offer the potential to do so (and perhaps this is covered later). What bothers me is the implicit endorsement being given that a 1.5 C world would not be a world with significant adverse impacts. [Michael MacCracken, United States of America]	Point taken, but also considering in detail avoided risks at 0.5 degrees of warming is beyond the scope of SR1.5.
2184	110	51	111	2	This summary relies on Arnell et al in preparation which seems to claim it can identify what change in risk there would be between warming of 1.8C and 2C. This seems difficult to believe. I guess this study will be published before the next draft of this chapter. It will be interesting to see the methodology used in that study. [Neville Nicholls, Australia]	The authors will carefully consider the final version of the paper by Arnell et al. and related
18028	110	52	110	52	Need more details in corresponding bibliographic entry (e.g. title) [Wilfran Moufouma Okia, France]	Noted.
2529	110	52	110	53	This is a bizarre and vague quantification. [Robert Koppu, United States of America]	The section has been rewritten and will be further revised towards the final draft.
16331	110	52	110	54	It is not clear what the percentages are referring to--are these based on some economic analysis of all types of impacts or is there some other metric. Percentages just don't seem the right way to be distinguishing the comparative outcomes. [Michael MacCracken, United States of America]	The section has been revised given new peer-reviewed research on impacts at 1.5 vs 2 degrees C of warming, and will be further revised towards the final order draft.
19272	110	56	111	1	Rephrase [Rubén Retuerto, Spain]	Noted.
13787	110	56	111	2	revise sentence and parentheses [Elvira Poloczanska, Germany]	Noted.
1523	110	56	111	2	The sentence does not look complete ("Moreover, ...") [Ken'ichi Matsumoto, Japan]	Noted.
2185	111	4	111	12	I found this paragraph quite surprising. I didn't think the ideas expressed very confidently here had been discussed earlier in the chapter. For instance, the discussion of the non-linearity of the response of coral to warming. I don't recall seeing a discussion earlier that this relationship is non-linear? I think this summary section needs to reflect earlier discussions in the chapter. [Neville Nicholls, Australia]	The foundation laid for the discussion around coral reef impacts may be found in the revised section 3.4.
11793	111	4	111	5	"display a non-linear relationship between the magnitude of the risks and°C of global warming"...seems to be missing a number before °C? [David Schoeman, Australia]	Noted.
7499	111	10	111	12	Please consider including this finding in the executive summary [Øyvind Christophersen, Norway]	Noted - suggestion will be considered for the final draft.
19273	111	23	111	23	Italicize "vs" [Rubén Retuerto, Spain]	Noted.
7500	111	29	111	33	This is an important aspect that merits further elaboration in the next draft as indicated. [Øyvind Christophersen, Norway]	Point taken.
12426	111	36			How are these regions defined? Reiterations of hot spots and RFCs. [Bill Hare, Germany]	This section refers to regional hot-spots, whilst the RFCs refer to global concerns and large-scale singular events.
14047	111	36			wonder whether the details should be integrated above and summarized in more general terms. Alternatively the examples could go into a table. [Elvira Poloczanska, Germany]	The section has been largely rewritten to now focus strongly on regional hot spots under 1.5 vs 2 degrees C of warming. A table has been introduced to summarize the findings.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2358	111	36	11	36	Can an explanation as to why the Hot Spot locations and categories have been chosen. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
1524	111	36	113	44	This section (section 3.6.5) is little bit complicated, because the sub-sections of this section are mixture os geographical regions and regions based on land use. Therefore, it is better to categorize the chapters into two parts. [Ken'ichi Matsumoto, Japan]	The section has been largely rewritten to now focus strongly on regional hot spots.
16720	111	36	111	45	The terminology "climate hot spot" is quite unclear, and lack of definition, and/or clear references. L. 42 to 44 : "Moreover, hot spots that may result from aggregated risks across the physical, natural, and human systems are also analyzed in relation to different global temperature goals, in addition to hot spots that relate specifically to the physical climate system, ecosystems of human systems.". Hot-spots presenting "aggregated risks", opposed to "specifically related to physical climate system, ecosystem, or human systems" have to be better defined, and then geographical/thematic/agricultural choices of hot-spots more substantially exposed (in terms of climatological dangerosity?). I suggest here the reference : Hare, W. L., Cramer, W., Schaeffer, M., Battaglini, A., & Jaeger, C. C. (2011). Climate hotspots: key vulnerable regions, climate change and limits to warming, Springer [Romain Courault, France]	Regional hot-spots are considered in this section. Many thanks for the reference to the study of Hare et al., which will be considered when composing the final draft of the Chapter.
14048	111	45			given the short sentences under each of the subheadings below, these will be essentially repeated in table 3.7, therefore a integrated overview discussion may be better placed in this section instead using subsections [Elvira Poloczanska, Germany]	The section has been rewritten following this suggestion.
6295	111	49	111	49	probabilities are relatively high (estimated to be in the order of 43%) 43% doesn't seem very high? Rephrase or clarify. And in Table 3.7 [Nathanael Melia, New Zealand]	Point taken. The text has been rewritten and will be further revised in this context towards the final chapter draft.
16333	111	49	111	49	Parenthetical expression is far too precise for the wording--to be on the order of 43%? This would seem to mean from 42.5 to 43.5%, and I would doubt that is what is meant. Perhaps say "near 50%" or "in the range 40-50%" or something--but no two-figure precision. [Michael MacCracken, United States of America]	Point taken, and the text will be further revised in this context towards the final version.
16334	111	49	111	50	The chapter is not really consistent on whether it is talking about ice-free all summer or in September and even in some places seems to imply all year long. I would also suggest that this notion that global warming has to double compared to the present to get rid of the greatly reduced amount (and thickness) of ice remaining in September seems to me to be at odds with reality and is presumably based on model simulations that do not well represent observations, and needs to be changed. I would also suggest that making the loss of sea ice for one month of the year some sort of key metric of the state of the Arctic is a bit strange--the really significant rate of change was when the snow on the ice first melted, lowering the surface albedo from something like 70+% to 25-% and a further change in surface albedo from say 15 to 5+% is just not all that much. With present ice retreat, there are already many important impacts on ecosystems, Indigenous Peoples, the ice sheets, etc. and this needs to be stated. [Michael MacCracken, United States of America]	The text has been revised and it is now stated very clearly that with an ice free Arctic is meant ice-free conditions in September or summer.
16335	111	50	111	51	I just do not think observational trends allow for this conclusion. Yes, models may show this, but observations really do matter and the models do not simulate what is actually happening. [Michael MacCracken, United States of America]	This section has been largely rewritten and now also refers to the latest modelling studies.
6296	112	3	112	3	TNn?? [Nathanael Melia, New Zealand]	This acronym has been defined earlier.
1964	112	3	112	3	TNn? [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	This acronym has been defined earlier.
16336	112	11	112	12	This is an inadequate description of the changes that are occurring and are projected. [Michael MacCracken, United States of America]	The text has been considerably extended in the SOD.
9617	112	15	114	20	combining tibetan plateau and transboundary kailash sacred landscape [Jianguo Wu, China]	This suggestion was accepted for the SOD.
2981	112	16	112	16	Half of naturally vegetated land surface in China could be under moderate or severe risk - Not clear - risk of what? Loss of vegetation? Drought? Extreme heat? [Erica Head, Canada]	The text has been largely rewritten for this section.
7501	112	17	112	17	Please be consistent throughout the report when referring to scenarios, e.g. RCPs or 1.5C vs 2C. Does "middel and high emission scenarios" refer to any RCPs here? [Øyvind Christophersen, Norway]	Noted.
17280	112	20	113	20	Many of these two subsections does not provide any information about what this section is about and the same sentence "remains to be analysed" is stated at the end of many of them. Should this not be discussed within "knowledge gaps"? [Maria Jesus Iglesias Briones, Spain]	The sections have all been considerably extended and revised for the SOD.
16337	112	24	112	25	The text here needs to be self-explanatory, not forcing the reader to go check somewhere. Expansion of this is thus needed. [Michael MacCracken, United States of America]	Noted - the text has been made more self-consistent.
3880	112	34	112	36	The African Sahel is one of the most vulnerable areas in the world to food insecurity and climate change could make that worse. The current citation (Schleussner et al. 2016) does not completely cover that vulnerability. Please edit so that it reads something like "Keeping warming to 1.5°C would substantially reduce the number of people in the African Sahel to a lack of food and nutrition (Sultan and Gaetani 2016)." Sultan, B. and M. Gaetani. 2016. Agriculture in West Africa in the Twenty-First Century: Climate change and impacts scenarios, and potential for adaptation. Frontiers in Plant Science 7: 1262. doi: 10.3389/fpls.2016.01262. [Patrick Gonzalez, United States of America]	Many thanks for these references. An Africa box has been added to further discuss vulnerabilities of the Sahel, but further careful consideration will be given to this region and its relevant literature towards the final Chapter draft.
10610	112	45	112	47	No information is really provided for this section. If it is intended as a summary of section 3.3-3.5, it should contain more detailed or substantial conclusion. [Elemer Briceño-Elizondo, Costa Rica]	The section has been significantly extended.
13788	112	56	112	56	publication in rev? prep? [Elvira Poloczanska, Germany]	The text has been updated.
11794	113	4	113	6	is fynbos not a fire-dependent system? What are the specific changes in the fires that might then cause problems? Frequency, intensity, something else? [David Schoeman, Australia]	Correct. Fynbos vulnerabilities are now discussed in more detail.
11795	113	11	113	20	All of these changes are given without context...which RCP/degree of warming? [David Schoeman, Australia]	The text has been largely rewritten.
11796	113	24	113	44	Again, significant repetition here [David Schoeman, Australia]	The text has been rewritten to avoid repetitions and now focuses largely on avoiding risks at 1.5 vs 2 degrees C of warming.
16338	113	24	113	44	While interesting to have information on yields, a key issue for decision makers is presumably total production and overall changes in total suitable cropland area. Both types of information should be given. [Michael MacCracken, United States of America]	The text has been extended using new peer reviewed evidence for the SOD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
624	113	30	113	30	The following finding is relevant to this section. Iizumi et al. (2017) associates the global mean temperature change from preindustrials to global mean yield growth of major crops and estimates the differences in the impacts on global mean yields between 1.5 and 2 degree C warming. The stagnation of global mean yields of maize and soybean becomes severe with warming even when 1.5 and 2 degree C warming are compared.  References: Iizumi, T., Furuya, J., Shen, Z., Kim, W., Okada, M., Fujimori, S., Hasegawa, T., and Nishimori, M., 2017: Responses of crop yield growth to global temperature and socioeconomic changes. Scientific Reports, 7, 7800, doi: 10.1038/s41598-017-08214-4. [Toshichika Iizumi, Japan]	Many thanks for the reference, which will be carefully considered for the final draft.
4645	113	34			Use "t ha-1" instead of "Mg ha-1". [Radim Tolasz, Czech Republic]	The text was rewritten.
11797	113	34	113	34	Either a superscript "-1" or "per", but not both in a single unit... [David Schoeman, Australia]	The text was rewritten.
19274	113	34	113	34	Remove "which" [Rubén Retuerto, Spain]	The text was rewritten.
19275	113	39	113	40	Rephrase [Rubén Retuerto, Spain]	The text was rewritten.
2803	113	46			What does TBC mean? Table 3.7. Is there some explanation of acronym? [Giacomo Pirlo, Italy]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6297	113	46	113	46	Table 3.7. time frame? Transient or equilibrium response? [Nathanael Melia, New Zealand]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6298	113	47	113	47	Table 3.7 Arctic sea ice -> Ice-free Arctic is September (defined as < 1m sq. km) [Nathanael Melia, New Zealand]	We are grateful for your suggestion, and will be including consideration of it in the next draft
6299	113	47	113	47	Table 3.7 col 3. ice free -> ice-free [Nathanael Melia, New Zealand]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16339	113	47	113	47	It would be helpful here to have a column for warming of 1 C--so what is happening at present. Given what has occurred, I just do not understand how it can be said it is "highly likely" that September sea ice will not disappear. More than that, it needs to be explained why September sea ice cover is the metric that is presented here given that there is so much change and so many impacts occurring to get to this situation. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
14050	114	3			could much of this be captured in a table? [Elvira Poloczanska, Germany]	The table on tipping points have indeed proved most useful to summarize the information, with extended discussions also added to 3.6.6.
9616	114	3	114	38	please add content [Jianguo Wu, China]	The section has been significantly extended.
16340	114	3	114	14	I am a bit confused here--does "more ambitious global temperature goals" mean limiting warming to perhaps 0.5 C or 1.0 C--which is a section that I think is needed. What it seems to mean, however, is achieving 1.5 to 2 C compared to 3-4 C--I am just not clear. And then it says "sensitivities to less ambitious global temperature goals are also briefly reviewed," well--doesn't this also mean, using the terminology here, describing the results at 3-4 C? How are these two aspects different? [Michael MacCracken, United States of America]	Yes, correct. To 1.5 and 2 degrees C are referred to as ambitious temperature goals, as opposed to 3 or 4 degrees C of global warming. This is now stated more clearly in the text. It has also been decided that the scope of SR1.5 should be largely focussed on impacts at 1.5 vs 2 degrees C of warming.
10612	114	16	114	17	Information on the avoidance of tipping points from Arctic sea ice is missing [Elemer Briceño-Elizondo, Costa Rica]	The discussion of various tipping points in the Arctic have been significantly extended.
17668	114	16	114	28	The authors should indicate that they would add the discussions for each section as they did in the other section. Also tropical regional may be considered. [Perdian Perdinan, Indonesia]	The section has been significantly extended.
17281	114	16	115	6	This section is incomplete [Maria Jesus Iglesias Briones, Spain]	The section has been significantly extended.
10613	114	18	114	19	Information on the avoidance of tipping points from Tundra is missing [Elemer Briceño-Elizondo, Costa Rica]	Agreed - more information is now provided in the updated tipping points sub-section of section 3.5 in the SOD.
10614	114	20	114	21	Information on the avoidance of tipping points from Permafrost ice is missing [Elemer Briceño-Elizondo, Costa Rica]	Agreed - more information is now provided in the updated tipping points sub-section of section 3.5 in the SOD.
10615	114	22	114	23	Information on the avoidance of tipping points from Indian Monsoon ice is missing [Elemer Briceño-Elizondo, Costa Rica]	Agreed - more information is now provided in the updated tipping points sub-section of section 3.5 in the SOD.
10616	114	24	114	25	Information on the avoidance of tipping points from West African Monsoon and sahel is missing [Elemer Briceño-Elizondo, Costa Rica]	Agreed - more information is now provided in the updated tipping points sub-section of section 3.5 in the SOD.
10617	114	26	114	27	Information on the avoidance of tipping points from Rain Forest is missing [Elemer Briceño-Elizondo, Costa Rica]	Agreed - more information is now provided in the updated tipping points sub-section of section 3.5 in the SOD.
10618	114	28	114	29	Information on the avoidance of tipping points from Boreal Forest is missing [Elemer Briceño-Elizondo, Costa Rica]	Agreed - more information is now provided in the updated tipping points sub-section of section 3.5 in the SOD.
9269	114	37			See Rosenzweig and Hillel, 2015 for regional climate change effects [Cynthia Rosenzweig, United States of America]	This paper has been used to strengthen the outputs of section 3.6
10619	114	37	114	38	Information on the avoidance of tipping points from Agricultural systems: key staple crops is missing [Elemer Briceño-Elizondo, Costa Rica]	Key staple crops is now a specific focus in the regional tipping point section of the new section 3.5 of the SOD.
2731	115	1	115	1	Good to include, livestock has not been discussed much in the chapter - perhaps not in the report on the whole? [Penny Urquhart, South Africa]	Agreed. The SOD has however been extended to include a more comprehensive discussions on the risks avoided for the livestock industry under 1.5 degrees C of warming. There are still relatively few papers that distinguish between risks at 1.5 degrees C and 2 degrees C of warming, however.
6300	115	5	115	5	Table 3.8 Arctic info repeats Table 3.7 [Nathanael Melia, New Zealand]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16341	115	5	115	6	In Table 3.8, why is it said that the Arctic becoming ice free in September is a tipping point? Tipping point into what? All indications are that ice will reform in the fall even if it disappears in September. I don't understand where the seeming non-linearity or knee in the curve is. In my view, the key tipping point was when the surface albedo went from unmelted snow to melted snow and water puddles on ice--that is where the large albedo change was (and so the largest change in energy uptake in the region). Melting the last bit of September sea ice, which already has a low albedo as the surface is melted, and going to the slightly lower albedo of open water is really not going to lead to much change in energy uptake by the Arctic Ocean, especially due to the low sun angle in September. So, where is the big tipping point. Right now, walrus are having to move to shore in late July--the ice that is there is neither strong enough nor in the right place to support them over potential feeding areas; now when this started happening might have been a tipping point. Or when shipping could get through the Arctic might have been a tipping point, but that has also already happened, especially as the proposed shipping can go through thin ice. So, what is meant by tipping point? [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7502	115	8	122	26	We are happy to see that these crucial aspects are extensively dealt with in the report. The Mitigation pathways reaching 1.5C will have far reaching consequences for biodiversity (and functional ecosystems providing ecosystem services), food security, poverty and human well-being among other factors. This information is important for policy makers. [Øyvind Christophersen, Norway]	We thank the reviewer for the comment
16342	115	8	115	13	What is the scientific basis for apparently accepting that 1.5 C is an acceptable new norm for the climate, as the title and text seem to imply? That is a level that the negotiators chose to ask about, but there is not really a scientific basis for allowing them to think that 1.5 C is a long-term choice that will not result in very serious impacts. Why isn't 1.5 C being thought of as a ceiling with the intent of bringing the temperature to closer to no change or at least less than 0.5 C, a level when key impacts like loss of mass from the ice sheets had not yet begun (now that was a tipping point we have apparently passed)? What I would think should be the subject here are the implications of having 1.5, 2, 2.5, 3 C or even more as a ceiling for the warming while seeking to return the global average temperature to within 0.5 C of the baseline (so basically within the variability caused by natural factors involving volcanic eruptions and changes in solar output). I just think the whole report is focused on returning to a warming level not at all based on the science--surely 1.5 C is less than 2 C, but why is it that 1.5 C is accepted as a new norm? I think the opening lines here need to address this issue, not letting the negotiators who suggested this value because they were worried about doing better would be too difficult. Well, there is no way that 1.5 C is going to mean the long-term survival of the low lying island nations that were apparently the inspiration for looking at 1.5 C rather than 2 C, and this needs to be clearly stated. [Michael MacCracken, United States of America]	Noted, there is no intention to suggest acceptable norms or otherwise, as the text is revised in the FGD we will consider this carefully.
16343	115	21	115	22	This enumeration of the causes of overshoot seems to view emissions pathways as the third largest reason, momentum within the climate system being, at least implicitly, the primary factor. The order of terms needs to be reversed and it made clear that these are in order of importance. The present emissions pathways have the world headed to something like 3.5 C warming, socio-economic factors (so the time to turn to new technologies) are likely second, and climate momentum is likely third (while using CO2eq makes the momentum term seem quite long, if one considers all forcings and their time constants, this term is a good bit less as black carbon, sulfate, tropospheric ozone and methane terms all are relatively short and so if their emissions were to be cut aggressively the warming effect of CO2 can be delayed). As said, the text does not seem to make clear that it is the (poor and limited) choices of governments that is the key factor that will be contributing to the overshoots--not mainly the momentum. Scientific reports need to be really clear about what is happening and why, and the text here simply does not do this. [Michael MacCracken, United States of America]	This text has been removed. A placeholder has been included. The text will be revised for the FGD. More background on the overshoots is also provided in the cross-chapter box on "1.5 warmer worlds".
1965	115	23	115	23	Unacceptable impacts this phrase should be used more generally where applicable. More generally clearer lay phrasing should be made more use esp. in regards to impacts [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
20472	115	29	115	29	Normally "Solar radiation management" [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	This text has been removed. A placeholder has been included. The text will be revised for the FGD. SRM is no longer addressed in the chapter (only in a cross-chapter box)
17282	116	1	116	17	Under construction [Maria Jesus Iglesias Briones, Spain]	Noted. Section is being revised for next versions.
9615	116	1	116	17	please add content [Jianguo Wu, China]	This text still need to be completed for the FGD. Some text is available in the cross-chapter box on "1.5 warmer worlds".
10994	116	20	116	20	I'd have expected this material to be covered in Chapter 5. I cannot find the bullet in the approved outline for Ch 3 that covers this - but Chapter 5 has "Positive and negative impacts of adaptation and mitigation measures including response measures and strategies, economic diversification, livelihoods, food security, cities, ecosystems, technologies" - the very topics covered here. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	We agree there is a need to coordinate closely with chapter 5. This section is included largely because of impacts on biodiversity which does not appear in your list.
12427	116	20	119	31	For this section on non-CO2 implications of mitigation it would be useful to have a comparison to the extent of change from e.g. socio-economic change (i.e. non-mitigation). [Bill Hare, Germany]	Not addressed in this section. But some of these aspects are discussed in the cross-chapter box on "1.5 warmer worlds".
19628	116	20	117	51	Other references to include in this section: Christopher Field and Katherine Mach. 2017. Rightsizing carbon dioxide removal. Science 19 May 356: 706-707; Sivan Kartha and Kate Dooley. 2016. The risks of relying on tomorrow's 'negative emissions' to guide today's mitigation action. Stockholm Environment Institute Working Paper No. 2016-18; Wil Burns and Simon Nicholson. 2017. Bioenergy and carbon capture and storage: the prospects and challenges of an emerging climate policy response. Journal of Environmental Studies and Sciences DOI 10.1007/s13412-017-0445-6; Van Vuuren D et al. (2015). Implications of long-term scenarios for medium-term targets (2050). The Hague: PBL Netherlands Environmental Assessment Agency; [Doreen Stabinsky, United States of America]	We thank the reviewer for the citations, we will consider including them in the final copy edit.
21162	116	24	117	51	because of associated land use change, loss of biodiversity over 21st century is worse in RCP 2.6, than RCP 4.5 or RCP6. see Newbold T, et al. 2015. Global effects of land use on local terrestrial biodiversity. Nature 520:45-. [David Cooper, Canada]	We thank the reviewer for the citations, we will consider including them in the final copy edit. Section 3.7.2 was not revised for the SOD due to lack of time.
21163	116	24	117	51	for discussion and references on impacts on biodiversity see: Leadley et al 2016, Relationships between the Aichi Targets and land-based climate mitigation, Convention on biological diversity, UNEP/CBD/SBSTTA/20/INF/29, available at: <a href="https://www.cbd.int/doc/meetings/sbstta/sbstta-20/information/sbstta-20-inf-29-en.pdf">https://www.cbd.int/doc/meetings/sbstta/sbstta-20/information/sbstta-20-inf-29-en.pdf</a> [David Cooper, Canada]	We thank the reviewer for the citations, we will consider including them in the final copy edit.
1201	116	24	117	51	Ch5 will consider the SDG implications of BECCS in section 5.4 for the SOD (i.e. implications for food security, poverty etc). We can discuss this further at LAM 3 to avoid overlap. [Petra Tschakert, Australia]	We agree the need to coordinate closely with chapter 5
11029	116	25	116	28	87% is too low, since these are only the scenarios that reach net negative emissions. Actually, almost all of the 116 scenarios include gross negative emissions; "second half of the century" is incorrect and misleading since gross negative emissions start already in the 2020s. See Peters/Geden 2017 (Catalysing a political shift from low to negative carbon) [Oliver Geden, Germany]	We thank the reviewer for the citations, we will consider including them in the final copy edit.
12428	116	25	117	51	The section on land-use changes in mitigation scenarios and their projected risks only considers the extreme case where all negative emissions are achieved through BECCS / afforestation / reforestation. It should also consider how other options for negative emissions, such as DAC and biochar, or the use of marginal land and crop residues could relieve pressure on land. Lines 45-48 on page 117 go some way towards highlighting the benefits of using a range of different mitigation and negative emissions approaches, but this should be expanded upon. Also, the risks of using land-based negative emissions options should be compared with the risks associated with other drivers of land-use change (including climate change). [Bill Hare, Germany]	We thank the reviewer for the comment, the text will be revised in the final draft.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16344	116	28	116	34	BECCS is only one of several possibilities--Carbon Dioxide Removal generally needs to be mentioned. Direct air capture, for example, seems to have the potential to play an important role as well as various efforts to enhance sinks in soils and the oceans. And these approaches other than BECCS do not have all the same land use implications, etc. This section needs to have a specific subsection devoted to the various Carbon Dioxide Removal approaches that are being discussed in the groups working to evaluate the various approaches. [Michael MacCracken, United States of America]	We thank the reviewer for the comment, the text will be revised in the final draft.
5914	116	29	116	29	Should be 13,5 GtCO <sub>2</sub> , not GtCO. There should be a reference to what year this sequestration rate must be achieved and not just a reference to the second half of the 21st century [Aage Stangeland, Norway]	We thank the reviewer for the comment, the text will be revised in the final draft.
1966	116	34	116	34	Cropand should read cropland [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
747	116	34	116	34	States 'cropand' should perhaps read 'crops' [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
2732	116	35	116	38	Critical point, and also need to factor in social acceptability and distributional effects. [Penny Urquhart, South Africa]	Noted.
11030	116	40	116	41	If an average sequestration rate is given, text should also give a year or a timeframe [Oliver Geden, Germany]	We thank the reviewer for the comment, the text will be revised in the final draft.
21164	116	40	117	42	Comparison here between BECCS and AR does not account for GHG emissions from indirect LUC referenced on previous page (116,50-52) [David Cooper, Canada]	We thank the reviewer for the comment, the text will be revised in the final draft.
4646	116	41			Change "GtC/yr" by "GtC yr-1" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
11031	116	42	116	45	numbers inconsistent with those in chapter 2 [Oliver Geden, Germany]	We thank the reviewer for the comment, the text will be revised in the final draft.
4647	116	43	116	45	The sentence is not very clear. We suggest new wording: "Other estimates (Smith et al. 2016) reach 380-700 Mha (i.e. 21-64% current arable cropland); or (Popp et al. 2014) xxx-xxx Mha (i.e. 24-36% arable cropland); or (Humpenödder et al. 2014) 508 Mha (i.e. xx% arable cropland)." But the original numbers (380-700 Mha x 21-64%) are not consistent. If 380 Mha is 21% of arable cropland, so 700 Mha is 39% of arable cropland, not 64%. [Radim Tolasz, Czech Republic]	We thank the reviewer for the comment, the text will be revised in the final draft.
5915	116	44	116	44	The figures 380-700 Mha/21-64% do not add up. If 380 Mha is equal to 21 % then 700 Mha should equal to less than 40 %, not 64 % [Aage Stangeland, Norway]	We thank the reviewer for the comment, the text will be revised in the final draft.
10620	116	47	116	56	Although the statement makes all logic sound, even without the need to check on the reference, the likelihood of such land use change s happening are completely unrealistic. There are many local laws as well as international schemes that would never allow this scenario to shape, tyhus I wonder why is it cited like this? [Elemer Briceño-Elizondo, Costa Rica]	We thank the reviewer for the comment, the text will be revised in the final draft.
10622	116	47	116	56	the reference used for this part seems unbigous about its treatment on biofuel effect on teh carbon balance [Elemer Briceño-Elizondo, Costa Rica]	We thank the reviewer for the comment, the text will be revised in the final draft.
10623	116	47	116	56	The reference used in this section cites biofuels as a potential source of deforestation, which is not true, equally not all biofuels come from agriocultural crop species; woody species aer more effective as temporary sinks than sugar cane for example [Elemer Briceño-Elizondo, Costa Rica]	We thank the reviewer for the comment, the text will be revised in the final draft.
11032	116	54	117	2	more literature on this kind of "offsetting" needs to be included, also a more concrete quantification [Oliver Geden, Germany]	We thank the reviewer for the comment, the text will be revised in the final draft.
9614	117	15	117	18	Biodiversity should be replaced by species [Jianguo Wu, China]	We thank the reviewer for the comment, the text will be revised in the final draft.
1671	117	17	117	21	Nevertheless, only increase in agricultural productivity would not be sufficient in some world regions (e.g. Africa and Asia) to be food self-sufficient under climate change, demographic growth, and life style shifts. Please see Pradhan et al. 2014 ES & T. [Pradhan Prajal, Germany]	We thank the reviewer for the comment, the text will be revised in the final draft.
19276	117	24	117	24	Remove "considers" or "finds" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
9332	117	24	117	24	There is excess of verbs in the phrase "One estimate considers finds" in which one verb may be deleted. [Sür KILKIS, Turkey]	Editorial - copyedit to be completed prior to publication
9270	117	33			Forthcoming papers on AgMIP CGRA 1.5 from Rosenzweig et al and Ruane et al [Cynthia Rosenzweig, United States of America]	We thank the reviewer for the comment, the text will be revised in the final draft.
4648	117	38			Change GtC/yr" by "GtC yr-1" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
20473	117	42	117	43	The clause after the semi colon seems to privilege natural ecosystems by suggesting that novel ecosystems do not contribute to conservation of biodiversity and ecosystems, whereas in fact novel ecosystems can conserve of indeed enhance both biodiversity and ecosystem services (see eg Thomas, Chris "Inheritors of the Earth" (2017). I suggest either making this point or applying teh statement of co-benefits more loosely but broadly, eg "...protection: reforestation can benefit both carbon sequestration..." [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	We thank the reviewer for the comment, the text will be revised in the final draft.
12429	117	54			The topics addressed here are likely to be addressed in greater detail in the upcoming land SR. However, it could still be improved, both in terms of comprehensiveness and structure.  1. A/Reforestation: What are climate effects of those, including for atmospheric moisture recycling (e.g. van der Ent et al. 2014, Zemp et al. 2017).  2. Effects on the hydrological cycle and sustainable water use. See e.g. Jägermeyer et al. 2017  3. Mitigation - adaptation interrelations including co-benefits or negative side effects. I.e. expanded irrigation for the sake of higher agricultural productivity may lead to increased drought resistance, reduced increase in extreme temperatures, but also has implications for sustainable water use. [Bill Hare, Germany]	Noted, thanks for the inputs. This will be considered in the FGD.
20296	117	54	118	19	See also: (1) Georgescu et al., 2011, PNAS 108 (11): 4307-4312, <a href="http://www.pnas.org/content/108/11/4307">http://www.pnas.org/content/108/11/4307</a> ; (2) Lin et al., 2018, Science of the Total Environment 610-611 (2018) 570-575; (3) Mueller et al., 2017, Journal of Climate 30: 7505-7528, <a href="http://journals.ametsoc.org/doi/full/10.1175/JCLI-D-17-0096.1">http://journals.ametsoc.org/doi/full/10.1175/JCLI-D-17-0096.1</a> [Aaron Glenn, Canada]	Noted, will consider for inclusion in FGD
19089	118	1	118	1	For avoid confusion with the paper by B. Mueller et al. (2015), this reference should be: N. Mueller et al. (2015). [Wim Thierry, Switzerland]	Yes, this is correct. This will be fixed in the FGD.
20297	118	1	118	3	Mueller et al. citation year should be 2016: <a href="http://dx.doi.org/10.1038/nclimate2825L3">http://dx.doi.org/10.1038/nclimate2825L3</a> [Aaron Glenn, Canada]	Yes, this is correct. This will be fixed in the FGD.
19277	118	3	118	3	Remove "B." before "Mueller...." [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
19090	118	11	118	11	A reference to the already-cited paper by N. Mueller et al. (2015) would also be relevant here. [Wim Thierry, Switzerland]	Yes, this is correct. This will be fixed in the FGD.
20298	118	15			Darvin et al., 2014 reference appears twice in the reference list. "a" not likely necessary if it is just the one reference. [Aaron Glenn, Canada]	Editorial - copyedit to be completed prior to publication



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
541	118	15	118	16	The overall effect of either irrigation or albedo has been at the most of the order of 1-2 C Please see Jacobson, M.Z., The short-term effects of agriculture on air pollution and climate in California, J. Geophys. Res., 113, D23101, doi:10.1029/2008JD010689, 2008 for support for this contention. [Mark Jacobson, United States of America]	Noted. Will consider for the FGD.
4649	118	19			The "see Figure 3.28" means reference to figure in Hirsch et al? Better is to add this figure direct to report. [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
13360	118	19	118	19	I could not find figure 3.28 in the chapter. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Editorial (wrong numbering)
8840	118	19	118	19	Figure 3.28 is wrong it should be Figure 3.22 [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
13789	118	19	118	19	revise numbering of Figure in the text [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
13361	118	34	118	38	Figure 3.22: Remove unnecessary acronyms in plot titles - simply replace with Central Europe and Central North America for ease of comprehension. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will consider for the FGD.
13362	118	34	118	38	Figure 3.22: Recommend including in figure legend meaning of solid and dashed lines, so that the reader does have to scan the caption and match up information. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Will consider for the FGD.
12430	118	35			Figure is not linked to the text and not sufficiently explained. Plus it's unclear what is displayed here that is specific to 1.5? Maybe a summary figure of different land-use -management climate interrelations is more appropriate [Bill Hare, Germany]	Noted. Will consider for the FGD.
19091	118	35	118	38	Please consider adding a cross-reference to figure 1.2 of this report where all SREX regions are shown on a global map. [Wim Thiery, Switzerland]	Noted. Will consider for the FGD.
12431	119	8			This needs to be expanded and merits a figure as well. The question of SLFCs and in particular aerosols is highly relevant for the intercomparison of transient 1.5 analysis (i.e. from RCP8.5) with 1.5 end of century etc. [Bill Hare, Germany]	Noted. Will consider for the FGD.
542	119	8	119	31	Anthropogenic driven changes in aerosols cause important modifications to global climate. Black carbon and organic matter, in particular, are the second-leading cause of global warming after carbon dioxide and ahead of methane and cause greater warming over the Arctic than other latitudes. (1) Jacobson, M.Z., Short-term effects of controlling fossil-fuel soot, biofuel soot and gases, and methane on climate, Arctic ice, and air pollution health, J. Geophys. Res., 115, D14209, doi:10.1029/2009JD013795, 2010; (2) Jacobson, M.Z., Effects of biomass burning on climate, accounting for heat and moisture fluxes, black and brown carbon, and cloud absorption effects, J. Geophys. Res., 119, 8980-9002, doi:10.1002/2014JD021861, 2014; (3) 75. Bond, T.C., S.J. Doherty, D.W. Fahey, P.M. Forster, T. Berntsen, O. Boucher, B.J. DeAngelo, M.G. Flanner, S. Ghan, B. Karcher, D. Koch, S. Kinne, Y. Kondo, P.K. Quinn, M.C. Sarofim, M.G. Schultz, M. Schulz, C. Venkataraman, H. Zhang, S. Zhang, N. Bellouin, S.K. Guttikunda, P.K. Hopke, M.Z. Jacobson, J.W. Kaiser, Z. Klimont, U. Lohmann, J.P. Schwarz, D. Shindell, T. Storelvmo, S.G. Warren and C.S. Zender, Bounding the role of black carbon in the climate system: A scientific assessment, J. Geophys. Res., 118, 5380-5552, doi: 10.1002/jgrd.50171, 2013. [Mark Jacobson, United States of America]	Noted. Will consider for the FGD.
21149	119	9	119	12	add citation - Ramanathan and Feng 2008, On avoiding dangerous anthropogenic interference with the climate system: Formidable challenges ahead, PNAS, doi/10.1073/pnas.0803838105; Ramanathan and Xu 2010, The Copenhagen Accord for limiting global warming: Criteria, constraints, and available avenues, PNAS, doi/10.1073/pnas.1002293107. [Nathan Borgford-Parnell, Switzerland]	We are grateful for your suggestion, and will be including consideration of it in the next draft
10675	119	9	119	12	Ramanathan and Feng 2008, On avoiding dangerous anthropogenic interference with the climate system: Formidable challenges ahead, PNAS, doi/10.1073/pnas.0803838105; Ramanathan and Xu 2010, The Copenhagen Accord for limiting global warming: Criteria, constraints, and available avenues, PNAS, doi/10.1073/pnas.1002293107. [Kristin Campbell, United States of America]	We thank the reviewer for the comment, the text will be revised in the final draft.
19367	119	9	119	16	How large are the impacts of these aerosol-driven precipitation changes likely to be? Do they significantly affect the impacts of a 1.5 degree change that were assessed earlier in the chapter? [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19366	119	9	119	31	This section on non-CO2 agents is too brief. There needs to be at least some attempt to assess the magnitude of the effects mentioned here. Huntingford et al. Phil. Trans. R. Soc. A 2011 369, doi: 10.1098/rsta.2010.0314 assessed some of these effects. Shindell et al. 2017 Faraday Discuss., doi:10.1039/C7FD00009J. http://dx.doi.org/10.1039/C7FD00009J assessed that the total impacts of methane (in terms of dollars) could be more than double the pure temperature impact. This section could link back to 3.4.1 and assess the additional impacts on terrestrial ecosystems from the processes outline here. The increased effect of SLFCs on the high latitudes could amplify Arctic impacts for instance which should be mentioned here. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2967	119	18	119	18	Grammar mistake: change strong to strongly [Bin Wang, United States of America]	Editorial - copyedit to be completed prior to publication
19368	119	18	119	20	These statements that methane mitigation will reduce warming in the short-term, but be warmer in the longer-term are not universally true, bu depend entirely on the metric used to trade between methane and CO2. The Pierrhumbert study used GWP100, which does indeed give this effect. Recent developments in metrics by Allen et al. in 2016 and 2017 (submitted) show that using CO2-fe or the GWP* metric to equate CO2 and methane leads equivalent temperature behaviour in both the short and long-term. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19369	119	20	119	23	For completeness the contribution of methane to stratospheric water vapour should also be mentioned. The impact of methane on stratospheric ozone has not be quantified (as far as I'm aware) and is not generally accounted for. This paragraph needs to state that the additional radiative forcing contributions from ozone, stratospheric water vapour, and methane oxidation are all typically accounted for in methane metrics and in the IAMs that generate scenarios. Otherwise the reader might get the impression that these need to be added to the climate projections coming from such models. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	We thank the reviewer for the comment, the text will be revised in the final draft.
19372	119	25	119	31	The additional biosphere-mediated impacts of methane and ozone on climate were quantified in Collins et al. 2010 doi:10.1029/2010JD014187 and Collins et al. 2013 doi:10.5194/acp-13-2471-2013 [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This will be considered in the FGD.
19370	119	27	119	28	Increased methane always increases ozone. I don't know of any studies that have shown any ozone reduction. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This will be considered in the FGD.
2968	119	28	119	28	Change nitrogen oxide to nitrogen oxides; and it is better to specify other organic oxides, e.g. by adding volatile organic compounds (VOC) [Bin Wang, United States of America]	Noted. This will be considered in the FGD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2969	119	29	119	29	A latest reference about ozone impacts terrestrial GHG exchange could be cited besides the one by Myhre et al. 2013: Wang, B., Shugart, H. H., & Lerdau, M. T. (2017). Sensitivity of global greenhouse gas budgets to tropospheric ozone pollution mediated by the biosphere. Environmental Research Letters, 12(8). Additionally, according to this study, aside from inhibiting land vegetation productivity, ozone can also alter the CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O exchange at the land-atmosphere interface and transform the global soil system from a sink to a source of carbon. So this information could be probably further mentioned. [Bin Wang, United States of America]	Noted. This will be considered in the FGD.
19371	119	30	119	31	Aerosols also increase the diffuse radiation and hence productivity (e.g. Mercado et al. 2009 Nature, 458, 1014–1018). [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This will be considered in the FGD.
12432	119	34			It is unclear, how this section is linked to impacts at 1.5°C as it is all quite general on SRM. Furthermore, this section misses assessments important key risks by SRM including: by abrupt cessation of SAI, by ocean acidification and for ice sheet disintegration (McCusker et al. 2015) [Bill Hare, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
7601	119	34			Frumhoff and Stephens, 2017 (in review) have a nice discussion of whether and how geoengineering might be used in this context. See also MacMartin et al., 2017 (in review). [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1202	119	34			Too much space is devoted to discussing solar radiation management throughout the SR. Lets consider condensing all discussion of SRM into one comprehensive x-chapter box at LAM 3. [Petra Tschakert, Australia]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
7602	119	34			Baker et al. 2017 (in review) argue that changing the global mean temperature (i.e. through geoengineering), does not mean the extreme climate will respond in the same way. Because, for instance, extremes can be highly dependent on local composition. [Dann Mitchell, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
10205	119	34			This section on SRM should refer to the box in Chapter 4, it could also be shortened given discussion elsewhere in report [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
14051	119	34			Box 4.13 gives an indepth discussion on SRM - much of the discussion in this section is superfluous [Elvira Poloczanska, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20474	119	34	119	34	Comment on whole section. Since benefits of SRM are not treated under mitigation, I wonder if it might not make sense for this material all to go in Box 4.2, in which a lot of it is already duplicated. To justify the treatment here because that box exists (line 39) seems odd. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
12293	119	34	121	16	Very useful section. Check for consistency with Ch1 and Ch4 and if any repetitions / overlaps can be reduced. [Jan Fuglestedt, Norway]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
19314	119	34	121	16	I think that this is a good chapter, clear and well-balanced on a contentious topic. [Marco Mazzotti, Switzerland]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4376	119	34	121	16	This section needs to be made more specific to the use of SRM as one possible element of a strategy for meeting 1.5C, rather than simply talking generically about SRM. Unfortunately most of the literature doesn't directly do this; to plug that gap we helped by using climate emulators to generate results specific to 1.5C: MacMartin, D. G., K. L. Ricke, and D. W. Keith, "Solar Geoengineering as part of an overall strategy for meeting the 1.5°C Paris target", submitted, Phil. Trans. Royal Soc. A. The section also needs to be clearer on what counterfactuals are being assumed. A 1.5C world achieved through less aggressive mitigation and SRM will not be the same as a 1.5C world achieved through aggressive mitigation alone, and if the choice was between between these two 1.5C worlds, then clearly from a purely climate perspective there is less risk to achieving it purely through mitigation, but if the choice was between 3C without geoengineering or 1.5C with some geoengineering, then it is not so clear. This simple point is never made anywhere in this section, yet that is fundamentally the most important single thing to say about SRM. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20107	119	34	121	16	The conclusion of this section should draw firm consequences from the risks of SRM discussed between page 119, line 47 and page 120, line 33, and clearly state that the risks associated with SRM make it reckless to be considered as a climate response. This concerns changes in global and regional precipitation patterns, shifts in global circulations, impacts on food production and ecosystem health, and, crucially, the so-called termination-shock of SRM. Chapter 3 authors should also look at literature that discusses the irresponsible prospect of making humanity dependent on the continued existence and functioning of a highly volatile technology that is ungovernable in a democratic way. Moreover, what is being considered in this section are only the known risks and impacts as they have been modelled, which are sufficiently grave and unjustifiable to consider SRM as a response strategy. The report should furthermore highlight that there remain vast and potentially disastrous unknown risks of SRM as a globale-scale intervention in the climate system. [Lili Fuhr, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
21165	119	34	121	16	For impacts on biodiversity of sRM, see: re: cdr technologies, refer to Williamson, P., & Bodle, R. (2016). Update on Climate Geoengineering in Relation to the Convention on Biological Diversity: Potential Impacts and Regulatory Framework. Technical Series No.84. Secretariat of the Convention on Biological Diversity, Montreal, available at: <a href="https://www.cbd.int/doc/publications/cbd-ts-84-en.pdf">https://www.cbd.int/doc/publications/cbd-ts-84-en.pdf</a> ; also: Williamson, P., Watson, R.T., Mace, G., Artaxo, P., Bodle, R., Galaz, V., Parker, A., Santillo, D., Vivian, C., Cooper, D., Webbe, J., Cung, A. and E. Woods (2012). Impacts of Climate-Related Geoengineering on Biological Diversity. Part 1 of: Geoengineering in Relation to the Convention on Biological Diversity: Technical and Regulatory Matters. Secretariat of the Convention on Biological Diversity, Montreal, Technical Series No. 66, 152 pages available at: <a href="https://www.cbd.int/doc/publications/cbd-ts-66-en.pdf">https://www.cbd.int/doc/publications/cbd-ts-66-en.pdf</a> [David Cooper, Canada]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4332	119	36	119	36	discussed in literature please provide some references [teodoro georgiadis, Italy]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16345	119	36	119	37	It might be better to say to directly alter the energy balance of the Earth system, either by reflecting more solar radiation or increasing the rate of loss of infrared (heat) energy from the planet. It might well be that reducing winter cirrus in the polar regions, for example, might be an approach to consider. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
3629	119	36	121	16	This section represents a very narrow view of SRM, focussing only on space reflectors and SAI. What about marine cloud brightening, for example? [Rob Bellamy, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3630	119	36	121	16	Chapter 1 states that Chapter 3 will explore the social dimensions of SRM, but this is nowhere to be seen. The authors should engage with the literature on the social dimensions of SRM, for example: Bellamy, R., Chilvers, J. and Vaughan, N. (2016): Deliberative Mapping of options for tackling climate change: Citizens and specialists 'open up' appraisal of geoengineering. Public Understanding of Science, 25, 269 – 286. [Rob Bellamy, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11860	119	36	121	16	It is also worth highlighting in this section that impacts of SRM should be assessed in comparison to a GHG-warmed world. So, reductions in monsoon rainfall should be compared to future expected rainfall, not to today's rainfall. [David Morrow, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2935	119	36	121	16	Chapter 3 is a weighty 165 pages (with an annex of 63 pages!). The title is "Impacts of 1.5°C global warming on natural and human systems". The first 40 pages are simply not about impacts on natural and human systems, but more about impacts on the physical climate system itself. I would recommend removing the physical system from this chapter or at the very least changing the title to "Impacts of 1.5C global warming on the physical, natural and human systems". [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2959	119	36	121	16	"Proposed solar radiation management schemes rely on the fact that the radiative forcing from scattering aerosol emissions lead to a cooling of climate via aerosol-radiation-interactions and aerosol-cloud-interactions. Aerosol-radiation interactions are via sunlight being scattered away from the Earth and aerosol-cloud-interactions are via cloud reflectivity being enhanced by injecting aerosols into clouds. Both aerosol-radiation and aerosol-cloud interactions increase the albedo of the planet. Both aerosol radiation and aerosol-cloud interactions have been assessed as providing a potentially strong negative radiative forcing (IPCC, 2007, 2013) and thus cooling the planet. SRM schemes rely on enhancing this negative radiative forcing to counterbalance the strong positive radiative forcing from increased greenhouse gas concentrations. The most widely researched SRM methods are stratospheric aerosol injection (SAI), which aims to enhance sunlight reflected from the planet in a manner analogous to large explosive volcanic eruptions which have been shown to periodically cool the climate, and marine cloud brightening (MCB) which aims to enhance the reflectivity of clouds as observed from ship-track or effusive degassing volcanic eruptions. Because the detailed mechanisms of SAI and MCB require complex aerosol and cloud microphysical modules within global GCMs, simpler experiments such as reducing the solar constant have been utilised as a crude approximation of the effects of SRM to allow a the response from more models to be assessed." [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2960	119	36	121	16	I am surprised that the following reference is not included for overcooling of the tropics. In my opinion it should replace the Curry et al (2014) reference:- [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2961	119	36	121	16	Kravitz, B., K. Caldeira, O. Boucher, A. Robock, P.J. Rasch, K. Alterskjær, D. Bou Karam, J. N. S. Cole, C.L. Curry, J.M. Haywood, P.J. Irvine, D. Ji, A. Jones, D.J. Lunt, J.E. Kristjánsson, J. Moore, U. Niemeier, H. Schmidt, M. Schulz, B. Singh, S. Tilmes, S. Watanabe, J-H Yoon, Climate model response from the Geoengineering Model Intercomparison Project (GeoMIP), J. Geophys. Res., doi:10.1002/jgrd.50646, 2013. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2962	119	36	121	16	I take exception to the following statement:- [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2963	119	36	121	16	"Factoring in the precautionary principle and the inequalities introduced by creating 'winner and loser' regions in terms of climate effects leads to the assessment with medium confidence (expert judgment) that the risks of SAI deployment for global food security and ecosystem health would outweigh the benefits, even for low levels of application, at the present state of knowledge." [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2964	119	36	121	16	i) Global warming creates winners and losers. Under global warming, if you are a resident of a low lying island you are undoubtedly a loser, while if you are in the frozen arctic tundra you might be considered a winner. The global warming debaters have long known that there are winners and losers under global warming, but has shied away from stating as much owing to the necessity of acting as a collective. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2965	119	36	121	16	ii) Where on earth has the expert judgement come from? Where has the medium confidence come from and what does this mean? How does medium confidence relate to statistics (likely, very likely, virtually certain etc used in previous IPCC reports)? Where are the references? Have you just made this up? [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2966	119	36	121	16	I have worked in this area for some time, and would consider myself neither a proponent or an opponent of SRM, but the arguments are far more nuanced than this. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1578	119	37	119	37	Change "Box 4.2" to "Box. 4.13" Box 4.2 has nothing to do with SRM. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
748	119	37	119	40	States Box 4.2 I think it should be Box 4.13 [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20475	119	39	119	40	See comment above [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1579	119	40	119	40	Change "Box 4.2" to "Box. 4.13" Box 4.2 has nothing to do with SRM. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1580	119	42	119	42	Change "Box 4.2" to "Box. 4.13" Box 4.2 has nothing to do with SRM. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1582	119	42	119	42	Change ".e" to ".e." [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1583	119	47	119	47	Define "Sunshade Geoengineering" as "reducing total insolation, either with space-based reflectors or as an artificial climate model experiment." [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16347	119	47	119	47	I think it important to not just cover global-scale SRM, but to also mention that there has been some research on the potential for using such techniques to possibly moderate regional impacts such as amplified Arctic warming, etc. Now, I do want to say that I have been an author of papers urging this, so admit to having a bias toward this approach as an initial step to both help alleviate severe impacts and serve as a way of learning whether such approaches might really be able to limit global warming. For an overview of the concept, for example, see MacCracken, M.C., 2016: The rationale for accelerating regionally focused climate intervention research, Earth's Future 4, 649-657, doi:10.1002/2016EF000450 and/or an example of an application to limiting amplified Arctic warming, see MacCracken, M. C., H-J. Shin, K. Caldeira, and G. Ban-Weiss, 2013: Climate response to solar insolation reductions in high latitudes, Earth Systems Dynamics, 4, 301-315, 2013; www.earth-syst-dynam.net/4/301/2013/; doi:10.5194/esd-4-301-2013. Beyond my papers, there are other studies starting to look at how to moderate Arctic warming, moderate severe tropical cyclones, etc. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16346	119	47	119	49	Being involved in looking at various SRM approaches, I don't think there has been all that much research on "Sunshade Geoengineering" if what is meant is putting mirrors in space to reduce the amount of solar radiation reaching the top of the atmosphere; if what is meant is arbitrarily turning down the solar constant, that is how some studies are done, but implementation in these cases is generally considered to be eventually done by tropospheric brightening (of clouds or, possibly, clear skies) or by stratospheric aerosols. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11858	119	47	120	3	The explicit contrast between "sunshade geoengineering" (SG) and SAI seems unwarranted here. SG is total science fiction; it's not going to happen. Modelers study it only because it is a convenient approximation for more plausible implementations of SRM. I'm not sure the difference between studies that turn down the solar constant and studies with more detailed simulations needs to be drawn here. But if it is drawn, I would recommend simply pointing out that different studies model SRM at different levels of detail. [David Morrow, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20476	119	47	119	48	It is not clear that sunshade geoengineering is an "implementation method" (in Chapter 4 p85 it is referred to as not feasible) or that anything can be "mostly hypothetical". Also much of the work here is hardly "assessment" in the normal sense, and these studies very rarely amount to SRM actually being "proposed". Maybe redraft the opening of this paragraph as follows: "Two modes of global-scale SRM have been explored in the literature. Implementations of the first, "Sunshade geoengineering" (SG), in which the amount of sunlight entering the Earth system at the top of the atmosphere is uniformly reduced, have been proposed using either very large or very numerous space-based reflectors. Such implementations are not currently feasible, but SG is still widely studied because it is comparatively easy to implement in climate model simulations. The second, Stratospheric Aerosol Injection (SAI) would in effect mimic the effects of volcanic eruptions... These global SRM approaches are typically studied in scenarios in which they offset the global mean warming..." [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1584	119	48	119	48	Delete "mostly" [it is all hypothetical] [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1585	119	49	119	49	Change "Injections" to "Injection" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1586	119	49	119	49	most commonly proposed as implementation What does this mean? Nobody is actually proposing actual implementation. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1587	119	50	119	50	change "mimics" to "would mimic" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
19278	119	50	119	50	temperatures is repeated [Rubén Retuerto, Spain]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1588	119	51	119	51	change "offset the global mean warming" to "offset all or part of the global mean warming" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16348	119	53	119	53	Regarding the word "significant", the question is what this is with respect to. While an SRM-affected climate may not perfectly match the non-GHG influenced world, every indication is that the climates that are created are much closer to their original state than the GHG-modified climate. Unless context is provided here, there is no justification for using the word "significant". A reasonable metric to consider might be how many standard deviations different the SRM-corrected climate is compared to the GHG-only climate, and over what fraction of the Earth this is the case (and in that standard deviations of unperturbed climates are pretty small in low latitudes, how large the actual change is, etc.). In that "significant" can imply statistical significance and/or ecological or societal significance, it is also a very confusing word--thus it is essential to clarify what is meant and to provide a metric for comparing to the climate that results without SRM. There are a number of papers that get into this, and it is quite clear that the climate is much closer to the unperturbed climate with SRM than without. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4377	119	54	119	55	This is not true. One can choose how much SG or SAI to do; a specific simulation might be set up to balance a particular radiative forcing, but that is not a property of SG or SAI in general. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
13393	119	54	119	56	Suggest rephrasing to "Both SG and SAI are often in the literature set up to offset a particular radiative forcing (e.g., 4xCO2, or parts of the anthropogenic forcing of RCP4.5), but SAI may produce a more on-uniform forcing depending on where, when and in what form aerosols are inserted in the stratosphere (e.g. Irvine et al. 2016, Laakso et al. 2012)". The time of year of injection also matters for the distribution of a global, homogenous aerosol layer due to transport and the Brewer-Dobson circulation. Also, in theory SG and SAI could be set up to offset climate variables like temperature and precipitation (e.g. Kravitz et al. 2014; Kravitz, B., MacMartin, D. G., Robock, A., Rasch, P. J., Ricke, K. L., Cole, J. N. S., Curry, C. L., Irvine, P. J., Ji, D., Keith, D. W., Kristjánsson, J. E., Moore, J. C., Muri, H., Singh, B., Tilmes, S., Watanabe, S., Yang, S. and Yoon, J. - H. (2014). A multi-model assessment of regional climate disparities caused by solar geoengineering. Environ. Res. Lett. 9, 074013. doi: 10.1088/1748-9326/9/7/074013) and not just radiative forcing. [Helene Muri, Norway]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16349	119	54	119	56	The use of "but" is not really appropriate. In that altering solar forcing will not be the same as the IR forcing augmented by GHGs (e.g., there is no solar to alter in high latitude winters), that one can induce non-uniform forcing can be an advantage in seeking to return the climate to near its original state. Thus, it would be better to indicate that the non-uniform forcing can be used to help adjust for the inherent differences between the alteration to the solar radiation that is created and the change in forcing due to changes in GHG and aerosol concentrations. I would also note that with respect to potential use of SRM in the context of what this report is about (limiting the temperature change to no more than 1.5 C--so perhaps offsetting 1 C of global temperature change at the maximum), the SRM effect will be able to be much smaller than trying to completely offset the warming of 4 times CO2 or even all of RCP4.5 which is the type of study that has been done to SRM and the studies find is not perfect in offsetting the change. Thus, this sentence really needs reworking to be more relevant to the type of situation being discussed here and to realize the assessment to be made is between GHGs without SRM and GHGs with SRM, not SRM alone, which is what has led to concern over some of the types of response to SRM. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4378	119	55	119	56	Two additional more recent papers that will be published before the cutoff date include (1) Tilmes, S., J. H. Richter, M. M. Mills, B. Kravitz, D. G. MacMartin, F. Vitt, J. Tribbia, and J.-F. Lamarque, "Sensitivity of aerosol distribution and climate response to stratospheric SO2 injection locations", submitted, J. Geophys. Res. A, and (2) MacMartin, D.G., B. Kravitz, S. Tilmes, J. Richter, M. Mills, J.-F. Lamarque, J.J. Tribbia, and F. Vitt, "The climate response to stratospheric aerosol geoengineering can be tailored using multiple injection locations" to appear, J. Geophys. Res. A. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
13392	119	56			Irvine et al. 2016 (Irvine, P. J., Kravitz, B., Lawrence, M. G. and Muri, H. (2016), An overview of the Earth system science of solar geoengineering. WIREs Clim Change, 7: 815–833. doi:10.1002/wcc.423) is a more appropriate reference than Muri et al. 2014 regarding the SAI and non-uniform forcing patterns. [Helene Muri, Norway]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16350	119	56	120	1	While this is true, if there is aggressive mitigation so that the overshoot only goes to 2.5 C, for example, then the SRM might only be invoked to reduce the global warming by 1 C to 1.5 C, or, my preference if it were to be done, maybe 2 C back toward 0.5 C. Virtually all of the global SRM studies that have been done are envisioning going from 3-4 C (or higher; e.g., 4 x CO2) to preindustrial, so a global cooling of at least 3-4 C. Yes, there are some pattern and latitudinal differences for such large change, but these are much smaller if the SRM-induced reduction in temperature is only 1 to 2 C. Thus, again, some context is needed here rather than just pull statements from the current literature and articles about invoking a full counterbalancing of 2 to 4 times the CO2 concentration. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1589	119	57	120	1	For the same global mean temperature reduction, SAI produces a greater change in the hydrological cycle. Not a robust result, which is probably model-dependent. This sentence should be deleted. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4379	120	1	120	1	This is not true. Because one can choose where to inject aerosols, and hence adjust the zonal distribution of radiative forcing, there is potentially less regional change in climate with SAI than with SG. See MacMartin et al noted in the previous comment and also Kravitz, B., D. G. MacMartin, M. J. Mills, J. H. Richter, S. Tilmes, J.-F. Lamarque, J. J. Tribbia and F. Vitt, "First simulations of designing stratospheric sulfate aerosol geoengineering to meet multiple simultaneous climate objectives", submitted, J. Geophys. Res. A. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20477	120	2	120	2	The problem with the termination-shock argument is that if termination shock looks highly hazardous termination is unlikely (since the capacity for SRM is unlikely to be limited to one, or even a few, actors). This might be addressed with the affixion of something along these lines at the end of the paragraph: "The prospect of such a shock may make termination unlikely -- in which case the world might find itself saddled with damaging side effects of SRM in perpetuity." [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
13394	120	5	120	10	Here it would be timely to also cite Aswathy et al. (2015) (Aswathy, V. N., Boucher, O., Quaas, M., Niemeier, U., Muri, H., Mülmenstädt, J., and Quaas, J.: Climate extremes in multi-model simulations of stratospheric aerosol and marine cloud brightening climate engineering. Atmos. Chem. Phys., 15, 9593-9610, https://doi.org/10.5194/acp-15-9593-2015, 2015.), considering Curry et al. (2014) only analyses SG experiments and Aswathy et al. (2015) discusses SAI. Then you have one citation for each of the two methods this section describes. [Helene Muri, Norway]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16351	120	5	120	17	First, this whole paragraph is drawing conclusions for application of SRM to create very large counterbalancing of warming (2 to 4 times CO2), so a much larger offset that would be wanted and proposed based on what this report is proposing--that is, with aggressive mitigation and aiming to have a 1.5 C world. As such, all of the findings are really overstated. Second, the appropriate assessment to be made are the relative benefits-detriments of GHGs without SRM to GHGs with SRM as compared to some baseline climate (possibly preindustrial, possibly mid-20th century). All of the studies that are done indicate that virtually the whole world is much better off with GHGs with SRM than GHGs without SRM, and this would especially be the case if SRM were introduced gradually as the GHG built up and iteratively (so adjusted along the way) rather than what is done in many of the modeling studies, which involve waiting until some amount of warming has built up and then seeking to suddenly offset it based on some emergency declaration. There actually is a real world analog for a gradual invoking of SRM, which is the first decade of the 21st century, during which, per Santer et al., relatively small volcanic eruptions slowed the rate of increase in warming--and nobody noticed until Santer and his colleagues worked very hard to investigate what might be happening. Overall, I just think this paragraph misrepresents, at least in terms of implied attitude, the potential benefits of SRM and greatly overstates the potential negative consequences. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11859	120	5	120	33	Although this section attempts to distinguish between extreme and moderate uses of SRM, I think it needs to do so more clearly and to convey more effectively the rationale for modeling "extreme" deployment. Identifying something as "an effect of SRM" without specifying the intensity of SRM required to get that effect is akin to identifying the slowdown of the AMOC or a massive Amazonian die-off as "an effect of climate change." It's absolutely worth highlighting the serious impacts associated with intense SRM, such as potential interference with the Asian monsoon, but it is equally important to specify that they result from intense deployment. [David Morrow, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11093	120	5	120	7	The report states that "In general, global model experiments suggest that in case of a global SRM implementation surface temperatures would be reduced most in regions with expected greatest warming under elevated GHG conditions (i.e. high-latitudes) and lead to less temperature and precipitation extremes (Curry et al. 2014)." When summarizing the effects of geoengineering it is critical to recognize which results are scenario-specific and make contingent or more general statements. This sentence is illustrative of this more general point. It would be better to say that: solar forcing is more effective at reversing the effects of CO2 forcing at low latitudes than high latitudes, which means that if global-mean temperatures were restored to some baseline there would be an over-cooling of tropical oceans and an under-cooling of high-latitudes. This problem occurs throughout this section. [Joshua Horton, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11104	120	5	120	8	First, the potential benefits of SRM, like those noted here, are not given sufficient prominence. There is robust theoretical and modelling evidence to support the view that solar geoengineering would reduce key climate risks which are driven by temperature change across the world: 1) lowering mean and extreme temperature [Kravitz et al. 2013; Curry et al. 2014; Aswathy et al. 2014], 2) reducing extreme precipitation [Curry et al. 2014; Aswathy et al. 2014], 3) reducing sea-level rise [Irvine et al. 2012; Applegate and Keller, 2015; Moore et al. 2015], and 4) reducing some climate-carbon feedbacks, such as permafrost loss [Keith et al. 2017; Tjiputra et al. 2016; Matthews et al. 2007]. There are only passing references to each of these 4 key potential benefits of SRM. These should be made more prominent. [Ben Kravitz et al., "Climate Model Response from the Geoengineering Model Intercomparison Project (GeoMIP)," JGR Atmospheres 118 (2013): 8320-8332; Charles L. Curry et al., "A Multimodel Examination of Climate Extremes in an Idealized Geoengineering Experiment," JGR Atmospheres 119 (2014): 3900-3923; V.N. Aswathy, O. Boucher, M. Quaas, U. Niemeier, H. Muri, and J. Quaas, "Climate Extremes in Multi-Model Simulations of Stratospheric Aerosol and Marine Cloud Brightening Climate Engineering," Atmospheric Chemistry and Physics Discussions 14 (2014): 32393-32425; P.J. Irvine, R.L. Striver, and K. Keller, "Tension Between Reducing Sea-Level Rise and Global Warming Through Solar-Radiation Management," Nature Climate Change 2 (2012): 97-100; Patrick J. Applegate and Klaus Keller, "How Effective is Albedo Modification (Solar Radiation Management Geoengineering) in Preventing Sea-Level Rise from the Greenland Ice Sheet?," Environmental Research Letters 10 (2015), doi: 084018; John C. Moore et al., "Atlantic Hurricane Surge Response to Geoengineering," PNAS 112 (2015): 13794-13799; David W. Keith, Gernot Wagner, and Claire L. Zabel, "Solar Geoengineering Reduces Atmospheric Carbon Burden," Nature Climate Change 7 (2017): 617-619; T.F. Tjiputra, A. Grini, and H. Lee, "Impact of Idealized Stratospheric Aerosol Injection on the Large-Scale Ocean and Land Carbon Cycles," JGR Biogeosciences 121 (2016): 2-27; H. Damon Matthews and Ken Caldeira, "Transient Climate-Carbon Simulations of Planetary Geoengineering," PNAS 104 (2007): 9949-9954] [Joshua Horton, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1590	120	7	120	7	change "less" to "fewer" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4380	120	8	120	10	This is not true. The overcooling of the tropical ocean and residual warming at high latitudes are a result of specific choices for where to inject aerosols; other choices can be made that eliminate both of these. See the same citations as in previous comment (MacMartin et al and Kravitz et al) [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1591	120	8	120	8	change "of tropical" "of the tropical" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1592	120	8	120	8	change "Curry et al. 2014)" to "Kravitz et al. 2013)" who found this first. Kravitz, Ben, Ken Caldeira, Olivier Boucher, Alan Robock, Philip J. Rasch, Kari Alterskjær, Diana Bou Karam, Jason N. S. Cole, Charles L. Curry, James M. Haywood, Peter J. Irvine, Duoying Ji, Andy Jones, Jón Egill Kristjánsson, Daniel J. Lunt, John Moore, Ulrike Niemeier, Hauke Schmidt, Michael Schulz, Balwinder Singh, Simone Tilmes, Shingo Watanabe, Shuting Yang, and Jin-Ho Yoon, 2013: Climate model response from the Geoengineering Model Intercomparison Project (GeoMIP). J. Geophys. Res. Atmos., 118, 8320-8332, doi:10.1002/jgrd.50646. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20478	120	8	120	8	overcooling of tropical ocean (probably better as "overcooling of the tropical ocean" is not a necessary effect of SRM. It is common in imagined implementations which seek to fully offset global mean temperature. In general the discussion of SRM here seems quite often to say things about SRM or SAI in general that are found in particular model experiments but are not necessary aspects of all possible use-cases, strategies and design choices. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1593	120	10	120	10	change "Curry et al. 2014)" to "Kravitz et al. 2013)" who found this first. Kravitz, Ben, Ken Caldeira, Olivier Boucher, Alan Robock, Philip J. Rasch, Kari Alterskjær, Diana Bou Karam, Jason N. S. Cole, Charles L. Curry, James M. Haywood, Peter J. Irvine, Duoying Ji, Andy Jones, Jón Egill Kristjánsson, Daniel J. Lunt, John Moore, Ulrike Niemeier, Hauke Schmidt, Michael Schulz, Balwinder Singh, Simone Tilmes, Shingo Watanabe, Shuting Yang, and Jin-Ho Yoon, 2013: Climate model response from the Geoengineering Model Intercomparison Project (GeoMIP). J. Geophys. Res. Atmos., 118, 8320-8332, doi:10.1002/jgrd.50646. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20479	120	10	120	10	I think the comma is meant to be a full stop [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4381	120	11	120	11	This is a strange comment, as it also applies to using mitigation to meet the 1.5C goal. A better comparison would be to compare a 1.5C world achieved through mitigation alone to a 1.5C world achieved through a combination of less-aggressive mitigation and some limited SRM; the case with SRM indeed has less precipitation on average (that is, even closer to preindustrial precipitation for most of the planet than the 1.5C world achieved through mitigation alone). See MacMartin, Ricke and Keith, Phil Trans Royal Soc A (2017) noted earlier. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11798	120	14	120	16	This is a very poorly constructed sentence...it could be interpreted in at least three different ways... [David Schoeman, Australia]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13395	120	14	120	16	I would suggest stopping this sentence after " ... in affected regions" on line 15. This section has already stated it only deals with SAI and SG, then you should leave out marine cloud brightening. Or you should indeed consider also including marine cloud brightening in the full discussion in this section, as several studies have investigated the responses to sea salt injections over the full oceanic tropical latitude band - either $\pm 30^\circ$ latitude, or $\pm 45^\circ$ latitude. In any case: " ... and towards prevailing La Niña like conditions, for instance, by emitting sea salt (Niemeier et al. 2013)" should be cut. We have found no statistical significant changes to ENSO in any SRM experiments so far. The ENSO changes in Niemeier et al. (2013) were not significant. See also e.g. Gabriel, C. J. and Robock, A.: Stratospheric geoengineering impacts on El Niño/Southern Oscillation, Atmos. Chem. Phys., 15, 11949-11966, <a href="https://doi.org/10.5194/acp-15-11949-2015">https://doi.org/10.5194/acp-15-11949-2015</a> , 2015. [Helene Muri, Norway]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2982	120	14	120	16	From "SRM methods may further induce shifts in the ITCZ . . ." to ". . . by emitting sea salt (Niemeier et al. 2013)." This sentence is almost incomprehensible and needs re-writing. [Erica Head, Canada]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20480	120	15	120	16	I think the phrase "for instance, by emitting sea salt" is included here in error. Note that it is not present in the same sentence in Chapter 4 page 89 line 18. Also note: this para and that para in chapter 4 are more or less identical. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4382	120	16	120	16	This section has not yet mentioned marine cloud brightening nor explained what it is (see chapter 4, box 4.13), so this citation is impossible to interpret without that context. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4383	120	17	120	18	Suggest "may not be reduced". One simulation in one model with specific choices for injection location does not warrant the level of confidence of "would not be reduced". [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4384	120	18	120	18	It can only be "half" if a particular level of SRM is assumed; without that information the quantification is meaningless. (Better would be to scale to some particular scenario, such as what would happen if one went from 3C to 1.5C with SRM, but presumably ok to simply state what that reference assumed.) [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
2627	120	21	120	33	ethical dimensions + economic feasibility of SRM? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20481	120	22	120	22	Missing word (presumably "levels") after GHG [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16352	120	22	120	25	It is true that a world with say a 2.5 C GHG level brought back to 1.5 C by SRM would be different than a 1.5 C GHG world, the key question really is which of these might look closer to the unperturbed baseline or maybe the mid-20th century climate. And a secondary question is whether a 1.5 C world with SRM taking it down to 0.5 C would be a better option than a 1.5 C GHG world alone (it is not at all clear that 1.5 C is really acceptable, especially as compared to a 0.5 C world). And the other question is really whether having a 2.5 C GHG level (which is where we are headed even with relatively aggressive mitigation) brought back to 1.5 C by SRM would be leading to lower impacts than a 2.5 GHG world without SRM. So, in my view, this whole discussion is not framed the way that makes the most sense--but is instead citing outcomes about how SRM on its own is different than either the unperturbed or the 1.5 C world, and these are just not the right questions. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
13396	120	24			The number "2" is missing. [Helene Muri, Norway]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20482	120	24	120	24	It would only be very different in some scenarios. If low levels of SRM were used (eg $< 0.3W/m^2$ ) it is quite plausible that the differences might be quite minor. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11799	120	24	120	24	Missing a number [David Schoeman, Australia]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1594	120	24	120	24	change "a °C" to "a 2°C" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
19279	120	24	120	24	A temperature value is missing before "°C" [Rubén Retuerto, Spain]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
9333	120	24	120	24	There is a missing number 2 in the phrase "very different from a °C or 1.5°C" [Siir KILKIS, Turkey]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1967	120	24	120	24	2°C -- missing "2" [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4385	120	24	120	25	The aforementioned MacMartin, Ricke and Keith (2017) might be helpful here as it actually shows projections for this particular scenario. That paper also shows that the adjective "very" written here is not appropriate as it is neither informative (insofar as it is not quantitative), nor true in a useful sense of the adjective -- reaching 1.5 through only mitigation or 1.5 through a combination of mitigation and SRM will be far more similar to each other than either would be to a world where mitigation led to something like 2.5 or 3C of warming. (Inappropriate use of the adjective "very" is also on line 29 of page 115.) [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16353	120	25	120	33	To me, this discussion is just incorrectly framed. Of course there will be differences in the two approaches--we can all agree that we want all the mitigation possible; the question is whether whatever that climate without SRM on its own leads to more serious impacts than whatever that GHG-reduced climate is with SRM. The notion is not to substitute mitigation with SRM, but to supplement mitigation with SRM (and note that there are multiple approaches to this and all of the statements in this paragraph seem to be from the invoking of global SRM with stratospheric aerosols--whereas using cloud brightening in the troposphere might well give quite different outcomes). As to the issues of winners and losers, with the GHG gas increase alone, almost everyone is a loser for low increases in global T and virtually all for large changes in global T--some much bigger than others. It is true that SRM does not get everyone back to the non-perturbed state, it does get virtually everyone back to be either small winners or losers. Again, what is needed is an assessment of GHG perturbation with or without SRM, and not just saying that SRM is different than unperturbed state without comparing to how much greater the changes are with only the GHG change. Thus, I think the whole framing of this discussion is just not appropriate to the situation and the policy question to be considered and needs to be redone. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4386	120	30	120	30	What does "recognizable" convey in this context? I am not aware of anyone who has meaningfully quantified the economic impacts associated with regional impacts of any geoengineering scenario [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20483	120	31	120	31	It is not clear how much SRM is being imagined here, and to what benefits those from SRM are small in comparison. What is being compared with what here). Also, the word order is messed up. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1595	120	31	120	31	change "of implementing" "with implementation of" But this sentence is still not right, as it does not specify how much SRM and does not have a reference. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1596	120	31	120	31	economic benefits are small, and may become negative. This is completely wrong. Nobody has done a complete analysis of SRM taking into account all the potential negative economic impacts of side effects. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11800	120	32	120	32	"Negative benefits" is a very awkward way of saying "costs" [David Schoeman, Australia]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4387	120	32	120	33	The cited reference Kravitz et al (2014) actually reaches precisely the opposite conclusion of the claim for which it is being cited, namely that whether or not there are "winners and losers" depends on the metric chosen for winning and losing, and that indeed there are reasonable choices for metric for which current climate models don't project any losers. While it is quite plausible that there will be winners and losers, the literature quite clearly rejects the strong claims made in this sentence regarding inevitability, and "cannot be avoided". [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20484	120	33	120	33	The claim that "SRM would thus inevitably create winners and losers" is not supported by the citations here, and I do not believe it can be made categorically. The approach to SRM in Aaheim shows there to be losers in their model. The Hegerl and Solom 2009 piece asserts that there could be winners and losers but does not show it to be the case. The Kravitz et al 2014 paper cited finds losers at a very high level of SRM (offsetting 85% of teh warming in a 4xCO2 world) -- but it specifically concludes that this does not mean that "winners and losers" are a necessary part of SRM: "Related to our study is the often stated claim that geoengineering will create winners and losers...[I]f only moderate amounts of global-scale solar geoengineering are used, there is no model-based evidence to support this concern..." There is no evidence that an implementation in which low levels of SRM are pareto optimal on a regional basis could not be designed. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20108	120	35	120	38	What would these "moderate deployments of SRM" be? [Lili Fuhr, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16354	120	35	120	38	While it is a step forward to be considering more realistic cases, the overall conclusion of this paragraph is just not correct. There is a tropospheric alternative to SAI that is accomplished by cloud brightening which has the potential to be focused on particular regions and can create regional RF. In addition, with SAI, there is no reason that the aerosol injection has to be uniform--there are all sorts of way to create seasonal and latitudinal patterns in forcing and so seek to address certain types of issues, etc. Finally, there is the regional approach of clearing wintertime cirrus to allow greater IR emission to space. Given all of these possibilities, I just do not understand what the basis is for the second sentence. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4388	120	38	120	38	This is not true. Choice of injection location will give some ability to influence the zonal pattern of radiative forcing; see Tilmes et al "Sensitivity of aerosol distribution and climate response to stratospheric SO2 injection locations", submitted, J. Geophys. Res. A., MacMartin et al, "The climate response to stratospheric aerosol geoengineering can be tailored using multiple injection locations" to appear, J. Geophys. Res. A, Kravitz et al "First simulations of designing stratospheric sulfate aerosol geoengineering to meet multiple simultaneous climate objectives", submitted, J. Geophys. Res. A., as well as Z. Dai, D. Weisenstein and D. Keith, "How controllable is stratospheric radiative forcing through sulfur injection", submitted. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16355	120	39	120	39	The paragraphs jump from SAI to land surface, leaving out the troposphere. In that there is a regionally varying sulfate forcing from SO2 from coal and aerosol forcing from smoke from fires, the present situation makes clear that regional forcings can be created and that they can have influences concentrated in particular regions that do spread a bit broader. In an SRM sense, the most researched approach is cloud brightening over the ocean, but it would also be possible to do this with clear air modification as well, just as sulfate haze does now but way out over the ocean where even a small loading over the dark ocean would have a relatively large influence with no real adverse impacts in that the action is taken over the ocean, so far from people, and widely spread out so not overlapping as occurs when SO2/sulfate result from coal-fired power plants over land areas and concentrated populations. I would also note that the SAI approach has been focused on achieving large offsets of warming and is optimally suited for this; however, for the situations arising in this report, only a quite limited SRM modification is needed, and the tropospheric approaches are quite well suited to this scale of counterbalancing GHG effects. So, there are tropospheric possibilities--just not yet as researched as use of stratospheric aerosols. I therefore think that it is important to add a paragraph here on tropospheric approaches. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4389	120	40	120	40	Would seem appropriate to mention marine cloud brightening as well (e.g. Latham et al 2012, see chapter 4 for citation). See chapter 4, and box 4.13. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20109	120	40	120	49	This section essentially says that local SRM comes with negligible impacts on the global climate, and that upscaling of SRM comes with indefensible and unjustifiable risks. How can the IPCC, tasked with developing realistic response strategies and the leading scientific authority on climate change related issues, lend itself to seriously considering high-risk, unsafe large-scale technological fixes that are prone to military abuse as well as causing conflict over inevitably unevenly distributed impacts? The IPCC should exhibit a clear position on such dangerous and reckless proposals and outright reject SRM. [Lili Fuhr, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1597	120	45	120	45	Seneviratne et al.). What year? [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16356	120	45	120	49	This conclusion with respect to how land surface SRM might be done applies even more strongly to the tropospheric SRM approaches; see MacCracken, M.C., 2016: The rationale for accelerating regionally focused climate intervention research, Earth's Future 4, 649-657, doi:10.1002/2016EF000450 for some discussion of possibilities. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1598	120	51	120	51	Delete "It is important to note that" [Every sentence in the report should be important or not be there.] [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16357	120	51	120	54	While true, a couple of comments that should be associated with the statements here. First, there is no intent to suggest that SRM is a substitute for mitigation—this needs to be pursued as much as possible. Second, just because one can't do everything does not mean one should not do what one can. Third, there are separate geoengineering approaches to detail with ocean acidification that could be done along with SRM, including a whole range of CDR approaches that could eventually be phased up so that SRM can be phased out; such approaches include reforestation, direct air capture, increased ocean uptake of carbon by various types of fertilization, and more. So, this criticism of SRM is something to note, not a disqualifying aspect, especially given the very extensive impacts of climate change that would be counter-acted. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4390	120	53	120	53	would be more appropriate to say "mostly do not address" or something like that. Reducing temperature will have carbon cycle feedbacks that will impact ocean acidification (various references, e.g. Keith DW, Wagner G, Zabel CL. 2017 "Solar geoengineering reduces atmospheric carbon burden." Nature Clim. Change 7, 617–619. Doi:10.1038/nclimate3376) [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1968	120	54	120	54	Sort bracketting [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20485	120	57	120	57	Elsewhere in the special report it is explicitly stated that SRM is not a form of adaptation [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16358	120	57	121	3	Some comments on these points, using the same numbering: (i) if one's intent is to suddenly a full reversal from 2 or 4 times CO2, for example, I will agree. But a more realistic implementation, after very small scale testing of injection techniques that would have no noticeable impact, would be to gradually ramp it up and learn iteratively. We have had small volcanic injections that serve as possible analogs, at least for testing models, and with models verified against similar analogs, greater confidence can be put in the model simulations. So, this criticism is based on a type of implementation that would not be the likely policy option. (ii) This has been shown by recent studies to be a quite small influence—the studies indicate there is no reason to expect a sudden change to ozone concentration as a result of an SRM injection. (iii) As has been noted in other comments, the question at hand is not whether SRM will cause changes in the troposphere—that is the whole intent. The real question is the comparative risk of GHG change with or without SRM, not what SRM will cause effects. One key issue raised has been whether the monsoon might be affected—an important question but one that can potentially be addressed by using tropospheric or regional approaches that would not affect the monsoon in the way that SAI would do. So, this whole criticism really is not framed correctly. (iv) As to effects on vegetation and crop production, the question is again whether the effects of GHG with SRM (and note that tropospheric approaches would not have the same impacts as SAI) would compare to the situation of GHG without SRM. Of course, SAI would affect light amounts, but it would also return the climate to more favorable conditions, so likely something much closer to pre-GHG than the with GHG without SRM situation. So, this comment seems to be coming from a comparison that is not what policymakers would be considering. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20111	121	1	121	16	Flegal/Gupta 2017 are critical of such an "impoverished" notion of equity that reduces its scope to the distributional outcomes ("winners and losers") of SRM. They write that "the expert-driven, outcome-oriented, and risk-based understanding of equity [proposed by SRM advocates] has a number of implications, not the least of which is whether and how such a vision is persuasive to the "vulnerable" on whose behalf vanguard experts claim to speak. This is especially the case if equity is understood as more than just a "fair" distribution of outcomes, but also more procedurally, as being about representative and inclusive knowledge production and decision-making" See Flegal/Gupta 2017 Evoking equity as a rationale for solar geoengineering research? Scrutinizing emerging expert visions of equity, in: Int Environ Agreements. [Lili Fuhr, Germany]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
19280	121	2	121	2	Change "remain" by "remains" [Rubén Retuerto, Spain]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
11106	121	2	121	16	Third, when discussing risks associated with solar geoengineering, it is unclear whether they are being juxtaposed against current climate conditions rather than against projected future climate conditions in the absence of SRM. For example, the text notes that SRM entails a risk of "effects on vegetation and crop production." But is this a risk compared to the climate today, or compared to a future climate experiencing unmitigated climate change? If the former, this may be a fair assessment, but it is not a relevant assessment insofar as solar geoengineering is envisioned as a future option for managing risks projected to accompany dangerous climate change later this century. And if the latter, it is unclear whether the risks of SRM deployment outweigh the risks of unmitigated climate change, with some research suggesting the opposite (e.g., Xia et al. 2014). [Lili Xia et al., "Solar Radiation Management Impacts on Agriculture in China: A Case Study in the Geoengineering Model Intercomparison Project (GeoMIP)," JGR: Atmospheres 119 (2014): 8695-8711] [Joshua Horton, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16359	121	3	121	12	The rest of this paragraph suffers from the same strange perspective as is discussed in comments on the preceding sentence. The risk assessment needed is GHG with and without SRM as compared to pre-GHG increase, and this discussion is just not making this analysis (and this criticism applies to a good bit of the analysis in the impacts research community in the geoengineering area and seems to have been picked up in this text). Yes, direct/diffuse ratio changes—note that volcanoes suggest this enhances forest growth, etc., so not at all necessarily negative. On effects of changes in water, there are huge effects resulting from the change in the CO2 concentration—are these effects larger or smaller than for the case with SRM? On changes in food production, there are papers in progress on this, and, not surprisingly, SRM leads to less impacts than with just the GHG effect. On winners and losers, again, they are much less affected than the many large losers that there are with just GHG impacts. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1599	121	3	121	3	change "production" to "production (Xia et al. 2014)." Xia, Lili, Alan Robock, Jason N. S. Cole, D. Ji, John C. Moore, Andy Jones, Ben Kravitz, Helene Muri, Ulrike Niemeier, B. Singh, Simone Tilmes, and Shingo Watanabe, 2014: Solar radiation management impacts on agriculture in China: A case study in the Geoengineering Model Intercomparison Project (GeoMIP). J. Geophys. Res. Atmos., 119, 8695-8711, doi:10.1002/2013JD020630. [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4391	121	5	121	7	line 5 correctly includes the adjective "potentially" when talking about simulation results that suggest SRM isn't awful, but the same adjective should be included in line 7 for talking about winners and losers, as noted earlier this claim is not universally supported by the literature. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4392	121	5	121	7	Line 6 the adjective "negative" seems normative here; unclear whether the precipitation impacts of a limited deployment would indeed generally be negative (insofar as the precipitation would be restored closer to preindustrial almost everywhere; see e.g. the summary in MacMartin, Ricke and Keith 2017) [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20486	121	7	121	7	The "winners and losers" remark should be removed in line with my comment on Chapter 3 p120 line 33: it is not a given that winners and losers must be created, though it is certainly possible. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
1600	121	9	121	9	fix font size in "and" [Alan Robock, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
19281	121	9	121	9	Change format in "and" [Rubén Retuerto, Spain]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
20487	121	12	121	16	Given this point about "winner and loser" regions, I do not think that the expert judgment assessment is merited. The last sentence of this paragraph should be removed. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
4393	121	12	121	16	The sentence construction is unclear whether the intent is to say that given present knowledge we should err on the side of caution today and not deploy today or rely on this being an available solution (which is pretty clear and no-one would disagree with), or whether the intent is to say that the present state of knowledge is sufficient to support medium confidence that the risks will outweigh the benefits in some hypothetical future deployment (which is quite clearly an unsupported claim given the published literature). There is no evidence to support that latter claim; additional research is needed, and the answer depends on the counterfactual. If mitigation were only sufficient to lead to 2.5-3C of warming, all climate modeling to date supports the statement that a 1.5C world achieved through a combination of SRM and that level of mitigation is much more similar to a 1.5C world achieved through mitigation alone than either is to a higher temperature world, in both temperature and precipitation, almost everywhere. That is certainly not a claim that there is sufficient evidence to rely on the present state of knowledge to conclude that the benefits will outweigh the risks, but given the sign of the evidence it is difficult to persuasively conclude the opposite. [Douglas MacMartin, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
16360	121	12	121	16	Given my comments and the need for reframing I indicate, doing a risk analysis of GHG change with and without SRM, I just do not think there is any justification for the concluding sentence here. And to say "at the present state of knowledge" also seems inappropriate, though it is certainly relatively little (too little) research has been done. With respect to the level of uncertainties, it seems to me very hard to see how uncertainties for the SRM situation that keeps the climate generally within bounds of actual recent experience via mechanisms for which the models already are treating analogous processes (for SAI, doing volcanic aerosols, etc.; for tropospheric approaches, treating cloud microphysics, etc.) would have greater uncertainties than simulations with GHGs at elevated levels and representing a world for which we have no analogs (yes, Earth's climate history had warmer periods, but we don't have good information on these periods and are indeed actually unable to explain how the Cretaceous climate could be so warm). So, asserting that SRM is not well enough understood seems quite a tenuous conclusion given the very strong conclusions and inferences that are being drawn from model simulations of elevated GHG concentrations. I would strongly urge reconsidering this conclusion--and instead calling for more research, especially research focused on potential plausible types of invoking SRM (so a slow buildup to, for example, offset future warming and a bit more) using a range of approaches and seeking to only offset what might be any overshoot of 1.5 C (or better yet, 1 C), and to make analyses of comparative risk--GHG without SRM versus GHG with SRM. [Michael MacCracken, United States of America]	Taken into account. This whole subsection (3.7.3) has now been deleted so that SRm covered only in Chapters 1 and 4.
12433	121	19			This section is not comprehensively covering all the issue that needs to be addressed, e.g. ocean acidification, glacier melt, changes to the hydrological cycle and biosphere. Plus it does not address the key question of reversibility. Several of the issues, such as sea-ice and ice sheet dynamics are also repeated in other sections. [Bill Hare, Germany]	Rejected. This section is intended to summarise the long-term implications bringing together material from earlier in the chapter (hence repetition). It focusses on aspects where equilibrium is unlikely to be established by the end of the century.
14052	121	19			Why are natural (ecosystems) and human systems not included here??? [Elvira Poloczanska, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
515	121	19	122	26	I would delete Section 3.7.4, it is not really relevant for the present report. [David Docquier, Belgium]	Rejected. Long-term commitment is very much within the scope of the SR.
19282	121	22	121	22	Remove "with" [Rubén Retuerto, Spain]	Accepted.
16361	121	22	121	28	Indeed, so why all the previous focus on no sea ice in September as a tipping point in the earlier table. [Michael MacCracken, United States of America]	Taken into account. Unclear which table is being referred to. Have worked on relevant box to ensure consistency.
2983	121	24	121	24	hypothesis - what hypothesis is being tested? The hypothesis needs to be stated [Erica Head, Canada]	Accepted. Have reworded.
9334	121	32	121	32	There is a missing word "to" in the phrase "are likely (to) have a profound impact" [Siir KILKIS, Turkey]	Accepted. Have reworded.
16362	121	33	121	33	Why just ten millennia? Why be so precise? [Michael MacCracken, United States of America]	Accepted. Have reworded.
2984	121	34	121	34	50 m of committed sea level rise is potentially possible Surely if the 50 m or sealevel rise is "committed" then it is certain, rather than being "potentially possible". [Erica Head, Canada]	Accepted. Have reworded.
16363	121	35	121	36	This statement needs qualification--first, dependence is likely on cumulative emissions, so going to zero emissions in the late 20th century does not lead to no further sea level rise. Second, there is very significant momentum in the processes controlling ice volume. Third, there are amplifying processes that will tend to continue the loss of ice (lower elevations are warmer; once the ice is warmed, it will take a long time to cool it enough to slow its movement; etc.). Fourth, unlike sea ice, the loss of ice on Antarctica is not likely to be reversible, in any short time, at least--experiences through the glacial cycling indicates that loss of ice occur much more rapidly than it forms. [Michael MacCracken, United States of America]	Accepted. Have reworded. Other points - Taken into account. The text in relevant subsections is very clear about all of these points.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4394	121	37	121	44	Same issues in this summary statement as in the text: L38, the adjective "entirely" is redundant. Line 39 is also true for mitigation: a 1.5C world achieved through mitigation has less tropical precipitation than a 3C world achieved through less aggressive mitigation, so the statement as written is not useful (and presumably reflects authors' biases rather than scientific evidence). It is sufficient to say that a 1.5C world achieved through less aggressive mitigation and SRM will not be the same as a 1.5C world achieved through aggressive mitigation alone. Again, would be valuable in the summary statement to reiterate the counterfactuals being considered; if the choice was between between these two 1.5C worlds, there is less physical climate risk to achieving it purely through mitigation, but if the choice was between 3C without geoengineering or 1.5C with some geoengineering, then it is not so clear. Again, the assertion regarding winners and losers is not supported by the published literature (e.g. Kravitz et al, 2014, cited herein). [Douglas MacMartin, United States of America]	rejected. The comment does not appear to be related to this subsection.
11801	121	39	121	39	A number is missing units... [David Schoeman, Australia]	Accepted.
16364	121	41	121	43	That the Greenland and Antarctic ice sheets will not be threatened except on centennial time scales and beyond seems to me a statement meriting greater qualification than indicated here. The DeConto-Pollard model includes a process that can lead to greater calving from ice shelves, and in a seminar they gave they indicated that they had arbitrarily limited the rate of calving that might occur based mainly on a preference—not physics. Thus, they basically cannot rule out considerably faster rates of ice shelves and so the potential for considerably higher glacial stream flow than their published paper has indicated. I also think that it is important to be indicating that the process of eventual loss of large amounts of ice sheet mass can be initiated on shorter than a centennial time period and would then carry forward for many millennia at rates of potentially a few or more meters per century. The text here makes it seem as if the ice sheets and associated sea level rise are potential problems well off in the future, and this is simply not the case. [Michael MacCracken, United States of America]	Rejected. The assessment is based on published work and reflect the published version of the deP&C results. Seminars are grey literature.
19062	121	49	121	49	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Editorial - copyedit to be completed prior to publication
11802	121	52	121	55	This sentence contains both grammatical errors and typos, which seem to be symptomatic of the last third of this chapter, which reads far more like a rough first draft than the earlier parts [David Schoeman, Australia]	Accepted. Sentence deleted.
16365	121	53	121	53	What does "more cooler" mean? Presumably getting lower elevations cold enough to build up a lot of snow would be quite a significant cooling, likely to well below the present temperature (note that there is not snow buildup occurring at present temperatures at latitudes equivalent to Greenland--indeed, mountain glaciers at the same latitude are losing mass. Based on what we know, suggesting that build up might occur seems unduly rosy. It would also be appropriate to note that glacial cycling tells us that loss of ice occurs much more rapidly than build up of ice on mountains. Thus, it seems to me that the sentence on lines 52-55 is thus offering an unjustified, very speculative possibility to decision makers and this is really not at all likely. [Michael MacCracken, United States of America]	Taken into account. Sentence has been deleted.
19283	121	54	121	55	Rephrase [Rubén Retuerto, Spain]	Taken into account. Sentence has been deleted.
9335	122	1	122	14	More recent references on the Antarctic ice sheet may be inserted, including but not limited to "Antarctica's Changing Larsen Ice Shelf" < <a href="https://www.nasa.gov/image-feature/antarctica-s-changing-larsen-ice-shelf">https://www.nasa.gov/image-feature/antarctica-s-changing-larsen-ice-shelf</a> > [Siir KILKIS, Turkey]	Rejected. Grey literature.
16366	122	3	122	7	I would just note that this same instability applies to the ice heading inward on the Jacobshaven ice stream, and perhaps other such fjords, as a result of the underlying land in the center of Greenland having been pushed down to hundreds of meters below sea level. [Michael MacCracken, United States of America]	Rejected. Perhaps, although (a) JI exists within a narrow trough which may mean ice dynamics are very different to WAIS and (b) if it was that unstable why is it still there?
9119	122	9	122	14	see comment on p.108, line 48-50 [Michael Oppenheimer, United States of America]	Taken into account. SOD has attempted to address tipping points etc in a more coherent fashion. Strong overlap with likely content of SROCC so that need to maintain focus on 1.5C worlds and not a wider discussion of instabilities etc.
2332	122	18	122	18	size of this store of ice is a bit misleading. Permafrost is defined as a thermal condition of the ground which may or may not contain ice (it is not a big block of ice which the statement suggests) and the amount of ice is highly variable with location and depth. [Sharon Smith, Canada]	Accepted. Sentence rewritten
7503	122	18	122	20	Consider rewriting this sentence to better explain the response lag. [Øyvind Christophersen, Norway]	Accepted. Sentence rewritten
2334	122	18	122	26	These models look at two different things so the comparison may not be valid especially with out a time period. Chadburn et al. (2017) considers equilibrium conditions so the time period over which the changes occur is not considered. While I agree the total potential loss of permafrost in response to a given change in air temperature is likely to be somewhat greater than that predicted to occur over a shorter period with a transient model, the actual difference is going to depend on the time period considered under the transient model and you have not provided that. Also, Slater and Lawrence (2013) only consider loss of permafrost in the upper 3 m so they are not really looking at the entire thickness of permafrost. Chadburn et al (2017) are looking at the size of the permafrost zones (the ones on Brown et al. map) and how that changes in response to air temperature changes, where as the transient models are considering the actual ground thermal conditions so they are not looking at the same thing. [Sharon Smith, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
2333	122	22	122	22	permafrost cover is incorrect terminology as permafrost is below the ground surface (term also used later in paragraph in line 25). Refer instead to the area underlain by permafrost. I expect that this terminology has come about because Chadburn et al. (2017) examine how the permafrost zones will change with changing air temperature and therefore may have referred to the land covered by the permafrost zones or regions (which is quite different than saying permafrost cover). [Sharon Smith, Canada]	We are grateful for your suggestion, and will be including consideration of it in the next draft
19284	122	22	122	22	Change "emperical" by "empirical" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
19285	122	24	122	24	Remove "is" after "2.9" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
12434	122	29			This section is not comprehensive and misses key things such as tipping points, reversibility, etc. Should be updated and linked to the preceeding chapters. [Bill Hare, Germany]	The section has been updated and expanded. It examines general knowledge gaps and some specifically identified as relevant to the previous sections.
10206	122	29			Should not have title of research needs - not allowed in IPCC reports [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Section has been renamed Chapter Limitations and Knowledge Gaps

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2359	122	29	123	15	Knowledge Gaps; A key issue for understanding different levels of warming and the subsequent differentiation of impacts relates to how climate resilience needs to be incorporated into natural and human systems. A great deal of evidence is being collated by the practitioner community (see Viner D and Howarth C 2014 Practitioners work and evidence in IPCC reports. Nature Climate Change Vol. 4 October 2014) and it is this community that is delivering resilience through infrastructure and asset design. Key areas of research that are needed by the policy and practitioner community are: Investigation into how components of the urban system interact with each other to impact upon mitigation and resilience targets; the use of risks frameworks in asset and system design to deliver resilience to a 1.5, 2.0 or higher warming world; the befits of the Resilience Dividend for financial investment and future returns. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Agreed. The section now acknowledges that: A better understanding is needed of the intersection of climate change with development pathways. Projecting risks under a range of climate and development pathways would promote understanding of how development choices could increase or decrease the magnitude and pattern of risks, and would therefore provide better estimates of the range of uncertainties.
516	122	31			If there is emerging literature, please provide some examples. [David Docquier, Belgium]	Significantly more emerging literature has been incorporated in the entire chapter for the SOD. This factor is now acknowledged in this section. Specific examples are not reiterated. However the limitation of inequity across disciplines remains and is also acknowledged..
19286	122	31	122	31	italicize "vs" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
17669	122	31	123	15	The limited information on tropical areas has been suggested, so further elaboration on suggestions on how to address the issue is needed. For example: the potential use of country report published by a country for the IPCC report. [Perdinan Perdinan, Indonesia]	The scope of the section is limited to acknowledging limitations and gaps such as the one referred to. No explicit recommendations are offered.
7281	122	31	123	15	The Higher Education Institutions critical role could be mentioned (e.g., Implementing climate change research at universities: Barriers, potential and actions Journal of Cleaner Production 170 (2018) 269e277 https://doi.org/10.1016/j.jclepro.2017.09.105 http://www.sciencedirect.com/science/article/pii/S0959652617320954?via%3Dihub [Ulisses Azeiteiro, Portugal]	The section acknowledges the need for more relevant literature. It is perhaps beyond the scope of the section to determine where the literature should emerge from.
16367	122	37	122	41	The point made here is important--there are significant impacts at 1.5 C and the implication in this report that 1.5 C might be an acceptable new, long-term level for global temperature might be acceptable seems to me unjustified by even the limited information that is available (e.g., with respect to ice sheet mass, biodiversity loss, etc.)--this value is a politically chosen value and not a location that provides some boundary between minimal and very large impacts. To make this clear, expanded discussion of the impacts of 1.5 C needs to be included throughout the report instead of focusing primarily on the difference between 1.5 and 2 C (both of which are politically chosen values). To get the needed information, it seems to me there needs to be a recommendation to have more research on the difference in impacts between 0.5 and 1.5 C should be called for. [Michael MacCracken, United States of America]	The introduction to the section adopts the recommendation made. It notes that: More research and analysis is also needed to clarify projected differences of climate change impacts and consequences for +1.5°C or +2°C global warming.
2186	122	43	122	45	I agree with this statement, but wonder why the authors seem so confident with many of the statements they make through this chapter when, as they say, "Relatively little literature is designed to study the impacts of the two warming levels". In particular, I do not see how the authors can make so many statements that restraining the warming "significantly" reduces the risks relative to 2C, with the available literature. In most cases they have not, to my mind, provided sufficient justification for their confident statements. They may well be right, but more evidence is required. Until then they need to use the IPCC calibrated language and avoid overestimating their confidence. [Neville Nicholls, Australia]	Significantly more literature has emerged since the FOD which in many instances have bolstered the ability the assess impacts. However, the point is taken, and the rewriting of the chapter for the SOD does incorporate more use of the IPCC uncertainty language.
9997	122	47	123	16	I totally agree [Mustafa Tufan Turp, Turkey]	Thanks.
9621	122	53	122	54	please add contents:more contents and literaures are needed about the risk of species extinction following climate change [Jianguo Wu, China]	Knowledge gaps with respect to terrestrial and oceanic ecosystems have been expanded.
19629	122	55	122	56	Agree strongly with this point. These should be strong cross-cutting messages throughout the report. It is also disconcerting that chapter 5 does not have a similarly deep analysis on this topic as is found in chapter 3 and this should be rectified. [Doreen Stabinsky, United States of America]	Noted.
21166	122	55	122	56	this finding should be acknowledged in ch 2 [David Cooper, Canada]	Noted.
13451	122	56	122	56	Might be good to mention that a temperature change of 1.5 deg or 2deg impacts the large-scale circulation system in a different way. Hence, simulations need to be designed to capture the variability of such pathway changes and how does the earth system models respond to these forcing. [Vidyunmala Veldore, Norway]	Whereas the lack of such studies is mentioned in the text. Outside of a reference to oceanic circulation, it is not explicitly noted in this section. This will be considered for the TOD.
19630	123		124		box is very necessary. [Doreen Stabinsky, United States of America]	Noted.
5485	123	2			delete double off [Aliyu Barau, Nigeria]	The section has been rewritten and the sentence no longer appears in the revision.
5904	123	2	123	2	Please delete "of". [Joan A. Lopez-Bustins, Spain]	The section has been rewritten and the sentence no longer appears in the revision.
19287	123	2	123	2	Remove "of" after "incorporation" [Rubén Retuerto, Spain]	The section has been rewritten and the sentence no longer appears in the revision.
13452	123	15	123	15	Economic impacts due to natural hazards like hurricanes, storm surges and floods exist for few regions. However a detailed list of economic impacts due to climate change related extremes need to be maintained for future understanding. [Vidyunmala Veldore, Norway]	Acknowledged. Will be added for third order draft.
9881	123	16			I suggest that further research on the impacts of increased temperatures and changing patterns of precipitation on social relationships is needed. [Susan Clayton, United States of America]	The chapter does not explore explicitly impact on social relationships. It is only briefly touched on in the chapter (i.e. conflicts). The general point of the need for further research on impacts relevant to all aspects of the human systems is however made.
20511	123	16	123	16	It is clear from the discussion earlier in chapter 3 that there are a number of knowledge gaps wrt to SRM which should be included at the end of this section. These might include a wide range of impacts, food security, ways of reducing moral hazard, modification of the ozone layer, etc. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	The substantive content on SRM has been moved from the chapter to a cross chapter box. SRM is now only briefly mentioned in the chapter and the reader referred to the cross-chapter box. Limitations relevant to SRM are now considered in that box.
17726	123	16	123	16	Also, little is known about impacts in the different systems/regions resulting from the different overshoot scenarios [Ana Bastos, France]	Both the need for regional focus and for assessment other than transient scenarios are acknowledged as knowledge gaps.
14053	124	1			There is a SR on climate change and land (SRCL) under development (agreed outline is available on IPCC website). I suggest this box focuses on 1.5 and 2 and provides a handshake for the SRCL to address in more depth [Elvira Poloczanska, Germany]	Agree, we have now emphasized that the box focuses on 1.5C and hence on the land footprint of negative emissions.
2628	124	1	124	20	relate back to aichi biodiversity targets? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	We will consider if there is space for this in next draft
19315	124	1	125	25	The proposed Box on Land Use is extremely important; the proposed outline is convincing. [Marco Mazzotti, Switzerland]	Thanks.
17283	124	1	125	25	Under construction [Maria Jesus Iglesias Briones, Spain]	Yes, this box was under construction in FOD.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12435	124	1	125	25	<p>[1/2] Cross-chapter box 3.11: land-use.</p> <p>I understand the box currently is in draft form, which makes it difficult to provide an in-depth review of the content that is provided there. The current starting point for this box, however, is that IAMs are using (sometimes beyond scale) amount of bioenergy. Whether or not this is a problem of the model setup (due to intertemporal optimisation, technology cost curves or simply the lack of other implemented NET options...) or a 'real world' issue needs to be established. I feel very strongly that current outline of the box needs to be revised in order to capture the complexity of the matter in sufficient detail.</p> <p># According to the title, the box is on land-use change. NETs undoubtedly play an important role here and need to be covered. However, future scenarios also use bioenergy without CCS at scale and undoubtedly it is the total sum of BE and BE+CCS that is relevant for land use implications as the land use implications of the CCS component may be small. The large-scale deployment of bioenergy in IAM pathways is not limited to 1.5°C and 2°C scenarios (see e.g. Schleussner et al. 2016, Fig. 3).</p> <p># It also misses other land-based negative emissions options, such as biochar, ecosystem restoration etc. The role of e.g. residues, marginal land, reforestation, agricultural intensification and diet changes is only in one bullet point at the end. [Bill Hare, Germany]</p>	Agree. Text edited. We now (a) acknowledge the land footprint of biofuels in general (b) retitled the box to explain focus on negative emissions and 1.5C (more general treatment will occur in Land report) (c) expanded final section on ecosystem restoration.
21169	124	1	125	25	<p>box 3.11: also discuss potential role of afforestation, reforestation and other ecosystem restoration in front-loading CDR see Houghton RA, Byers B, Nassikas AK. 2015. A role for tropical forests in stabilizing atmospheric CO2. Nature Climate Change 5:1022-1023. [David Cooper, Canada]</p>	Agree. This is done in Chapter 4's mitigation section. 4.3.6 specifically. We added a cross reference.
12436	124	1	125	25	<p>[2/2] Cross-chapter box 3.11: land-use. # There is very little on second and third-generation biofuels, in particular agricultural and forest residues, optimal forest harvesting. The WG3 AFOLU chapter 11 should be a starting point here. Future levels of bioenergy deployment required should be put in perspective to current use of bioenergy and identified sustainability levels.</p> <p># Context on other drivers of land-use change in the SSPs and their relative contribution needs to be provided (see e.g. Popp et al 2017). Ch 02 contextualises the mitigation challenge with socio-economic development pathways and it is recommended that CH 02 scientists should also contribute more strongly here, too. [Bill Hare, Germany]</p>	Agree, but space did not permit us to include this. If it is not covered in the chapter 4 this will be addressed in the next draft.
4650	124	5	124	6	Change "GtCO2eq/yr" by "GtCO2eq yr-1" [Radim Tolasz, Czech Republic]	Editorial - copyedit to be completed prior to publication
4651	124	10			The abbreviation for plural is usually Xs. For example "National Meteorological Services" as "NMSs". So for "negative emission technologies" is better to use "NETs" instead of "NETS". [Radim Tolasz, Czech Republic]	Accepted.
4652	124	13			Change "NETS" by "NETs" [Radim Tolasz, Czech Republic]	Agree
16368	124	13	124	14	Consideration should be given to additional approaches to CDR beyond BECCS and afforestation. [Michael MacCracken, United States of America]	Agree. Due to space constraints we have added a cross reference to Ch 4 where this is considered in more detail. We will consider altering the balance of the text in the final draft.
2733	124	13	124	19	Important to consider other perspectives e.g. Larkin et al 2017 - their paper on 'what if NETs fail at scale?' [Penny Urquhart, South Africa]	Agree : the feasibility discuss occurs in Ch 4 and a cross reference will be provided in the next draft
13397	124	19			Abandoned land could also play a role here. Could be mentioned after "marginal land". [Helene Muri, Norway]	Agree
8841	124	28	124	28	Box 3.11 Figure 1 is not there. [Lubna Alam, Bangladesh]	Agree
21167	124	30	125	34	address also reforestation and other ecosystem restoration [David Cooper, Canada]	Box revised
21168	124	30	125	34	factor in also iLUC referedtoin lines 44-50. [David Cooper, Canada]	See response to comment 16386
4653	124	36			Change "NETS" by "NETs" [Radim Tolasz, Czech Republic]	Text revised
4654	124	38			Change "NETS" by "NETs" [Radim Tolasz, Czech Republic]	Text revised
1567	124	44	124	50	<p>Some useful references for this section : The Joint Research Center from the EU states that "From the studies analyzed it emerges that in order to assess the climate change mitigation potential of forest bioenergy pathways, the assumption of biogenic carbon neutrality is not valid under policy relevant time horizons (in particular for dedicated harvest of stemwood for bioenergy only) if carbon stock changes in the forest are not accounted for." <a href="http://publications.jrc.ec.europa.eu/repository/bitstream/JRC70663/eur25354en_online.pdf#page=15">http://publications.jrc.ec.europa.eu/repository/bitstream/JRC70663/eur25354en_online.pdf#page=15</a> Also this Chatham House report : "Although most renewable energy policy frameworks treat biomass as though it is carbon-neutral at the point of combustion, in reality this cannot be assumed, as biomass emits more carbon per unit of energy than most fossil fuels. Only residues that would otherwise have been burnt as waste or would have been left in the forest and decayed rapidly can be considered to be carbon-neutral over the short to medium term." <a href="https://www.chathamhouse.org/publication/impacts-demand-woody-biomass-power-and-heat-climate-and-forests">https://www.chathamhouse.org/publication/impacts-demand-woody-biomass-power-and-heat-climate-and-forests</a> And finally this article by Searchinger : <a href="http://www.sciencedirect.com/science/article/pii/S0301421512001681">http://www.sciencedirect.com/science/article/pii/S0301421512001681</a> [Noé Lecocq, Belgium]</p>	Text revised
14951	125	18	125	18	On the proposed subsection on implementation issues and "negative consequences for equity". There is a considerable literature on the principles of equity and on how they are impacted by various mitigation policies. See, for example, Simon Caney 'Climate Change and Non-Ideal Theory: Six Ways of Responding to Noncompliance' in Climate Justice and Non-Ideal Theory (Oxford: Oxford University Press, 2016) edited by C. Heyward and D. Roser, 21-42. see also Simon Caney 'Global Justice, Climate Change, and Human Rights' in Leadership and Global Justice (Basingstoke: Palgrave Macmillan, 2012) edited by D. Hicks and T. Williamson, 91-112 - on the role of human rights in the context of mitigation policies. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Agree, text revised; however as these reports have very similar messages as peer reviewed literature now cited in the revised Box, we have focused on these sources instead.
14952	125	18	125	18	continued: It is important that any such analysis include the literature on ethics and climate change - including equitable burden sharing. See Simon Caney 'Cosmopolitan Justice, Responsibility, and Global Climate Change', Leiden Journal of International Law, vol.18 no.4 (2005), 747-775 and Simon Caney 'Two Kinds of Climate Justice: Avoiding Harm and Sharing Burdens', Journal of Political Philosophy, vol.22 no.2 (2014), 125-149 . [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - this is beyond the scope of this box due to space constraints.
9998	125	27	132	70	Here, reaching 2°C carbon budget figures or comments adapted from IPCC WGI AR5 can be added in order to compare with 1.5°C. [Mustafa Tufan Turp, Turkey]	Rejected - this is beyond the scope of this box due to space constraints.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7171	125	28	132		The Box 3.12 - 1.5C Warmer Worlds could play an important role in informing policy makers. I suggest avoiding mixing between questions and statements in the bolded text (e.g., Could SRM limit global temperature warming at 1.5C? versus The transformation towards a 1.5C can be implemented in a variety of ways) [Julain Florin VLADU, Germany]	Noted. We kept the subtitle on SRM as a question to highlight the uncertainty associated with this topic.
5436	125	28	132		Box 3.12: It is suggested to link this box and the scenarios described therein to the concept of shared socioeconomic pathways (SSPs) introduced in chapter 2. It would be very helpful to better link chapters 2 and 3 and to make the concepts more coherent. [Klaus Radunsky, Austria]	Noted. SSPs were not discussed in the present box because the focus is on the impacts associated with given global temperature levels. An assessment of changes in impacts integrating distinctions between SSPs is not yet available from the literature.
1203	125	28	132		Box 3.12: this is fantastic - great job! [Petra Tschakert, Australia]	Noted. Thank you.
12437	125	32	125	33	[1/3] Box 3.12:  This box needs to be improved considerably to be useful or deleted altogether. Most importantly, the scope needs to be refined. The current box is totally overloaded. It tries to cover what is otherwise the topic of large parts of Ch 01 and 03 (plus Ch 02) in just a few pages. This is an impossible task unless the box is renamed to 'Summary for policy makers'.  Several elements are of particular concerning:  # Reference to SRM. It is clear that the Paris LTGG is linked to a risk assessment based on GHG mitigation pathways. The way to achieve that as established in Article 4 is explicitly and solely linked to GHG mitigation. A 1.5°C world as envisioned in the Paris Agreement can therefore not be achieved through SRM. [Bill Hare, Germany]	Noted. The amount of material was in part reduced (e.g. smaller table). Regarding SRM: Because this topic is addressed within the report (cross-chapter box on SRM), it is felt that this topic needs to be mentioned (though briefly). The question of whether SRM is compatible with the Paris agreement should be addressed in the cross-chapter box on SRM rather than the present box. The material included here highlights the pitfall of considering SRM in the context of the Paris agreement, i.e. focusing on global temperature alone without considering the associated regional footprint.
12438	125	32	125	33	[2/3] Box 3.12:  # Key aspects of 1.5°C world are insufficiently covered. In my view, such a box could be very useful if it establishes for which impacts GMT alone is a good indicator, so all 1.5°C worlds are equal, and for which it is of limited applicability starting from the geophysics of it. This includes TCR (we don't know the exact CO2 level of when 1.5°C will be reached, leading so substantial uncertainty for ecosystem and ocean acid impacts), timing including overshoot, beyond 2100, etc. Special focus should be given to oceanic and cryosphere processes. In a next step, the socio-economic uncertainties of such a 1.5°C world should be outlined. That goes beyond mitigation side effects, but links to broader aspects of the SSPs including in particular vulnerability and exposure and obviously adaptation. Timing is again very important here as e.g. vulnerabilities end-of-century would be lower than 2030. [Bill Hare, Germany]	Noted. The suggested additions would be interesting but would clutter the box (see above comment from the same reviewer). For this reason, material on the mentioned points has not been added.
12439	125	32	125	33	[3/3] Box 3.12: # Table 1: Apart from the introduction of new concepts to classify uncertainty (unluckily I didn't find a definition of the IPCCs official understanding of luck...) this table has fundamental issues and I can only recommend to delete it. 1. Pathway classification: From what I understand, the table includes just one category that could be seen as a 1.5°C pathway under some definitions. All the others are not. What is the point of including them in a box that is called '1.5°C warmer worlds'? 2. The set of impact indicators, in fact all extreme weather event indicators, is not more than a selection of 'chance'. How can this selection be justified? Shouldn't such a box rather adopt concepts of Ch 03 such as hot spots or RFCs?  # Table 2: I'm sympathetic to the idea, but the logical connections drawn are problematic at times.  # Minor comment: 1.5 warmer worlds - incorrect wording of PA "goals". The language should reflect what was written in the Paris Agreement that refers to one temperature goal (see e.g. Schleussner et al. 2016). [Bill Hare, Germany]	Noted. The term "unlucky" was replaced with "worst case". The size of the table has been reduced (less scenarios) and it now only includes scenarios compatible with 1.5° or 2° warming. The title of the table has been changed to reflect that it does not strictly highlight "worlds with 1.5°C global warming" but worlds possibly resulting from scenarios compatible with 1.5° or 2°C global warming ("Different worlds resulting from 1.5°C and 2°C mitigation (prospective) pathways"). Table 2: other reviewers have been supportive of keeping the table, highlighted issues (by other reviewers) have been addressed. "goals": was kept in plural, because it refers to the two goals listed in the Paris agreement: "holding global temperature increase well below 2°C" and "pursue efforts to limit temperature increase to 1.5°C".
16369	125	32	125	33	Is it really the case that the Paris Accord offers these levels as potential new stabilization levels rather than viewing them as desirable peak levels with the intent to go back to lower levels thereafter? Were it not for possible natural carbon feedbacks and other long-term adjustments occurring, won't it require some actions to keep the world at 1.5 C once one stabilizes at that level. To get this level, emissions of short-lived species will be down and their concentrations will rapidly drop and so will their forcing, etc. While the UNFCCC objective does suggest stabilization and so it is perhaps conceivable of thinking of 1.5 C as a new stable level, but if this is the level chosen, the ongoing impacts of 1.5 C will likely violate the qualifications of Objective 2 of the UNFCCC. For example, even if temperature is stabilized, sea level rise will not be stabilized and that will be creating havoc with coastlines. In addition, the CO2 level at 1.5 C will be having severe impacts on ocean ecosystems, etc. It very much seems to me that the stabilization level needs to be back below 0.5 C, not 1.5 C or 2 C. And this need to get back to below 0.5 C and the inadequacy of a 1.5 C stabilization level needs to be made clear to readers, so very clearly stated. [Michael MacCracken, United States of America]	Rejected. The Paris agreement does not mention efforts for reducing global temperature warming further than 1.5°C.
2360	125	42	125	45	If we are talking about global average temperatures, yes, this value can be derived from observations or models. However, the use of a prefacing term is normally applied. For example: the observed global mean temperature, or the modelled global mean temperature. Does this also need to state what are the 30-year reference time periods that are being referred to in this chapter and report. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We have now included the definition of 1.5°C global warming introduced in Chapter 1.
16370	125	43	125	44	It is not the "globally averaged temperature of the Earth"—it is the change in temperature averaged across the Earth, up from something like 15 C to 16.5 C. [Michael MacCracken, United States of America]	Noted. This text does not need to be revised, it refers to the absolute global mean temperature.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14924	125	51	125	53	While there is uncertainty about when the 1.5C and 2C temperature targets will be crossed globally and locally, the following two studies indicate how far ahead the regional temperatures over land are compared to global average temperature. Joshi, M., Hawkins, E., Sutton, R., Lowe, J. and Frame, D., 2011. Projections of when temperature change will exceed 2 [deg] C above pre-industrial levels. Nature Climate Change, 1(8), pp.407-412. & Karmalkar, A.V. and Bradley, R.S., 2017. Consequences of Global Warming of 1.5 C and 2 C for Regional Temperature and Precipitation Changes in the Contiguous United States. PloS one, 12(1), p.e0168697. [Ambarish Karmalkar, United States of America]	Noted. We have added a reference to Karmalkar and Bradley. A reference to Joshi et al. was not added because it is not specifically addressing 1.5°C global warming.
380	125	52			Rephrase: 'there will be locations and time periods in which the temperature exceeds 1.5°C warming and other where it will be below this threshold'. It is important to say that local temperature will also be below 1.5°C warming in some locations. [David Docquier, Belgium]	Noted. Text was not adapted, but this information can be seen in Fig. 1 of the box.
8842	125	53	125	54	There is no such thing as "Box 3.12 Figure 1" [Lubna Alam, Bangladesh]	Rejected. See Figure 1 of the box.
2361	125	56	125	56	Th WMO define a climatology as a 30 year period, why then is there reference to a 20 year period, this needs to be justified. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This will be edited in the FGD.
381	126	13			Remove '(Chapter 3)' or identify specific section in the text. There is no point to cite the chapter in which you are. [David Docquier, Belgium]	Rejected. This is a cross-chapter box.
387	126	13	126	14	Rephrase: 'For instance, some model simulations project a 3°C warming in the Arctic cold temperature extremes in a 1.5°C warming world, while others project a 6°C warming'. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
388	126	24			I cannot find Table 3.9. [David Docquier, Belgium]	Editorial. Reference has been corrected.
382	126	25	126	47	Fig. 2 of Box 3.12: What are the two different emission pathways (red and blue curves)? It is important to precise in the legend. [David Docquier, Belgium]	Noted. The two emissions pathways are RCP4.5 (blue) and RCP8.5 (red). This information appears too detailed for this cross-chapter box. The information can be found in the referenced publication.
383	126	25	126	47	Fig. 2 of Box 3.12: What does represent the dashed black line? [David Docquier, Belgium]	Noted. The dashed black line indicated the 1:1 line corresponding to when the regional warming is equal to the global warming. In order not to clutter the caption, this information was not included.
384	126	25	126	47	Fig. 2 of Box 3.12: What is 'contiguous US'? [David Docquier, Belgium]	Noted. It refers to the 48 adjoining US states (see e.g. <a href="https://en.wikipedia.org/wiki/Contiguous_United_States">https://en.wikipedia.org/wiki/Contiguous_United_States</a> ).
385	126	25	126	47	Fig. 2 of Box 3.12: Consider replacing TNn and TXx by proper variable names on y axes. [David Docquier, Belgium]	Editorial - copyedit to be completed prior to publication
386	126	25	126	47	Fig. 2 of Box 3.12: Why isn't the dashed red line exactly at 1.5°C warming (but rather a bit below)? [David Docquier, Belgium]	Editorial. Should be exactly at 1.5°C (as also indicated in the caption).
4655	126	42			Add "(TNn)" to sentence "minimum annual night-time temperature (TNn)" [Radim Tolasz, Czech Republic]	Corrected.
4656	126	43			Add "(TXx)" to sentence "maximum annual day-time temperature (TXx)" [Radim Tolasz, Czech Republic]	Corrected.
4657	126	46			Be concrete with "two different emission pathways". For example "solid red (RCP2.6) and blue (RCP4.5) lines for mentioned emission pathways" [Radim Tolasz, Czech Republic]	Noted. The two emissions pathways are RCP4.5 (blue) and RCP8.5 (red). This information appears too detailed for this cross-chapter box. The information can be found in the referenced publication.
19288	126	50	126	50	Italicize "vs" [Rubén Retuerto, Spain]	Editorial - copyedit to be completed prior to publication
7504	126	50	127	2	Impacts of emissions pathways with and without overshoot should also be treated in the main text of the sub-chapter. This is due to the potentially large implications for ecosystems, tipping-points but also human society. [Øyvind Christophersen, Norway]	Rejected. This is addressed in the box (see material from table 1).
7505	126	56	126	56	Please consider replacing "ecosystem mortality" with "ecological regime shifts and species extinctions". In most cases new, but maybe to humans less favourable, ecosystems will establish where present day ecosystems degrade or disappear. Species extinctions are irreversible. [Øyvind Christophersen, Norway]	Noted. Was not changed. May be considered for the FGD.
389	127	2			I cannot find Table 3.9. [David Docquier, Belgium]	Editorial. This reference was fixed.
391	127	4			I guess it should be in bold since it is the title of the paragraph. [David Docquier, Belgium]	Editorial. This was fixed.
7506	127	4	127	14	The likelihood of actually reaching the 1.5 degrees global warming target when following 1.5 degrees pathways is an important aspect to communicate clearly to policy makers. It would also be interesting to compare these and their impacts with pathways with higher certainty of reaching the target - if such literature on such pathways exist. [Øyvind Christophersen, Norway]	Noted. There is no literature to our knowledge that addresses scenarios that have a higher probability of reaching 1.5°C.
11803	127	4	127	4	This sentence seems to me to be extremely circular, and therefore somewhat pointless? [David Schoeman, Australia]	Rejected. This was a misunderstanding because the text was actually a subtitle.
392	127	5			Precise which box. [David Docquier, Belgium]	Noted. The box can be found in chapter 1. The exact numbering will be included for the FGD.
390	127	11			I cannot find Table 3.9. [David Docquier, Belgium]	Editorial. Reference was fixed.
393	127	23	127	29	This paragraph title is 'Risks and opportunities' but there is nothing about opportunities. [David Docquier, Belgium]	Noted. This was not fixed, but we will look into this for the FGD.
21170	127	31	127	34	also not consider in ch2 is impact of indirect land use change on net GHG emission reductions [David Cooper, Canada]	Noted. This seems too detailed to be included in this box.
7507	127	31	127	35	Why are these aspects not considered? Is literature lacking? [Øyvind Christophersen, Norway]	Noted. These aspects are considered in the report but not integrated in the available scenarios from the literature.
20488	127	37	127	44	This paragraph repeats the winners and losers point again. It also contrasts a 1.5C world achieved through SRM with one achieved through early emissions reduction and stabilization of concentrations without noting that these are not at all mutually exclusive. It is quite possible to imagine a 1.C world with SRM, early emissions reductions and a stabilised CO2 concentration. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The purpose of this paragraph was not to refer to SRM in detail. The cross-chapter box on SRM provides more in-depth material on this topic and is referred to here.
11861	127	37	127	44	In the section on SRM, it is worth mentioning that the magnitude of impacts depends on how much cooling is achieved through SRM. Going from 1.8°C to 1.5°C is very different than going from 3°C to 1.5°C. [David Morrow, United States of America]	Noted. This level of detail does not seem suitable for this box (but this topic is addressed in more depth in the cross-chapter box on SRM).
20110	127	37	127	44	Why is the mention of SRM so carelessly jotted in the description of 1.5 worlds? Authors should look at the untenable risks they discussed only several pages before - it shouldn't figure here as an aspect of any 1.5 world under consideration by the IPCC. [Lili Fuhr, Germany]	Noted. This is a debated topic. Because a cross-chapter box from the report addresses this issue, it seems relevant to mention it here (although briefly).
20406	127	37	127	44	This paragraph on SRM is meaningless unless you specify the level of SRM that is used to offset the additional greenhouse effect. I doubt very much that if one uses SRM to offset 0.5°C in GMST (ie from 2°C to 1.5°C), there would be a "substantial reduction in tropical precipitation". Please be more quantitative. [Olivier Boucher, France]	Noted. We have included the text "In case of full deployment".

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16371	127	37	127	44	This is a really misleading statement rather than an assessment of the relative risks of GHGs with or without SRM. The GHG induced is clearly very different and novel--simulations of the GHG with SRM climate all show the climate to be much closer to the situation without the GHG increase at all. Also, the conclusion here is based on only one type of SRM, namely stratospheric aerosol injection, and, indeed, only one implementation of that approach, namely uniformly distributed aerosols. In addition, the conclusions appear to be drawn from a very large dose of SRM instead of the type of use that would be consistent with what is assumed in this report, namely offsetting whatever modest overshoot of 1.5 C that might result from strong, but not adequate, mitigation. For the GHG case only, there would be, essentially, only quite to very large losers whereas with SRM offset, the net effects would be small, though indeed with relatively small winners and losers, to suggest that the latter situation is better is really quite perverse. The question is not how a 2.5 C GHG case with 1 C of SRM compares to a 1.5 GHG world, but how a 2.5 GHG world with no SRM compares to a 1.5 C world achieved with SRM from the 2.5 GHG world--the comparison in the text is really irrelevant as no one researching SRM is advocating any moderation at all in mitigation. If at all possible, 1.5 C should be achieved by mitigation--and if that can be done, applying SRM to get the world to 0.5 C should be considered for a 1.5 GHG world involves many significant impacts and commitments to very large sea level rise. So, this whole paragraph needs a complete rewrite. [Michael MacCracken, United States of America]	Noted. This level of detail cannot be included in this box. But this topic is addressed in more depth in the cross-chapter box on SRM, which is referred to here.
20407	127	46	127	47	Atmospheric CO2 decays with several timescales, some of which are indeed very long. But saying that 'the lifetime of CO2 in the atmosphere is more than 1000 years' is incorrect [Olivier Boucher, France]	Rejected. Solomon et al. 2010, PNAS note "Carbon dioxide displays exceptional persistence that renders its warming nearly irreversible for more than 1,000 y".
16372	127	46	127	57	It seems unfortunate that there has been virtually no discussion at all of the various forms of Carbon Dioxide Removal beyond BECCS and afforestation. There are indications that Direct Air Capture may become cost effective compared to the growth of climate change impacts. There are also proposals to enhance ocean uptake of carbon, for burying of biochar and more (including approaches for dealing with ocean acidification)--all could be helpful and are really not being discussed. [Michael MacCracken, United States of America]	Noted. The discussion provided is based on the scenarios considered in Chapter 2.
394	127	47			In reality, the Earth responds not only to cumulative CO2 emissions but to all cumulative greenhouse gas emissions (CO, NH4, N2O, etc.). This should appear somewhere in the SR15 report. [David Docquier, Belgium]	Noted. This is considered too detailed for the present box but is addressed elsewhere in the report (e.g. chapters 1 and 2).
20408	127	48	127	51	These statements are also incorrect (and not what's in chapters 1 & 2). If all GHG (anthropogenic) emissions go to 0, then the climate does not stabilize to 1.5°C or 2°C warming, it will cool slowly after the temperature peak. [Olivier Boucher, France]	Rejected. This consideration is not relevant in the context of 21st century projections, which is the focus for the reader.
19631	127	51	127	55	Yes. This point should not be buried in a box in this chapter. It should be part of the overall framing of the report in chapter 1. The report will be heavily critiqued if this huge gap in analysis is not admitted up front. [Doreen Stabinsky, United States of America]	Noted.
398	128		130		Table 1 of Box 3.12 does not look very good. Consider either making smaller text not to cut words or reducing the amount of information. For example, is it necessary to keep the row about carbon capture storage since all scenarios consider it? [David Docquier, Belgium]	Noted. The box was simplified and the amount of material was reduced.
402	128	2	128	6	More text describing the storylines should be added. These storylines are very nice and show possible future worlds in which we will live. [David Docquier, Belgium]	Noted. Thank you. We have included more text describing the assumptions underlying the storylines.
395	128	10	128	13	Text font size should increase to match the rest. [David Docquier, Belgium]	Editorial. Fixed.
396	128	13			I cannot find Table 3.10. [David Docquier, Belgium]	Corrected.
397	128	16			Table 1 of Box 3.12 is not cited in the text. [David Docquier, Belgium]	Corrected.
16373	128	16	128	17	This is an awfully complex table to get across some basic points about what is possible and what is not, and implications/likelihoods, etc. I would hope there is a visual way of presenting this information. [Michael MacCracken, United States of America]	Noted. The table was simplified. We will consider including some visual display of the data for the FGD.
14055	128	17			This table is climate of 1.5 C warmer worlds as it does not include ecosystems or human systems [Elvira Poloczanska, Germany]	Noted. We will try to include such information for the FGD, but it is more difficult to synthesize.
20489	128	19	128	19	In Table 2, which follows this line, storyline/scenario 1 is unsatisfactory. There is no reason why, in this most appealing of worlds, quality of life should remain similar to that of 2018 in 2100. Stasis of this sort seems highly unlikely. Given recent widespread improvements in quality of life, why would a world in which climate change impacts were largely curtailed merely enjoy the same quality of life as we have today? The third scenario is also problematic. It shows SRM having a strongly negative effect. This is of course possible. But including it as the only SRM scenario necessarily adds to the lack of balance in treating SRM as a climate response that stems from a willingness to discuss (mostly negative) impacts in chapter 3 without discussing potential benefits in chapter 2. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The scenarios are purely illustrative of some possible outcomes and cannot be comprehensive. This is now better highlighted in the table.
399	129				What is the unit of drying in the Mediterranean region? [David Docquier, Belgium]	Noted. The units of drying are in standard deviations. This information was included in a footnote in the revised text but does not seem to be in the final of the SOD. This will be fixed for the FGD.
400	129		130		What is the difference between 'Possible climate range at peak warming' and 'Possible climate'? [David Docquier, Belgium]	Noted. We indicate the term "climate range", to highlight that we provide an estimate of the overall spread of most likely outcomes.
401	131				Do the storylines build upon Table 1 or upon Table 1 of Box 3.12? [David Docquier, Belgium]	Noted. The storylines build upon Table 1 of Cross-chapter Box 3.2, but also on other SR15 material (see supplementary information).
21171	131		131		include in first storyline in box 3.12, not only reforestation with native trees, but also broader ecosystem restoration [David Cooper, Canada]	Noted. The storylines are of purely illustrative nature, they cannot be comprehensive.
7508	131		132		Box 3.12, Table 2: These storylines are extremely important and effective ways of communicating the consequences associated with which pathway we choose to follow to reach the 1.5 degrees global warming limitation. [Øyvind Christophersen, Norway]	Noted, thank you.
14989	131		132		While these story lines may be interesting to readers, they are not based upon peer reviewed literature and are well beyond the mandate of the IPCC. They should be removed. [Farhan Akhtar, United States of America]	Noted. The supplementary information now includes an annotated version of the storylines with relevant references to underlying SR15 material. It will be fully updated for the FGD. Sentences that cannot be fully traced back to underlying report material will be removed.



IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7509	131		131		Box 3.12, Table 2, Scenario 1; Please define "marginal land" and consider the use of this term in this context. If the agricultural definition of "edge of cultivated areas" (i.e. areas where growing crops is difficult) is used then growing crops on such areas may not reduce conflict with biodiversity and biodiversity conservation since such areas normally house ecosystems with associated biodiversity as long as these areas are not also ecologically degraded, meaning that land use change on such land will have impacts on biodiversity. Thus the potential conflict with conservation. Economically not valuable land from an agricultural aspect is not equal to ecologically not valuable land. To avoid conflict with biodiversity and conservation all land use change resulting in impacts on existing ecosystems and biodiversity should be minimised. [Øyvind Christophersen, Norway]	Noted. Will be defined in the FGD.
403	131		132		These storylines constitute a very nice way to show policymakers and citizens what the world would look like in the future according to different scenarios. Although many assumptions are made to build these storylines, I think citations of these storylines in the text are lacking. Box 3.12 is often cited throughout Chapter 3, but I think these storylines (Table 2 of Box 3.12) should be explicitly cited. [David Docquier, Belgium]	Noted, thank you. We are now providing references for the underlying material in the Supplementary Information (annotated version of the storylines). The references will be expanded for the FGD.
2734	131		132		These storylines are very useful and innovative, encourage the authors to further develop, and to explore whether it is possible for Chapter 5 to also pick up on these in discussions of climate resilient development pathways. [Penny Urquhart, South Africa]	Noted, thank you.
14054	131	1			Would it be possible to develop schematics from these tables ?? [Elvira Poloczanska, Germany]	Noted. We will consider including schematics to illustrate Table 1 in the FGD. It seems more difficult to find a way to illustrate Table 2.
16374	131	1	131	1	Regarding Box 3.12, Table 2: Considering points made in my comments regarding CDR and SRM, I'd like to suggest a couple of additional scenarios that are added to the scenarios listed here that I think would merit consideration: Scenario 1a: After suitable research, modest SRM is begun in 2025 and ramps up to keep global warming from exceeding about 1.2 C and then is continued, as necessary, to bring overall warming back to 0.5 C in conjunction with the scaling up of global scale CDR in 2040 that is built up so that SRM can be phased out by 2100 (that is, combined SRM and CDR geoengineering is used to limit overall warming to 1.2 C and then to bring warming down to 0.5 C, with CDR used as the exit strategy for SRM) Taken together, these efforts significantly slow the rate of increase of sea level rise and biodiversity loss while also reducing the increased risks of extreme events that are already becoming evident. Scenario 2a: SRM is invoked somewhat more strongly to keep global warming from about 1.4 C and CDR is ramped up more rapidly so that the period above 1 C is kept to only several decades, and their combined effects are such as to bring the warming in 2100 back to 0.7 C and headed to below 0.5 C at which point it would be possible to phase out SRM while continuing to aggressively pursue CDR to reverse much of what ocean acidification has occurred. With respect to Scenario 3, fine to leave as an attempted SRM effort, although it is misleading to suggest that the effect of SRM would not bring the climate back closer to the unperturbed state than without SRM--it would likely be beneficial and most would be better off, but there could be reasons that it ends and the situation could get very different. For Scenario 3a, I would again have SRM begin early and then have to build up to higher levels--and the problem would be much longer need for SRM and CDR with quite significant ocean acidification effects. And one could well postulate problems with retaining SRM for so long because people would be enjoying the climate and just not understand how necessary the costs of SRM and quite massive CDR that would be needed to sustain not excessively deleterious conditions--and so the international system collapses and great warming occurs and recovering the situation ends up being challenging. As a general comment, my view is that SRM makes most sense if there is strong mitigation and then SRM is used to very much limit overall warming and push the warming back toward 0.5 C and below, and that if there is a deficient commitment to mitigation so the GHG concentrations become quite high and climate change is large, relying on large SRM efforts does become problematic both due to the large amount needed and the long period it would be needed. I really think the present representation of how SRM and CDR might be utilized in the chapter are not scientifically well presented nor politically optimal and need significant revision. [Michael MacCracken, United States of America]	Noted. Because of space constraint, the suggested scenarios cannot be included. The provided scenarios are purely of hypothetical nature.
2362	131	1	132		The Scenarios. These should not be included in this assessment. They are based purely on conjecture and personal judgement rather than any reviewed science. There are a whole series of questions that could be raised about these. Most notably the lack of supporting references. Furthermore, mentioning dates and locations for things to happen (whilst being a sensible approach for this type of storyline) holds the IPCC hostage to fortune. For example, in scenario 3 the dates of 2030 and 2038 are mentioned, notwithstanding Irma, what happens if these events do not occur on these dates. The IPCC will be open to criticism saying its predictions/forecast are no good. So, in summary, it is best to remove these as they open a whole series of issues which could be misconstrued by critics and taken wildly out of context. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The supplementary information now includes an annotated version of the storylines with relevant references. It will be fully updated for the FGD. Sentences that cannot be fully traced back to underlying report material will be removed.
11458	131	1	132		I question the wisdom of including these storyline scenarios (Box 3.12) which could easily be read as commentary on the politics of climate change policy. It would be more constructive to set out some tables that move from the three mitigation scenarios in Column 1 to columns identifying potential ecological, social and interactive impacts. There is no need to comment on the Paris Agreement or to suggest city and state governments will make up for lack of national leadership in the USA. There is especially no need to speculate about centralised government control over meat prices. Since the report does not systematically analyse policy options it should not be commenting on them, particularly in a manner that could be read as being critical of particular governments or otherwise misconstrued. [Stewart Lockie, Australia]	Noted. Other reviewers have appreciated the storylines, hence they were kept. They are of purely illustrative character.
5905	132		132		Box 3.12, Table 2 is very interesting and original, but I'd delete Miami case. This is such an extremely local example. [Joan A. Lopez-Bustins, Spain]	Noted. We have kept Miami as an example, this is purely for illustrative purposes, and we note that 2017 hurricane Irma had one possible trajectory reaching Miami.

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11108	132		132		We consider the Scenario 3 storyline describing SRM deployment to be biased, misleading, and unscientific. It is biased insofar as it is the only storyline involving SRM and is concerned solely with imagining consequences of a "termination shock." Without explicitly stating so, this narrative strongly suggests that the widespread devastation following cessation of SRM is attributable to SRM, in effect presenting solar geoengineering as a dangerous technology with no potential to reduce climate risks and enhance global welfare. The scenario is misleading in that it presents SRM as the worst-case scenario, without acknowledging the range of ways in which SRM could help global society, especially the global poor (Horton and Keith 2016). As the only story featuring solar geoengineering, readers may be led to believe that SRM should not be pursued without having considered the potential benefits of using it in combination with other climate policy tools. Finally, the storyline is unscientific in the sense that its basis is completely unclear. The particular story it tells is just one of an infinite set of possible pathways. Why is it privileged over all others? What method was used to devise it? Why should it be taken as representative? Unless alternative, more balanced storylines involving SRM are offered, we recommend removing this from the draft. [Joshua Horton and David Keith, "Solar Geoengineering and Obligations to the Global Poor," in Climate Justice and Geoengineering: Ethics and Policy in the Atmospheric Anthropocene, ed. Christopher J. Preston (London: Rowman & Littlefield, 2016): 79-92] [Joshua Horton, United States of America]	Noted. This is an illustrative scenario, chosen as "worst-case outcome".
7330	132	17	132	17	Delete the text "and human security". [Eleni Kaditi, Austria]	Location cannot be identified.
12895	133				I think IPCC does not use "line" when author's lastname is repeated. [Jorge Carrasco, Chile]	Editorial - copyedit to be completed prior to publication
10	133		133		The reference Alfieri, L., Bisselink, B., Dottori, F., Naumann, G., de Roo, A., Salamon, P., Wyser, K. and Feyen, L.: Global projections of river flood risk in a warmer world, Earth's Future, 5(2), 171–182, doi:10.1002/2016EF000485, 2017, is repeated twice. Please remove one of the two. [Lorenzo Alfieri, Italy]	Editorial - copyedit to be completed prior to publication
11	133		133		If changes above are accepted please add the following references: Alfieri, L., Feyen, L. and Di Baldassarre, G. : Increasing flood risk under climate change: a pan-European assessment of the benefits of four adaptation strategies, Climatic Change, 1–15, doi:10.1007/s10584-016-1641-1, 2016. Alfieri, L., Feyen, L., Dottori, F. and Bianchi, A.: Ensemble flood risk assessment in Europe under high end climate scenarios, Global Environmental Change, 35, 199–212, doi:10.1016/j.gloenvcha.2015.09.004, 2015. Alfieri, L., Dottori F. and Feyen L., Flood impact assessment for Europe in view of climate change, Deliverable 7 of the project PESETA3: Final report for DG CLIMA, JRC Technical Reports, 2017 (in review). [Lorenzo Alfieri, Italy]	We are grateful for your suggestion, and will be including consideration of it in the next draft
8844	133		133		There is an extra "of" after Vol. and DOI missing [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8845	133		133		ABI, 2005: Financial Risks of Climate Change. London, 39 pp. Ref not found [Lubna Alam, Bangladesh]	Reference included in the list of references.
8846	133		133		Adger, W. N., J. M. et al. ref has incorrect Author name and incomplete citation [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8847	133		133		Albright, R., and Coauthors ref has incomplete name of authors and no DOI [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8848	133		133		Alder, J., Benin, S., Cassman, K. G., Cooper, H. D., Johns, T., Gaskell, J., ... Devendra, C. (2005). Food. In A. M. Balisacan & P. Gardine (Eds.), M. E. A. W. I. P., and Coauthors, 2015: Adoption of the Paris Agreement. Reference is totally wrong and not in use in Document. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8849	133		133		Alin, S., and Coauthors, 2014... Incomplete author names in reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8850	133		133		Anderson, G. B., K. W. Oleson, B. Jones, and R. D. Peng, 2016 no page number in the reference. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8851	133		133		J. P. Evans, A. J. Pitman, and A. Di Luca, 2015... first author name is missing. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4333	133		133		two times are reported "and coauthors" I do not like this way to report references [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
17207	133		133		The references of Alfieri et al 2017a and Alfieri et al 2017b are the same [Maria-Carmen Llasat, Spain]	Editorial - copyedit to be completed prior to publication
19092	133	1			Several references are identical, e.g. Alfieri et al., 2017a and 2017b; Davin et al., 2014a and 2014b; Dove et al., 2013a and 2013b; Hirsch et al., 2017a and 2017b; Kaniewski et al., 2015a and 2015b; Schuessner et al., 2015, 2016a and 2016c (non-exhaustive list). [Wim Thiery, Switzerland]	Editorial - copyedit to be completed prior to publication
8852	134		134		Arnell, et al. E. Al, and E. Al, No Title, in prep., in prep. reference is misleading [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8853	134		134		Asadieh, B., N. Y. Krakauer, and B. M. Fekete, 2016 Page numbers are missing [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8854	134		134		—, and Coauthors, 2015 Author name missing [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8855	134		134		—, —, S. Salmenlinna, M. Löfdahl, A. Siitonen, N. G. H. Taylor, and J. Martinez-Urtaza, 2016 Author name missing [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8856	134		134		Barlow, M., and Coauthors, 2016 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8857	134		134		Barnes, M. L., and Coauthors, 2016 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4334	134		134		three times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8858	135		135		Bassu, S., and Coauthors, 2014 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8859	135		135		Bindoff, N. L., and Coauthors, 2013 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8860	135		135		Birkmann, J., R. Licker, M. Oppenheimer, M. Campos, R. Warren, G. Luber, B. C. O'Neill, and K. Takahashi, 2014 Reference is in totally wrong format. [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8861	135		135		Bonsch, M., and Coauthors, 2016 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8862	135		135		Boucher, O., and Coauthors, 2012 Incomplete Author name and no page number [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4335	135		135		six times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8863	136		136		Boucher, O., and Coauthors, 2013a Incomplete Author name and no page number [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8864	136		136		—, P. M. Forster Incorrect year; incomplete author name, volume and page no missing [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8865	136		136		Bring, A., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8866	136		136		Brown, H. E., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8867	136		136		Brown, S., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8868	136		136		Buhaug, H., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8869	136		136		Bring, A., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8870	136		136		Burrows, M. T., and Coauthors, 2011 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8871	136		136		Burrows, M. T., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8872	136		136		Butler, E. E., and P. Huybers, 2012 Incorrect year it should be 2013 [Lubna Alam, Bangladesh]	Noted. Year has been corrected
8873	136		136		Butterworth, M. K., C. W. Morin, and A. C. Comrie, 2016 Incorrect year it should be 2017 [Lubna Alam, Bangladesh]	Noted. Year has been corrected
4336	136		136		seven times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8874	137		137		Camilloni, I. A., R. I. Saurral, and N. B. Montrouli, 2013 Volume no is missing and incorrect Page number (389-399) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8875	137		137		Caminade, C., and Coauthors, 2014 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8876	137		137		Campbell, L. P., C. Luther, D. Moo-Llanes, J. M. Ramsey, R. Danis-Lozano, and A. T. Peterson, 2015 Page number missing [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8877	137		137		—, and —, 2010 Author name missing it should be "Cao, L., & Caldeira, K. (2010)" [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8878	137		137		Chadburn, S. E., E. J. Burke, P. M. Cox, P. Friedlingstein, G. Hugelius, and S. Westermann, 2017 Volume no is missing and incorrect Page number (340-344) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8879	137		137		—, G. Reygondeau, and T. L. Frölicher, 2016 Missing Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8880	137		137		Chollett, I., P. J. Mumby, and J. Cortés, Missing year (2010) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4337	137		137		one time is reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8881	138		138		—, —, and I. M. Chollett Pj.; 2013 Incomplete Author name (Chollett, I., and I. M. Chollett Pj.; 2013) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8882	138		138		—, S. Enr'quez, and P. J. Mumby, 2014 Incomplete Author name (Chollett, I., S. Enriquez, and P. J. Mumby, 2014) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8883	138		138		Christensen, J. H., and Coauthors, 2013 Incomplete Author name (Christensen, J. H., Kanikicharla, K. K., Marshall, G., & Turner, J. :2013) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8884	138		138		—, and Coauthors, 2017: Reference is incorrect [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8885	138		138		Ciais, P., and Coauthors, 2013 Incomplete Author name and year is incorrect (2014) [Lubna Alam, Bangladesh]	Rejected. 2013 is the correct year
8886	138		138		Cinner, J. E., and Coauthors, 2016 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8887	138		138		Clark, P. U., and Coauthors, 2016 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8888	138		138		Cooper, E. J., 2014 Reference format is incorrect [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4338	138		138		six times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8889	139		139		Cunningham, S. A., and Coauthors, 2013 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8890	139		139		Curry, C. L., and Coauthors, 2014 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8891	139		139		Dai, A., 2016 Incomplete reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8892	139		139		Dankers, R., and Coauthors, 2014 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8893	139		139		—, —, —, —, and —, 2014b No Author name (Davin, E. L., Seneviratne, S. I., Ciais, P., Olloso, A., & Wang, T. : 2014) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4339	139		139		three times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8894	140		140		Donat, M. G., and Coauthors, 2013a Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8895	140		140		Donat, M. G., and Coauthors, 2013b Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8896	140		140		Donnelly, C., W. Greuell, J. Andersson, D. Gerten, G. Pisacane, P. Roudier, and F. Ludwig, 2017page number missing (1-14) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8897	140		140		—, —, —, —, —, and —, 2013b No Author name (Dove, S. G., Kline, D. I., Pantos, O., Angly, F. E., Tyson, G. W., & Hoegh-Guldberg, O. 2013) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8898	140		140		Duarte, C. M., and Coauthors, 2013 Incomplete Author name [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8899	140		140		Dunne, J. P., R. J. Stouffer, and J. G. John, 2013 Incomplete Page number (563-566) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8900	140		140		Ebi, K., N. Ogdén, J. Semenza, and A. Woodward, 2017: Detecting and attributing the health burdens to climate change. <i>Enviro Heal. Perspect.</i> . Invalid Reference [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
8901	140		140		Ellison, D., and Coauthors, 2017 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4340	140		140		five times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8902	141		141		Engelbrecht, F., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8903	141		141		—, C. H. L. Schönberg, M. A. Mello-Athyde, O. Hoegh-Guldberg, and S. Dove, 2014 Missing first Author name (Fang, J.K.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8904	141		141		Fawcett, A. A., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8905	141		141		Feeley, R. A., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8906	141		141		Feng, X., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8907	141		141		Feria-Arroyo, T. P., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8908	141		141		Fernandes, J. A., W. W. L. Cheung, S. Jennings, M. Butensch??n, L. De Mora, T. L. Fr??licher, M. Barange, and A. Grant, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8909	141		141		—, S. M. Thomas, J. E. Suk, B. Sudre, A. Hess, N. B. Tjaden, C. Beierkuhnlein, and J. C. Semenza, 2013 Missing first Author (Fischer, D.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8910	141		141		—, J. Sedlá?ek, E. Hawkins, and R. Knutti, 2014 Missing first Author (Fischer, E.M) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8911	141		141		Fisher, J. B., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8912	141		141		Frieler, K., M. Meinshausen, A. Golly, M. Mengel, K. Lebek, S. D. Donner, and O. Hoegh-Guldberg, 2012 Incorrect year (2013) [Lubna Alam, Bangladesh]	Noted. Year has been corrected
4341	141		141		five times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8913	142		142		Frieler, K., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8914	142		142		Fuss, S., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8915	142		142		Gabriele-Rivet, V., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8916	142		142		Gang, C., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8917	142		142		García Molinos, J., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8918	142		142		Gasparri, A., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8919	142		142		Gattuso, J.-P., and Coauthors, 2015a Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8920	142		142		—, and Coauthors, 2015b missing Author names (Gattuso, J.P., Magnan, A., Bille, R., Cheung, W.W., Howes, E.L., Joos, F., Allemand, D., Bopp, L., Cooley, S.R., Eakin, C.M. and Hoegh-Guldberg, O. :2015b) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8921	142		142		—, and Coauthors, 2013 missing Author names (Gerten, D., Lucht, W., Ostberg, S., Heinke, J., Kowarsch, M., Kreft, H., Kundzewicz, Z.W., Rastgooy, J., Warren, R. and Schellnhuber, H.J., 2013) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8922	142		142		—, and M. Heberger, 2014 missing first Author name (Gleick, P.H) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8923	142		142		Gosling, S. N., and Coauthors, 2017 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4342	142		142		eight times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
8924	142		143		—, S. K. Wilson, S. Jennings, N. V. C. Polunin, J. Robinson, J. P. Bijoux, and T. M. Daw, 2007 missing first Author name (Graham, N.A.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8925	143		143		Graham, N. A. J., S. Jennings, M. A. MacNeil, D. Mouillot, and S. K. Wilson, 2015 Incomplete page number (94-97) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8926	143		143		—, L. Gudmundsson, and S. I. Seneviratne, 2017 Invalid reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8927	143		143		—, and —, 2015 Missing Author names (Gu, G., & Adler, R. F., 2015) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8928	143		143		Guan, K., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8929	143		143		Guilford, B. P., and Coauthors Invalid Reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8930	143		143		—, and —, 2016b Missing Author names (Guiot, J. and Cramer, W., 2016b) and page number (465-466) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4343	143		162		67 times are reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication.
8931	144		144		Hales, S., S. Kovats, S. Lloyd, and D. Campbell-Lendrum, 2014 Incorrect reference (World Health Organization 2014) [Lubna Alam, Bangladesh]	Thanks. Reference has been corrected.
8932	144		144		Halpern, B. S., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8933	144		144		Handmer, J., and Coauthors, 2012 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8934	144		144		Hartmann, D. L., and Coauthors, 2013 Incomplete reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8935	144		144		Hasegawa, T., S. Fujimori, K. Takahashi, T. Yokohata, and T. Masui, 2016 Incorrect DOI (10.1007/s10584-016-1606-4) [Lubna Alam, Bangladesh]	Rejected - DOI is correct
8936	144		144		Hatfield, J. L., K. J. Boote, B. A. Kimball, L. H. Ziska, R. C. Izaurralde, D. Ort, A. M. Thomson, and D. Wolfe, 2011 missing Volume no (103) and Page no (351-370) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8937	144		144		Hedley, J., and Coauthors, 2016 Incorrect DOI (10.3390/rs8020118) [Lubna Alam, Bangladesh]	Rejected - DOI is correct
8938	144		144		Hegerl, G. C., and S. Solomon, 2009 missing Page number (955-956) and DOI (10.1126/science.1178530) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8939	144		144		Hegerl, G. C., and Coauthors, 2007 Incomplete Reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8940	144		144		—, O. Hoegh-Guldberg, G. Casassa, M. P. Hoerling, R. S. Kovats, C. Parmesan, D. W. Pierce, and P. A. Stott, 2010 missing first Author name (Hegerl, G. C.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8941	144		144		—, Y. Fan, N. Mori, A. Semedo, and X. L. Wang, 2013 missing first Author name (Hemer, M. A.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8942	144		145		Herbert, E. R., and Coauthors, 2015 Incomplete Author names missing Volume no (6) and page number (1-43) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8943	145		145		Heron, S., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8944	145		145		Hidalgo, H. G., and Coauthors, 2009 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8945	145		145		Hinkel, J., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8946	145		145		—, —, —, —, and —, 2017b Missing Author names (Hirsch, A.L., Wilhelm, M., Davin, E.L., Thiery, W. and Seneviratne, S.I., 2017b) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8947	145		145		Hoegh-Guldberg, O., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8948	145		145		Hoegh-Guldberg, O., R. Cai, E. S. S. Poloczanska, P. G. G. Brewer, S. Sundby, K. Hilmi, V. J. J. Fabry, and S. Jung, 2014 Incorrect reference (Intergovernmental Panel on Climate Change, 2014. Climate Change 2014—Impacts, Adaptation and Vulnerability: Regional Aspects. Cambridge University Press.) [Lubna Alam, Bangladesh]	Rejected. Citation refers to the specific chapter (The Ocean)
8949	145		145		Hollowed, A. B., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8950	145		145		Honda, Y., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8951	145		145		—, J. A. Maynard, and S. Planes, 2013 missing First Author name (Van Hooidonk, R.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8952	145		145		van Hooidonk, R., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8953	145		145		Hsiang, S., and Coauthors, 2017 Incomplete Author names and missing page number (1362-1369) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8960	146		146		—, and Coauthors, 2017 missing Author names (Irvine, P. J., Kravitz, B., Lawrence, M. G., Gerten, D., Caminade, C., Gosling, S.N., Hendy, E.J., Kassie, B.T., Kissling, W.D., Muri, H. and Oeschles, A., 2017) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8961	146		146		Ishida, H., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8962	146		146		Jackson, J. E., and Coauthors, 2010 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8963	146		146		Jacob, D., and Solman, No Title. submitted Invalid Reference [Lubna Alam, Bangladesh]	Reference has been corrected in SOD
8964	146		146		Jacob, D., and Coauthors, 2014* Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8965	146		146		Jamero, M. L., M. Esteban, and M. Onuki, 2016 Incorrect reference [Lubna Alam, Bangladesh]	Reference has been corrected in SOD
8954	146		146		Hughes, T. P., and Coauthors, 2017 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8955	146		146		Humpenöder, F., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8956	146		146		—, 2012 missing Author name (Field, C. B. (Ed.). 2012) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8957	146		146		—, 2013 missing Author name (IPCC, 2013) and incorrect reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication.
8958	146		146		—, 2014a incorrect Reference (IPCC, 2014a: Synthesis Report Summary Chapter for Policymakers. IPCC, 31pp.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8959	146		146		—, 2014b missing Author name (IPCC 2014b) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18029	146	40	146	40	Accessed August 21, 2015 - seems a too long time to access a webpage. Could instead point to version of the Red list e.g. 2017? [Wilfran Moufouma Okia, France]	Noted.
8966	147		147		Jiao, M., G. Zhou, and Z. Chen, eds., 2014 Reference not found [Lubna Alam, Bangladesh]	Jiao et al is in Chinese. Reference is available by request.
8967	147		147		Jiao, M., G. Zhou, and Z. Zhang, eds., 2016 Reference not found [Lubna Alam, Bangladesh]	Jiao et al is in Chinese. Reference is available by request.
8968	147		147		Jiménez Cisneros, B. E., T. Oki, N. W. Arnell, G. Benito, J. G. Cogley, P. Döll, T. Jiang, and S. S. Mwakaila, 2014 Reference not found [Lubna Alam, Bangladesh]	This is Chapter 3 of the AR5 - WGI
8969	147		147		Jones, A., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8970	147		147		Jones, C. D., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8971	147		147		—, J. Guiot, and E. Van Campo, 2015b <sup>1</sup> missing first Author name (Kaniewski, D.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8972	147		147		Karl, T. R., and Coauthors, 2015 Incomplete Author names missing page number (1469-1472) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8973	147		147		Kartashev, V., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8974	147		147		Keith, D. W., and D. G. MacMartin, 2015 missing volume no (5) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8975	148		148		Kennedy, E. V., and Coauthors, 2013a Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8976	148		148		—, and —, 2016 missing Author names (Khormi, H. M., and Kumar, L. 2016) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8977	148		148		Kirtman, B., and Coauthors, 2013 Incorrect reference format (Kirtman, B., S.B. Power, J.A. Adedoyin, G.J. Boer, R. Bojariu, I. Camilloni, F.J. Doblas-Reyes, A.M. Fiore, M. Kimoto, G.A. Meehl, M. Prather, A. Sarr, C. Schär, R. Sutton, G.J. van Oldenborgh, G. Vecchi and H.J. Wang, 2013: Near-term Climate Change: Projections and Predictability. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. pp 953-1028) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8978	148		148		Kline, D. I., and Coauthors, 2012 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8979	148		148		Kloster, S., F. Dentener, J. Feichter, F. Raes, U. Lohmann, E. Roeckner, and I. Fischer-Bruns, 2009 Incorrect year (2010), missing volume no (34) and page number (1177-1194) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8980	148		148		Knutson, T. R., and Coauthors, 2010 Incorrect reference (Knutson, T.R., McBride, J.L., Chan, J., Emanuel, K., Holland, G., Landsea, C., Held, I., Kossin, J.P., Srivastava, A.K. and Sugi, M., 2010. Tropical cyclones and climate change. Nature Geoscience, 3, pp.157-163.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8981	148		148		—, K. A. Emanuel, and G. A. Vecchi, 2014 Missing first Author name (Kossin, J. P.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8982	148		148		Koster, R. D., and Coauthors, 2004 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8983	148		148		Kravitz, B., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8984	148		148		Krey, V., and Coauthors, 2012 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8985	149		149		Kwak, J., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8986	149		149		Lal, R., 2014 Inorrect reference (Lal, R., 2014. Soil carbon management and climate change. In Soil Carbon. Springer International Publishing, pp. 339-361) [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
8987	149		149		von Lampe, M., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8988	149		149		—, S. Malyshev, and E. Shevliakova, 2016a missing first Author name (Li, D.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8989	149		149		—, R. M. Horton, D. A. Bader, M. G. Zhou, X. D. Liang, J. Ban, Q. H. Sun, and P. L. Kinney, 2016b missing first Author name (Li, T.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8990	150		150		Lluch-Cota, S. E., O. Hoegh-Guldberg, D. M. Karl, H. O. Pörtner, S. Sundby, and J. P. Gattuso, 2014 Incorrect reference (Lluch-Cota, Salvador E., et al. "Cross-chapter box on uncertain trends in major upwelling ecosystems." Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change. Cambridge University Press, 2014. 149-151.) [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
8991	150		150		Lobell, D. B., W. Schlenker, and J. Costa-Roberts, 2011 missing Page Number (616-620) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8992	150		150		Luyssaert, S., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8993	150		150		Martay, B., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8994	150		150		Mathis, J. T., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8995	151		151		McFarland, J., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8996	151		151		Mirle, K., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8997	151		151		—, and Coauthors, 2016 missing Author names (Mitchell, D., Heaviside, C., Vardoulakis, S., Huntingford, C., Masato, G., Guillod, B.P., Frumhoff, P., Bowerly, A., Wallom, D. and Allen, M., 2016.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8998	151		151		—, and Coauthors, 2017 missing Author names (Mitchell, D., AchutaRao, K., Allen, M., Bethke, I., Beyerle, U., Ciavarella, A., Forster, P.M., Fuglestvedt, J., Gillett, N., Haustein, K. and Ingram, W., 2017) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
8999	151		151		Moore, J. C., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9000	151		151		Mora, C., and Coauthors, 2017 Incomplete Author names and missing page number (501-506) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9001	151		151		Moritz, M. A., M.-A. Parisien, E. Battlori, M. A. Krawchuk, J. Van Dorn, D. J. Ganz, and K. Hayhoe, 2012 Missing page number (1-22) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9002	152		152		Murray-Tortarolo, G., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9003	152		152		Mystakidis, S., S. I. Seneviratne, N. Gruber, and E. L. Davin, 2017 Missing page number (014009) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9004	152		152		Nakicenovic, N., and Coauthors, 2000 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9005	152		152		Navarro, J., and Coauthors, 20 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9006	152		152		Nelson, G. C., and Coauthors, 2014a Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9007	152		152		Nelson, G. C., and Coauthors, 2014b Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9008	153		153		O'Neill, B. C., and Coauthors, 2017 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9009	153		153		Ochieng, A. O., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9010	153		153		Ogden, N. H., and Coauthors, 2008 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9011	153		153		—, M. Radojevic, X. Wu, V. R. Duvvuri, P. A. Leighton, and J. Wu, 2014b Missing first Author name (Ogden, N.H.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9012	153		153		—, —, and —, 2017 Missing Author names (Okpara, U.T., Stringer, L.C. and Dougill, A.J., 2017) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
6262	154				The correct name of the 5th co-author in the Reference 'Porter et al. (2014) is M.M. Iqbal (not M.M. Eqbal). [Muhammad Mohsin IQBAL, Pakistan]	Accepted. Revised .
9013	154		154		Peel, G. T., and Coauthors, 2017 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9014	154		154		Peng, S., and Coauthors, 2012 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9015	154		154		—, J. K. Vink, R. M. Horton, A. Gasparini, D. A. Bader, J. D. Francis, and P. L. Kinney, 2017 Missing First Author name (Petkova, E. P.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9016	154		154		Piao, S., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9017	154		154		Pittelkow, C. M., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9018	154		154		Poloczanska, E., C. Brown, and W. Sydeman, 2013 Incorrect Author names (Poloczanska, E.S., Brown, C.J., Sydeman, W.J., Kiessling, W., Schoeman, D.S., Moore, P.J., Brander, K., Bruno, J.F., Buckley, L.B., Burrows, M.T. and Duarte, C.M., 2013) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9019	154		154		Popp, A., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9020	154		154		Porretta, D., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9021	154		154		Prein, A. F., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9022	155		155		Raleigh, C., Linke, A. and O'Loughlin, J., 2014 Missing Page number (p76) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9023	155		155		Reichstein, M., and Coauthors, 2013 Incorrect reference (Reichstein, M., Bahn, M., Ciais, P., Frank, D., Mahecha, M.D., Seneviratne, S.I., Zscheischler, J., Beer, C., Buchmann, N., Frank, D.C. and Papale, D., 2013. Climate extremes and the carbon cycle. Nature, 500(7462), p.287.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9024	155		155		Reisinger, A., R. L. Kitching, F. Chiew, L. Hughes, P. C. D. Newton, S. S. Schuster, A. Tait, and P. Whetton Incorrect reference (Barros, V.R., Field, C.B., Dokke, D.J., Mastrandrea, M.D., Mach, K.J., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C. and Girma, B., 2014. Climate change 2014: impacts, adaptation, and vulnerability-Part B: regional aspects-Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.) [Lubna Alam, Bangladesh]	Reference is correct, it refers to Chapter 25 "Australasia" from AR5- WGII
9025	155		155		Revi, A., D. E. Satterthwaite, J. Aragón-Durand, F. Corfee-Morlot, R. B. R. Kiunsi, M. Pelling, D. C. Roberts, and W. Solecki, 2014 Incorrect reference (Revi, A., Satterthwaite, D.E., Aragón-Durand, F., Corfee-Morlot, J., Kiunsi, R.B., Pelling, M., Roberts, D.C. and Solecki, W., 2014. Urban areas. Climate change, pp.535-612) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9026	155		155		Rhein, M., S. Rintoul, S. Aoki, E. Campos, and D. Chambers, 2013 Incorrect reference (Rhein, M.A., Rintoul, S.R., Aoki, S., Campos, E., Chambers, D., Feeley, R.A., Gulev, S., Johnson, G.C., Josey, S.A., Kostianoy, A. and Mauritzen, C., 2013. Observations: ocean. Climate change, pp.255-315.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9027	155		155		—, J. B. Moreno-cruz, J. Schewe, A. Levermann, and K. Caldeira, 2015 Missing First Author name (Ricke, K. L.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9028	156		156		Rippke, U., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9029	156		156		Romero-Lankao, P., J. B. Smith, D. J. Davidson, N. S. Diffenbaugh, P. L. Kinney, P. Kirshen, P. Kovacs, and L. Villers Ruiz, 2014 Incomplete Reference [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9030	156		156		—, and W. Solecki, 2014 Missing First Author name (Rosenzweig, C.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9031	156		156		—, and D. Hillel, 2015 Incorrect Reference (Hillel, D. and Rosenzweig, C. eds., 2010. Handbook of climate change and agroecosystems: impacts, adaptation, and mitigation (Vol. 1). World Scientific) [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
9032	156		156		Rosenzweig, C., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9033	156		156		Rosenzweig, C., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9034	156		156		Russo, S., A. F. Marchese, and J. S. Giuseppina, 2016 Incorrect Reference (Russo, S., Marchese, A.F., Sillmann, J. and Immé, G., 2016. When will unusual heat waves become normal in a warming Africa?. Environmental Research Letters, 11, p.054016) [Lubna Alam, Bangladesh]	Noted. Reference has been corrected
9035	156		156		Saeidi, M., F. Moradi, and M. Abdoli, 2017 Incorrect page number (204-218) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9036	157		157		Sarojini, B. B., P. A. Stolt, and E. Black, 2016 Incorrect reference [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
9037	157		157		Schleussner, C.-F., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9038	157		157		Schleussner, C.-F., and Coauthors, 2016a Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9039	157		157		—, J. F. Donges, R. V. Donner, and H. J. Schellnhuber, 2016b Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9040	157		157		Schleussner, C. F., and Coauthors, 2016c Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9041	157		157		Schmitz, C., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9042	157		157		Schwartz, J. D., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9043	157		157		—, S. Herbst, A. Rechenburg, J. E. Suk, C. Höser, C. Schreiber, and T. Kistemann, 2012a Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9044	157		157		—, C. Höser, S. Herbst, A. Rechenburg, J. E. Suk, T. Frechen, and T. Kistemann, 2012b Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9045	157		158		Seneviratne, S. I., and Coauthors Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9046	158		158		Seneviratne, S. I., and Coauthors, 2012 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9047	158		158		Seneviratne, S. I., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9048	158		158		—, M. G. Donat, B. Mueller, and L. V. Alexander, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9049	158		158		—, —, A. J. Pitman, R. Knutti, and R. L. Wilby, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9050	158		158		Settele, J., and Coauthors, 2014a Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9051	158		158		Simon, J. A., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9052	158		158		—, T. M. Ali Khan, and M. S. Rahman, 2000 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9053	158		158		Smith, K. R., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9054	158		158		Simon, J. A., and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9055	158		158		—, T. M. Ali Khan, and M. S. Rahman, 2000 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication

IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9056	159		159		—, and Coauthors, 2010 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9057	159		159		—, and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9058	159		159		—, and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9059	159		159		—, and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9060	159		159		Springmann, M., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9061	159		159		Stephens, P. A., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9062	159		159		Stocker, T. F., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9063	159		159		Su, B., J. Huang, M. Gemmer, D. Jian, H. Tao, T. Jiang, and C. Zhao, 2016 Incorrect reference [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
9064	159		159		Sun, S., X. Yang, J. Zhao, and F. Chen, 2015 Incorrect reference [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
9065	160		160		Sydeman, W. J., M. Garcia-Reyes, D. S. Schoeman, R. R. Rykaczewski, S. A. Thompson, B. A. Black, and S. J. Bograd, 2014 Incorrect Volume (345) and Page number (77-80) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9066	160		160		Tanaka, A., and Coauthors, 2017 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9067	160		160		Teurlai, M., and Coauthors, 2015 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9068	160		160		Tilmes, S., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9069	160		160		Tory, K. J., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9070	160		160		—, and Coauthors, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9071	161		161		—, and Coauthors, 2013* Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9072	161		161		Warszawski, L., and Coauthors, 2013 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9073	161		161		—, K. Frieler, V. Huber, F. Piontek, O. Serdeczny, and J. Schewe, 2014 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9074	161		161		de Vrese, P., S. Hagemann, and M. Claussen, 2016 Incorrect Reference (Vrese, P., Hagemann, S. and Claussen, M., 2016. Asian irrigation, African rain: Remote impacts of irrigation. Geophysical Research Letters, 43(8), pp.3737-3745.) [Lubna Alam, Bangladesh]	Reference is correct. Editorial edits will be made prior to publication.
9075	161		161		Walsh, K. J. E., and Coauthors, 2016b Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9076	162		162		Wiens, J. J., 2016* Missing Page Number (e2001104) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9077	162		162		—, and —, 2014b Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9078	162		162		Wiltshire, A., T. Davies-Barnard, and C. Jones, 2015 Incorrect reference (Wiltshire, A. and Davies-Barnard, T., 2015. Planetary limits to BECCS negative emissions. AVOID2 WPD. 2a Report, 1.) [Lubna Alam, Bangladesh]	Accepted. Revised .
10621	162		162		Citation: Wiltshire, A., T. Davies-Barnard, and C. Jones, 2015: Planetary limits to BECCS negative emissions, is not well cited. [Elemer Briceño-Elizondo, Costa Rica]	Accepted. Revised .
9079	163		163		Yang, J., H. Tian, B. Tao, W. Ren, C. Lu, S. Pan, Y. Wang, and Y. Liu, 2015a Missing Page Number (451-455) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9080	163		163		Yu, R., and P. Zhai Incorrect Reference [Lubna Alam, Bangladesh]	This is a submitted paper. Editorial - copyedit to be completed prior to publication
9081	163		163		—, Z. Jiang, and P. Zhai, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9082	163		163		Yumashev, D., K. van Hussen, J. Gille, and G. Whiteman, 2017 Incorrect page numbers (1-13) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9083	163		163		Yunhe, Y., W. Shaohong, Z. Dongsheng, and D. Erfu, 2016 Incorrect Author Names (Yunhe, Y.I.N., Shaohong, W.U., Dongsheng, Z.H.A.O. and Erfu, D.A.I.) [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9084	163		163		Zhu, Z., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
9085	164		164		Zougmore, R., and Coauthors, 2016 Incomplete Author names [Lubna Alam, Bangladesh]	Editorial - copyedit to be completed prior to publication
4344	164		164		one time is reported "and coauthors" [teodoro georgiadis, Italy]	Editorial - copyedit to be completed prior to publication
16375	165	1	165	1	Page 2 of 63 of the Annex–Figure S3.2: It needs to be stated that there remain biases during the World War II period that have yet to be removed. This is very evident if one looks at the record of ocean temperatures that the problem is over the ocean, with biases remaining due to any of a significant number of possible contributing factors: how measurements were taken, different mix of ships and locations of measurements, types of ships, and so on. This period over the ocean turns out to be the only time during the entire period of model simulation that the observations are clearly outside the bound of the ensemble of model simulations, suggesting a bias in the observations than in the models. Unfortunately, this warming bias lead to a real misinterpretation of the temperature record, which is evident if one places one's finger of the WWII years and looks at the record. It has led to suggestions that variations in solar radiation have had a large influence, holding off detection/attribution and providing a hook for naysayers to grab on to. This remaining bias needs to be corrected, and perhaps could be if models and reanalysis were used together. [Michael MacCracken, United States of America]	We are grateful for your suggestion, and will be including consideration of it in the next draft
16376	165	2	165	2	Page 3 of 63 of the Annex–Figure S3.3: I personally think that using blue coloring for positive warming numbers can give a very misleading impression of the results. I would suggest using a different color bar. Comment also applies to other figures as well. [Michael MacCracken, United States of America]	Noted.
7560	165	21	165	21	Should read: Small Island Developing States [William Kochtitzky, United States of America]	Accepted. Revised .
15631	43284	5	43284	5	Incomplete sentence: "a 1.5°C global warming world"? It would be preferable to state: "different ways in which warming may be limited to 1.5°C". [Matthias Honegger, Germany]	Text has been revised
15632	43284	6	43284	6	Replace: "This means" by "Accordingly" [Matthias Honegger, Germany]	Accepted. Text revised.
15633	43284	24	43284	25	Suggest to add a typical range for the factor by which warming is stronger over land than over oceans i.e. by a factor of 2 to 3. [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15634	43284	50	43284	50	Suggest to add a paraphrasing sentence to say: "Thus, observed changes to date are expected to accelerate in response to the additional 0.5 degree of warming". [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15635	43284	57	43315	1	Confusing sentence structure, suggest to change to: "Such studies also reveal detectable differences of precipitation extremes in many land regions between 1.5°C and 2°C of global warming". [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15636	43315	1	43315	4	Formulate this sentence as an example, otherwise it seems out of place to specifically highlight this particular region. [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft

**IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 3**

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15637	43315	11	43315	11	Insert: ...significant benefits for all known ecosystems (including terrestrial, wetland, coastal, and ocean ecosystems including coral reefs, freshwater systems, and food production systems (i.e., fisheries and aquaculture)). [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15640	43315	14	43315	50	Do these paragraphs summarize particular sub-sections of chapter 3? If so, they should indicate the corresponding sections, otherwise they may be a bit shortened. Also it appears that these sections almost exclusively address marine and other aquatic ecosystems, omitting almost entirely discussions of terrestrial and in particular agricultural lands and their productivity. [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15638	43315	21	43315	22	The second half of the sentence (on ecosystem services) seems obsolete after the first sentence (line 16-19) already addressing terrestrial and wetland ecosystems and unrelated to the first part regarding the risk of species extinction. [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15639	43315	27	43315	28	It would be beneficial to add a note on related avoided methane emissions from avoided melting of permafrost soils. [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft
15641	43315	54	43315	55	Remarkably short section, consider subheadings for above section to render section size more consistent. [Matthias Honegger, Germany]	We are grateful for your suggestion, and will be including consideration of it in the next draft