IPCC WGI SR15 First Order Draft Review Comments And Responses - Chapter 1

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4364					There should be a box or a separate section discussing Anthropocene earlier in the chapter [Shouraseni Roy, United States of America]	a box on anthropocene has been added
1300					A key point missing from the Executive Summary is that there are particular sectors/ geographies where many of the 1.5 related issues/opportunities/challenges are most pronouced, exacerbated or materialise earliest. Reading the report it would seem that these include health, cities/infrastructure, agriculture/food security, multi-level governance. It would be useful to highlight these "policy hot- or bright spots" in the executive summary of Chapter 1 to provide the startiing point for the discussions in the remainder of the report. [Debra Roberts, South Africa]	This is an issue for subsequent chapters - especially chapter 4
7190					Is the notion of CO2-fe emissions really crucial? E.g. Chapter 2 does not use the metric. Hence, what is the reason to introduce it in the Chapter that is Setting the Stage, if this Figure is only standing around in the background without playing a role? [Nico Bauer, Germany]	Noted
1049					One of the successful aspects of AR5 was bolding high level messages that were easy take aways for media. Suggest continuing that in this report as has been done in the Executive Summary. [Martini Catherine, United States of America]	Point taken and attended to
9505					This Chapter 2 has a role of guiding following chapters by very well defined clear mandates (questions to be responded by each chapter). Without it, entire volume of Report easily tend to increase. [Shuzo Nishioka, Japan]	Noted.
13090					CONTINUE ON FROM PAGE 16 [Veryan Hann, Australia]	Noted
17210					Policymakers and Governments look in the reports for practical information that informs their action and response. The executive summary needs to show upfront how SR1.5 (despite not being prescriptive) can be useful for the national strategies and the prioritization of adaptations. [Carlos Garci Soto, Spain]	An attempt has been made to improve the ES
3139					This chapter does not include any real discussion of the connections between investment requirements for various pathways, and the potential macroeconomic benefits of these investments, but it should. This is a key part of framing the issues - the additional investment requirements of 1.5 degree C non-overshoot scenarios versus 2.0 degree C non-overshoot scenarios. How much is this incremental investment requirement??? [Richard Rosen, Germany]	This was left to subsequent chapters
1092					1 already does a relatively good job in setting the stage and framing the issue, the executive issue does not adequately reflect the content of the chapter because it already includes many statements that appear to be based on more substantial assessment in other chapter and hence may be useful for the ES of the full report rather than Ch1. At least some important framing issues, such as definitions and the different types of feasibility should be added. [Rob Swart, Netherlands]	This has been addressed
1093					The chapter and the summary have a very negative overall message: even 1.5 degrees will have serious impacts (albeit it bit less than 2 degrees) and achieving it will be extremely hard. I would have expected a more positive or at least balance message also emphasizing the benefits and opportunities! [Rob Swart, Netherlands]	You would have helped us if you gave e.g.s of the positive aspects. We found mostly negative messages in the literature
6471					Needs a close edit, particularly in regard to punctuation, commas and apostrophes. [Roger Bodman, Australia]	It was revised
9558					This Chapter 2 has a role of guiding following chapters by very well defined clear mandates (questions to be responded by each chapter). Without it, entire volume of Report easily tend to increase. [Shuzo Nishioka, Japan]	Noted.
9585					This Chapter 2 has a role of guiding following chapters by very well defined clear mandates (questions to be responded by each chapter). Without it, entire volume of Report easily tend to increase. [Shuzo Nishioka, Japan]	Noted.
896					I chose only to read Ch. 1, since the modeling and policy details of the subsequent chapters appear to be outside my area of expertise. On the whole, I found Ch. 1 to be clear, interesting, and informative. It nicely lays out a roadmap for the report. Thanks to the many contributors. [Sarah Gille, United States of America]	Thank you
21132					. [Nathan Borgford-Parnell, Switzerland]	No comment provided
20365					I like the framing of the 1.5°C issue done in this chapter. However generally speaking I find this chapter light on references. A lot of concepts, data and numbers are provided without backing references. Some of the sentences are quite complicated, can you try to say things in a simpler way? Finally the Executive Summary still needs some attention but this is quite normal at this stage. [Olivier Boucher, France]	The chapter was revised extensively for the SOD
15250					Copy-editing needed, in this Chapter and potentially the entire report (I have not checked): decide if you are using "stabilization" or "stabilisation" and be consistent; also in other similar words [Pauline Midgley, Germany]	Point taken
1400					I think the biggest problems are in Chapter 1, which frames the entire report. SRM is not well integrated into this chapter, and the implicit message there is, “SRM is too problematic to deal with properly. We’re going to focus on other things.” This seems strange, given that based on my reading of the report, SRM is the only reliable way to get to 1.5°C without major transformations in the way society operates (and even then, it’s still not a guarantee). Also, if your aim really is to assess “the conditions under which the global community could limit the rise in global temperatures to 1.5°C”, it’s not your place to choose which methods get presented and which ones don’t. This may necessitate moving to something other than the “pathways” framing (Section 1.2). While useful for a variety of conversations, no current pathway includes SRM. [Ben Kravitz, United States of America]	Point taken- An attempt has been made to provide a balanced assessment - SRM is treated in that respect with other options to also avoid being policy prescriptive
6301					Titles of the boxes should be boldfaced. [Dmitry L. Musolin, Russian Federation]	point taken
6302					many references are not propperly formatted (spaces, commas, etc.) [Dmitry L. Musolin, Russian Federation]	Editorial issues have been attended
20648					Make more clear in chapter 1 the changes anticipated in the underlying literature. This will underscore the message of the first chapter that frames the 1.5 degree report (basis for decision making). Make more clear (such as in Section 1.1.3) that the report lays out different pathways that will secure objectives / make certain objectives hard to secure which decision makers care about). Consider adding a discussion on what development objectives look like and how to apply risk tolerance to these objectives so that the benefits and costs can be discussed in more holistic (not just economic) terms. Consider drawing on the decision making work of authors like Howard Raiffa and Daniel Kahnemann on sections laying out risk management options and decision making. If possible, consider puting 1.3.3 (human dimensions) ahead of 1.3.1 (physical impacts) and 1.3.2 (ecosystems impacts)...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 will "select"). [Koko Warner, Germany]	Point taken, the text was revised but there was care not to focus on results

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11451					In sum, this chapter is a useful introduction but would benefit nonetheless from more direct language and a focus, particularly in the executive summary, on articulating the key points for policy-makers rather than on summarizing debates, definitions etc. [Stewart Lockie, Australia]	Attempts were made to improve the ES- however chapter 1 is the introduction and is expected provide context and define terms than present concrete results which are for subsequent chapters
6084					Well written and balanced. [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Thank you
					General comments on chapter 1 About social sciences and the understanding of climate change: The social dimension of climate change and transdisciplinary knowledge Indeed, it is important to highlight that this is the first report that includes an extensive literature in social sciences. This is consistent with the fact that in global academic debates the understanding of climate change is increasingly being shown not only as a scientific fact but as a process of profound social implications. However, since climate change is a complex phenomenon, complex solutions that emerge from new understandings (beyond disciplinary approaches) are also required, so it would be advisable to consider the importance of moving towards «transdisciplinary knowledge» to meet the challenges of global climate disorder. In this regard, it should be noted what was pointed out by Pope Francis, in Laudato Sí. On care for our Common Homme: «(110) The specialization which belongs to technology makes it difficult to see the larger picture. The fragmentation of knowledge proves helpful for concrete applications, and yet it often leads to a loss of appreciation for the whole, for the relationships between things, and for the broader horizon, which then becomes irrelevant. This very fact makes it hard to find adequate ways of solving the more complex problems of today's world, particularly those regarding the environment and the poor; these problems cannot be dealt with from a single perspective or from a single set of interests. A science which would offer solutions to the great issues would necessarily have to take into account the data generated by other fields of knowledge, including philosophy and social ethics; but this is a difficult habit to acquire today. Nor are there genuine ethical horizons to which one can appeal. Life gradually becomes a surrender to situations conditioned by technology, itself viewed as the principal key to the meaning of existence». [Cf. Francis. Encyclical Letter Laudato Si' of the Holy Father Francis On care for Our Common Home. Vatican City: Vatican Typography, 2015]. About climate justice, ethics, intergenerational equity and future generations We consider that the report deeply asserts when including initial references to climate justice, intergenerational ethics, intergenerational equity and future generations. This is reinforced when it is explicitly pointed out that among those most affected by asymmetries in the impacts and vulnerability of climate change are our «future generations». The Stockholm Declaration (1972) referred to intergenerational equity in Principles 1 and 2. Subsequently, the World Commission on Environment and Development (1987) set out the definition of sustainable development, and then various international instruments have alluded to the principle of intergenerational equity, including the Declaration on the Responsibilities of the Present Generations Towards Future Generations of the United Nations Educational, Scientific and Cultural Organization (UNESCO) of 12 November 1997 [Cfr. United Nations. Yearbook of the International Law Commission, 1998 (vol. II, part one). New York and Geneva: United Nations, 2010]. Indeed, from the concept of sustainable development emerges two fundamental issues that must be considered in the design and implementation of global sustainability policies: 1. The inexorable cause-effect relationship between the decisions that the present generations make and their implications for future generations, considering the accumulated impacts over time. From this premise arises the need to build a global policy of intergenerational equity which traverses multilateral environmental agreements, 2. The limits imposed by nature on the economy. The Earth is not infinite: it is not possible to continue acting under the paradigm of infinite material welfare, on a finite planet. This is turning the concept of sustainable development into an oxymoron	Thank you but others had different views and we could not go into such detail in an introduction chapter. Beside we have page limitations

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					acting under the paradigm of infinite material welfare, on a finite planet. This is turning the concept of sustainable development into an oxymoron. For this reason, we consider that for addressing the old ethical dilemmas posed by climate justice and the notion of equity of the United Nations Framework Convention on Climate Change (UNFCCC) it is already very necessary to develop a conceptual proposal to delineate the scope of the term «future generations», and thus open the debate for the development of the rights of future generations. This is an issue that continues to be postponed and has severely biased the concept of sustainable development. In this regard, we must emphasize that the rights of current generations of children and young people to the Earth are also the rights of future generations. We propose this because the concept of sustainability links –in an equivalent way– the present generations with future ones: the unsustainable policies which affect present generations, will affect future generations too, even more seriously, due to the accumulative effects and non linear translimitations of the biosphere (planetary boundaries). Considering that the Special Report Report on 1.5 Degrees proposes an approach on the relationship between sustainable development and 1.5ºC, it would be important to establish conceptual precisions between sustainable development and sustainability, since they are not necessarily the same. And yet, with all the sustainable development policies implemented globally, the perverse effects of climate change on socio-ecosystems –and on the planet's self-organizing system– have continued to increase. Sustainable development policies are not the same as sustainability policies either. About the governance capacity of institutions to address climate change: Innovative governance Regarding the governance capacity of institutions to address climate change, we consider that an innovative proposal that would help to effectively include ethical issues in the design and implementation of global climate policies is a «global defensive mechanism for future generations» (ombudsman or high commissioner for future generations). This would be a highly supportive innovative governance arrangement to give voice to the generations to come, through a proxy. Considering that Chapter 1 (Framing and context) `recognizes that climate change implies significant threats to future wellbeing in that future generations are likely to be vulnerable to climate impacts and are least represented in current decisions that shape future outcomes` –and that justice, equity and ethics are central to understanding the ambition of the Paris Agreement– along the formulation of global climate policies a clear distinction must be made among the scope of the principle of intergenerational equity, the right to the future and the rights of future generations, as well as to consider intergenerational justice, interspecies justice, and the rights of the Earth (rights of nature). These topics should be deepened in the development of the Special Report on 1.5 Degrees. For that reason the issue of the rights of future generations is a breaktrough with the conventional thinking, an innovative topic –in evolution, at the philosophical, political and legal level– that is becoming more visible every time in the forums and negotiations of Multilateral Environmental Agreements (MEA`s), especially in global climate negotiations. In this respect, Latin America is making fundamental contributions, considering also that from the ecological ethics of the ancestral cosmovisions of South America, the duties of responsibility of the present generations with the future generations are expressed in the «principle of guardianship of the Earth».	

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20935					Precisely on December 9th, 2015, during the Twenty-first Conference of the Parties (COP21, Paris) of the United Nations Framework Convention on Climate Change (UNFCCC), the Andean Parliament, jointly with The Biosphere Group - Think Tank on Sustainable Futures Research, the Regional Office for Latin America (ORLA) of terre des hommes - tdh Germany and the Ministry of Environment of Perú (MINAM) launched the Side Event «Climate crisis and guardianship of Earth: Andean ancient wisdom as legacy for future generations» and presented the «Paris Declaration on Climate Change and Future Generations», that was subsequently endorsed by the Andean Parliament through its Resolution 7 (approved on March 29, 2016 in Bogotá, Colombia), which states in its second article: «... the design and formulation of a legal proposal on the ombudsman (high commissioner or rapporteur) for future generations». Currently, the Andean Parliament's Third Committee on Regional Security and Sustainable Development has approved a recommendation –at the soft law level– on the scope of the mandate of an Ombudsman for future generations. The recommendation is still pending to debate and approval by the plenary of this platform of political representation of the Andean Community (CAN), conformed by Colombia, Ecuador, Perú, Bolivia and Chile. This would be the first proposal (draft) of a regulatory framework for the prospective implementation of that defensive mechanism for future generations. In that context, on June 22, 2017 in Geneva, the United Nations Special Rapporteur on Human Rights and the Environment (Professor John Knox) called for a Public Consultation on Children`s rights and the Environment. At the same time, an Expert Consultation on Children`s rights and the Environment was held on 22-23 June 2017. This meeting addressed the issue of the rights of future generations in an ad hoc session. The central objective of these meetings –promoted by the International Federation of Terre des Hommes (TDH) and the United Nations Children's Fund (UNICEF)– was to disseminate the scope of the Special Rapporteur's next thematic report that will focus on obligations relating to the rights of children and the environment including the analysis of the interactions between the rights of current generations and the rights of future generations. The Special Rapporteur's analysis will be reported to the Human Rights Council in March 2018. About climate change, human rights, intergenerational equity and future generations In order to limit or halt the deterioration of human rights based on the impacts of climate change and to avoid further harm to future generations, we consider that the principle of intergenerational equity should be strengthened and supplemented by the precautionary principle, being fundamental to approximate human rights with international environmental law and climate law, in order to give meaning to the «right to sustainability» for current generations of children and young people, as well as for future generations. The concept of sustainable development includes both of them. Indeed, as Pope Francis points out in Laudato Sí. On care for our Common Homme: «(159) The notion of the common good also extends to future generations. The global economic crises have made painfully obvious the detrimental effects of disregarding our common destiny, which cannot exclude those who come after us. We can no longer speak of sustainable development part from intergenerational solidarity». [Cf. Francis. Encyclical Letter Laudato Si' of the Holy Father Francis On care for Our Common Home. Vatican City: Vatican Typography, 2015].	

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					In the same way, it is pertinent to consider the development of a methodology (tool) which will allow us to include the intergenerational variable in the design and implementation of global policies of sustainability and climate change. Such a methodology must foresee how civilizational errors (translimitations to planetary boundaries), could pose a threat to future generations and endanger their existence on Earth. About types of knowledge, ethics and dialogue of knowledge Ethics in the management of knowledge to face the consequences of climate change implies the recognition of the existence of different comprehensions, the visualization of different cultural forms of perceiving the global climate disorder. The ancestral wisdom associated with climate management responds to an episteme and gnosis different from the epistemic foundations of normal science. This also highlights the issue of the ethics of knowledge, from which it is questioned whether objective science can –or should–validate other systems of knowledge. One aspect that should be considered, within the theoretical framework and context of the Special Report on 1.5 Degrees, is that traditional ecological knowledge (TEK) is integrated into a comprehension of human life in interconnection and interdependence among all forms of life (coevolution) which is based on the ethics of the «principle of guardianship of the Earth», from which in the indigenous societies of Latin America –and particularly in the South American Andes– the responsibilities of current generations are ensured and maintained with future generations. In addition, another contribution on which this report (or the successive reports of the Intergovernmental Panel on Climate Change - IPCC) can go deeper is that the ancestral climate comprehensions also imply comprehensions of cyclical time dynamics –or circular time– which is consistent with the postulates of physics. [Cf. Pajares G., Erick & Loret de Mola, Carlos. 'Climate, guardianship of Earth and intergenerational equity: our memories of the future'. In: desco - The Center for Studies and Development Promotion, ed. Perú Today: Towards another development. Lima: desco, 2015, pp.197-219]. In this sense, the integration and complementation of the different types of knowledge –and the emergence of a holistic knowledge– goes hand in hand with a re-evolutionary education based on an «ethics of difference» and that at the same time fosters a dialogue of knowledge, cultures and civilizations to transcend the fragmentary knowledge that is at the basis of the planetary ecological crisis. [Erick Pajares, Peru]	
9930					The following comments aim to put SR15 in the context of the Paris Agreement (PA) and its implementation process that has already begun, and make some suggestions to improve the linkage between the AR5, the PA and the reports on INDCs presented by the UNFCCC. [Olga Alcaraz, Spain]	Noted
1753					"reach global peaking of greenhouse gas emissions as soon as possible". Some interpretation is also needed in this regard, how to understand this peaking (before the 'balance'): as e.g. it cannot be achieved for each GHG (each SLCFs), whether it can be interpreted as 'net emission' etc. [Tibor Farago, Hungary]	This is taken up in subsequent chapters of the report
1754					2030 Agenda: Consideration of the 2030 Agenda should not be limited to the SDGs. Typically, while SDG13 is 'silent' on GHG emissions, para 31 and para 32 explicitly include: the need to reduce those emissions, to deal with mitigation. It is also true for quite a few other issues, incl. e.g. 'transformation', 'resilience', 'inequalities among countries'. [Tibor Farago, Hungary]	Hopefully now clear.
7145					A rigorous scientific definition of some terms used in the Paris Agreement (PA) and related terms, such as global average temperature of 1.5 and 2 °C, equilibrium between anthropogenic emission and removals of GHGs and temperature overshooting, will help future negotiations, will simplify communication of the PA goals, and will provide a solid basis for assessing collective progress on the implementation of the PA [Iulain Florin VLADU, Germany]	An attempt has been made to achieve this
14331					How can informed climate decisions be made if education doesn't explictly focus on causes, effects, risks and responses to climate and related global changes? How can society build capacity if climate, energy and sustainable practices aren't integral to climate action? How can climate-related education (literacy building), communication (information sharing), and outreach (messaging to inspire/engage) be harnessed to rapidly scale climate responses? None of these questions are examined in this chapter to frame/context. [Mark McCaffrey, Hungary]	The "How:" question is for Chapter 4

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2799					The content of the report should support sequential decisionmaking by negotiators; the Paris Agreement calls for a global stocktake every 5 years. For this report and the 2018 dialogue they need to know (1) current NDCs are not adequate to achieve the Paris Agreement goal (Box 4.12 expaned to include 2oC), (2) there are no/few analyses consistent with 1.5oC stabilization with no overshoot, (3) based on those analyses to achieve 1.5oC requires ..... This information should be in chapter 2, but that chapter's consideration of analyses other than IAMs is currently inadequate to address items 2 and 3. (4) most analyses indicate that even with ambitious mitigation efforts the temperature increase will exceed 1.5oC after 2050 (current chapter 2), (5) if overshoot is likely the options include some combination of (a) implementation of negative emissions technologies (BECCS), (b) enhanced removal of CO2 from the atmosphere (section 4.3.6), (c) solar radiation management (section 4.3.7) and (d) adapting to a higher temperature increase (6) a decision on which of the options listed in (5) to pursue probably does not need to be made until 2040. With this framing, the Special Report could limit its coverage of the post-2050 options to a few pages, making the overall report much more manageable. In short, the message is that current action is inadequate, more aggressive mitigation action is needed as soon as possible, that may not be enough to meet the 1.5oC target but if further action is needed a variety of options are available for consideration around 2038. [Erik Haites, Canada]	noted and considered where appropriate
3833					I lack an explanation why this particular method of measuring temperature was chosen. There are several other and in the debate some argue that satellite data, perhaps also obtained from NASA, would be better. Just a clarification would be good. A comparison of mean temperature over longer time span than from mid 19th century would be interesting. This starting point is rather low, since we were still in the little ice age. If we go back several hundreds and thousands of years we can get an interesting picture of the natural variations in the pre-industrial age. These variations were caused by other phenomena than CO2, such as variations in earth orbit and solar activity. We can in fact see that a raise of temperature came prior to a raise in CO2, which is not that strange since oceans cannot keep all the CO2 if they get warmer. Otherwise I have no comments on Chapter 1. [Mats Winroth, Sweden]	Several consultations/discussions and reference to literature to address this have been made, we hope it is now clear
13570					please use consistent spelling throughout chapter and report, e.g. pre-industrial vs preindustrial [Elvira Poloczanska, Germany]	Noted
13571					please be consistent in the use of abbreviations vs full term (e.g. greenhouse gas vs GHG) [Elvira Poloczanska, Germany]	Noted
13572					what are the origins of 1.5C? This explanation is missing from the chapter [Elvira Poloczanska, Germany]	This report is focused on Paris Agreement
13573					There is an extremely strong focus on social sciences/socio(-economic) impacts, while sections dealing with ecosystems (marine/terr) are very limited -> this balance needs to be improved [Elvira Poloczanska, Germany]	Noted
12811					This is an excellent chapter that covers a wide ground. For a FOD, this chapter is in excellent shape. As a general comment, I note that it is important that this chapter does not anticipate findings that are based on an assessment that is carried out in subsequent chapters. If you provide assessment statements already in Chapter 1, they would need to be based on multiple lines of independent evidence, firmly rooted in the literature, and be delivered with the uncertainty language. Therefore, either careful and consistent forward referencing should be made, or statements that are assessments need to follow the standard as in the subsequent chapters. Else they should be eliminated or moved forward to the appropriate assessment chapter. [Thomas Stocker, Switzerland]	Taken into account in the SOD
20240					Overall, the chapter is comprehensive, easy to follow, appropriately cited, and clear. The Box sidebars are very useful and are a convenient way to develop deeper dives into specific methods, data, nomenclature, and framings. [Joshua Loughman, United States of America]	Thank you
4887					The decision to include a separate section about Solar Radiation Management in this chapter (section 1.4.5) should be rethought. It does not seem justified, draws a spotlight on this single topic while no such spotlight is put on more relevant topics, and also it hinders the flow of thoughts here, i.e. it is confusing to the reader. Moreover, section 1.4 does not seem to be a logical place for the topic. [Sigrid Kusch, Germany]	Note- Text has been revised
12321					[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, pursing 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 substantal increase in both the margin and likelihood by which warming is held well below 2 °C compared to 'hold below 2 °C' (e.g. Schleussner et al. 2016). This is the very raison d'etre 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]	Noted and taken account
5410					In this chapter the linkages between the paragraphs of the executive summary and the underlying sections of the chapter are missing. It would be very much appreciated if those linkages are included in the next version (those are mostly already available in all the other chapters) in order to make also this chapter more user-friendly. [Klaus Radunsky, Austria]	Done
12322					[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 seperate 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]	Noted - text was revised

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12323					[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 abve. 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 quantititative distinctions are drawn between the former hold below 2oC pathways from the AR5 generarion 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]	Noted - text was revised
12325					The framing chapter should focus on main concepts relevant throughout the report and not preempt the analysis presented in other chapters. Section 1.3, for example, would be better placed in Ch 03. [Bill Hare, Germany]	The SOD took note of this
21290					General comment on whole chapter: The transition from section 1.1 to 1.2 and 1.3 is too abrupt and not well explained. Currently there is no substantive mention of policy in the first half of the chapter and there is no simple explanation for the ambition to weave social, technological and scientific perspectives together to shed light on the feasibility of achieving 1.5 C. To draw reader in, we need to read about how the social research fits in and why it is needed to understand, interpret and use for policy purposes the technical and scientific information that is also presented in this chapter. [Jan Corfee-Morlot, France]	Taken account - text was extensively reviewed
21037					In general this chapter provides a very comprehensive overview, which seamlessly integrates the physical and social dimensions at every step. This is a truly interdisciplinary concept. [alessandra conversi, Italy]	Thank you
21038					Economic growth is continually mentioned in the chapter. Population growth as a major driver of global change is scarcely mentioned (see Page 1-6, line 55). How can emissions decrease if the population increases? I do not know if it is mentioned more explicitly in the other chapters, but I presume not. I also presume it is a political decision. Yet I believe population growth should at least be mentioned more often in the chapter. In addition, it should be mentioned whether the scenarios and pathways described (e.g., in Fig 1.3) incorporate population growth. [alessandra conversi, Italy]	This is carefully considered given that regions with projected population increase are areas of low emission.
12324					[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 interpreration of "hold below 2oC" and show quantitative distinctions between these in the available scenario literature (eg pathwatys 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, pursing 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]	Noted
21289					General comment on whole chapter: the social science material at the front of the chapter (Section 1.1, pp 6-8) is poorly written, opaque and jargonistic and somewhat duplicative with what appears later in the chapter. It distracts from much more solid material that comes later in the chapter. It covers the framework yet not well and path dependence - again not well - and then moves onto governance and social equity issues but the text is much less comprehensible than what is written on similar topics in the back of chapter. Suggest to move some of the material from the back to the front section - in particular: the discusion of transformation and what it means (1.4.3) , feasibility and the proposed framework (box 1.3), tradeoffs (1.4.4) , something on policy and the challenges of implementation (1.4.6.). as well as storyline (1.5). All of this would all fit better at the start of the chapter and help ease the reader into the science which comes next. If it is too late to reorder sections, an alternative is for the front section to be fully rewritten to highlight briefly some of what is to come in the back . The front section 1.1 needs to be fully consistent and using the same language & ideally same key references as the more indepth material found in the back sections mentioned. [Jan Corfee-Morlot, France]	Obsoleted - section 1.1 and the whole chapter was extensively reviewed
21039					Some sentences are too long and elaborated (examples will follow) and need to be read more than once in order to be fully understood. I suggest simplifying them, as people do not have the time to read a sentence twice. It may also be negative in terms of communication. Also consider to put non-essential-to-the-point (but important for the sake of precision) information in parenthesis, so that people can zoom in on the take home message (as in this sentence). [alessandra conversi, Italy]	editorial - attended
21040					I do not know if that is appropriate for this report, and maybe this is mentioned in the other chapters, but I think that in addition to scenarios it should be useful an assessment of progress, for example the rates of use of renewables, and how the rate of progress fits with the overall goal. [alessandra conversi, Italy]	Noted but this is for Chapter 4
21041					In general, this chapter provides a very comprehensive overview, which seamlessly integrates the physical and social dimensions at every step. This is a truly interdisciplinary concept. [alessandra conversi, Italy]	Thank you
21042					While I see very interesting information in the summary, I do not see an overall conclusion/synthesis of the chapter [alessandra conversi, Italy]	rejected - this is an introduction chapter
5687					Chapter 1 is an introduction of the whole report. It provides a guidance of the contents of the following chapters. It would be good to indicate the sections (e.g., 2.3.2, 4.3.1..) where the particular issues are addressed in detail in the later chapters. In the current version of Chapter 1, the sub-sections in the later chapters are sometimes refered to, but most of the time, they are missing. [Hong Yang, Switzerland]	Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5702					General comments: Chapter 1 should avoid providing too much detail on issues that are elaborated in a great detail in the remaining chapters. In essence, Chapter 1 should serve as a general introduction of the whole special report. Also, as this is a special report on a 1.5C warmer world, the issues elaborated should reflect the specialty compared with the general discussions that have been extensively reported in the previous ARs. Specific features that are related to 1.5C warmer world should be highlighted. [Hong Yang, Switzerland]	Taken into account
2915					CO2 forcing equivalent is inconsistently used. Futhermore the abbreviation CO2-fe should be definded before using it the first time (p. 14, line 8 as far as I can tell). After having defined it then it should be used consistently in the following text. [Sabine Wurzler, Germany]	Noted -attempts made to address this
15229					There is very limited use of the IPCC calibrated confidence and likelihood langauage in Chapter 1. I counted three confidence statements and only two italicised likelihood statements, although the word "likely" is used frequently, presumably not in the calibrated sense as it is not italicised. Perhaps this is in an attempt to improve readability for a less technical readership but it risks taking away from the scientific standing of the assessment. I suggest careful consideration of this point; if avoiding its use then why use it at all? If using, be careful to distinguish between the general use of "likely" and the calibrated "likely". This would also apply to other Chapters [Pauline Midgley, Germany]	Considered in SOD where applicable
9086					Understanding the impacts may be necessary before discussing the mitigation pathways. Thus swapping Chapter 2 and 3 seems more appropriate. [Suchandra Bardhan, India]	Rejected - the chapters were determined by the scoping meeting
1160					It is good to see sustainable development, human rights, ethics and governance appear upfront in the framing of this chapter and the Special Report. At the same time, it seems vital to more explicitly stress the narrative of the SR - "…in the context of sust. dev. and efforts to eradicate poverty'. To reduce overlap with Ch5, it would be helpful to see Ch1 framing particular issues but not (randomly) report on results - e.g. re climate responses and SDGs, p35). [Petra Tschakert, Australia]	Taken into account in the SOD
1161					Ch1 appears uneven in terms of level of detail, use of references, and sophistication of language. [Petra Tschakert, Australia]	Attempts were made in the SOD to address this imbalance
1163					The terminology should be '1.5C warmer world', not '1.5C world' (see Box 3.12). [Petra Tschakert, Australia]	Noted
12184					I think the chapter could have more somewhat more assessment of the knowledge status in the various fields. I understand that this will also be covered in the following chapters, but still I think some more emphasis on summaries of knowledge could be useful. [Jan Fuglestvedt, Norway]	vague. Comment not clear
12185					I think the report would benefit from more focus in this chapter on trade-offs, synergies, dilemmas, challenges and main questions. [Jan Fuglestvedt, Norway]	Accepted
1162					The Anthropocene is not an appropriate framing (see comments on the ID). It is not used in other chapters and detracts attention away from the task of the SR, which is to focus specifically upon impacts and responses to the 1.5C target. It is a contested concept that has yet to be formally scientifically validated. For these reasons we cannot justify its inclusion. The 2030 Agenda for Sustainable Development does NOT mention this term anywhere (hence statements like on p6, l38; p8, l44-47 are problematic and need to be removed). Not useful to have the A listed as one of emergent knowledge bases, with 1 reference, and no other examples (p9, l17-21). [Petra Tschakert, Australia]	Rejected- This is a biased comment. IPCC has to make objective assessment of relevant literature and there are many scholars dealing with climate change and the Anthropocene. Besides this report coverage extends to many contested issues for e.g. Carbon dioxide removal (CDR), SRM, climate resilience development pathway- etc are still contested.
2466					Start with a narrative story/case to get people's attention; lay out major goals of report [Lisa Lucero, United States of America]	Attended to in SOD
12463					How do we link sustainable development, poverty reduction and increased equity? This section completely misses addressing challenges of meeting human's five basic needs. Before enhancing discussion on 1.5 C limit, LA and CLA should address meeting human basic needs. Please define 'great social science' literature? Why do we want to limit here to only social science? Significant changes also include frequency of natural disasters. Instead of commenting on NDC as a whole, its better to acknowldge Paris Agreement and comment on it. Affordable and clean energy is SDG 7 not 17. Negaive impact of climate action shall refer negative impact on both mitigation and adaptation actions (page 36). [Dr Noim UDDIN, Australia]	Taken note in the context of other views
15281					Decide whether "versus" (ocasionally given as vs.) is going to be italicised or not and apply consistently. If italicised then you may wish to consider whether "vice versa" should also be italicised [Pauline Midgley, Germany]	Editorial - attended
6836					Please see my comment on chapter 3 as a whole about "aiming at 1.5C, but preparing for 3C". Chapter 1 should provide the framing for this overall message. [Bert Metz, Netherlands]	Chapter 1 tried to stay within the mandate of the report
5573					Section 1.7 "Storyline of the report" should be put at the very beginning of chapter 1. Generally references to other chapters of the report and where respective discussions can be found should be made throughout the chapter. [Astrid Kiendler-Scharr, Germany]	Adjustment made in SOD
10181					I support for focus on human induced warming and I really like section 1.2 on working definitions. Section 1.2.1.4 is particularly important and could be brought into the ES. The cHapter, the ES and Section 1.2 could benefit from being more explicit that human induced warming is used in pathways etc. [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Taken account
5574					A more explicit introduction of why "1.5 °C" is in the focus of this report should be made, including statements that this choice does not imply per se that limiting climate change to 1.5 °C is achievable [Astrid Kiendler-Scharr, Germany]	Noted with care to avoid being policy prescriptive
10182					The chapter is very well written and covers the important definitions in a succinct and well referenced way. It is of a very high quality already, achieves the right blalance and is well structured [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thank you
5575					Throughout chapter 1 the term "Anthropocene" is used at multiple places. The use of Anthropocene when referring to current and future human-induced warming introduces ambiguities, it is recommended here to refer to "industrialization" instead, i.e. the cause of increased GHG emissions [Astrid Kiendler-Scharr, Germany]	Rejected - Anthropocene is more encompassing
12242					Some more clear links to where the various points will be treated in the other chapters would be useful. [Jan Fuglestvedt, Norway]	Accepted- this was done
7389					Please consider how to include descriptions of the impact of already occured global warming (1C), as this may be important to the overall understading of the subject. [Øyvind Christophersen, Norway]	Noted - dealt in AR5 and also in Chapter 3
17377					There seems to be little weight given to the private sector as service provider throughout the chapter [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Taken account where applicable

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1011					Though cost is described as "costs may be relatively easily quantifiable in terms of money" in page 5 line 37, no figure is shown throughout executive summary. At least there should be description on where readers can find cost in this special report. [Mitsutsune Yamaguchi, Japan]	Noted- text was extensively edited
9460					this chapter represents a promising start to a very challenging task. However there are still some palces where language is unclear or ambiguous (I comment on some specifically, and I recommend further work with assistance from a writer skilled in communication to ensure text is clear and understandable to a non-expert - this is the chapter which will particularly interest many policymakers. [David Wratt, New Zealand]	Editorial issues were attended
13046					check the text in the references, i.e. Myre et al 2017 or Schlussner et al 2016b [Caserini Stefano, Italy]	Noted
6394					Overall the boxes are very useful - and well written [Sybil Seitzinger, Canada]	Thank you
14918					General comment: Several instances of 'rise in global temperatures'. It would be better to use 'rise in average global temperature'? In some cases, it's only 'global temperature' (pg. 4, line 22) …need consistency. [Ambarish Karmalkar, United States of America]	Noted and adjusted
17807					Please refer to the IPCC Style guide: https://wg1.ipcc.ch/SR/documents/IPCC_SR15_StyleGuide.pdf when compiling the SOD. For example, use common abbreviations e.g., i.e., etc. only in parentheses. Use “for example”, “that is”, and “so on”, respectively, in the text. [Wilfran Moufouma Okia, France]	editorial - attended
6603					Defining the term 'sustainable development with reference to the Brundtland definition closes off a conceptually a potentially rich and important area of consideration for climate mitigation if not climate change more generally. This is not a problem of the Brundtland definition per se but rather of any static definition that does not acknowledge the contestation and different perspectives inherent in this very broad and 'vague' term. An alternative approach would be to present the concept as conceptually open, dynamic and evolving, acknowledging the contestation as an opening for working with it. The relevance of the nature of development paths for mitigation is discussed in Winkler, H., Boyd, A., Torres Gunfaus, M., & Raubenheimer, S. (2015). Reconsidering development by reflecting on climate change. International Environmental Agreements: Politics, Law and Economics. http://doi.org/10.1007/s10784-015-9304-7; and Rafey, W. M. (2013). Visions and models in South Africa: Balancing energy development with global climate change. Harvard College amongst others. [Emily Tyler, South Africa]	Obsoleted - sections were revised extensively
9543	1				Chapter 1 has a role of guiding following chapters by very well defined clear mandates (questions to be responded by each chapter). Without it, entire volume of Report easily tend to increase. [Shuzo Nishioka, Japan]	Noted.
9569	1				Chapter 1 has a role of guiding following chapters by very well defined clear mandates (questions to be responded by each chapter). Without it, entire volume of Report easily tend to increase. [Shuzo Nishioka, Japan]	Noted.
19649	1		61		Comment on entire chapter: This chapter sets the tone for the entire report and it is positive that it acknowledges and sets out the human rights, ethics and justice aspects of both the impacts of climate change and responses to climate change. [Tara Shine, Ireland]	Noted. We have endeavoured to emphasise the aspect of human rights (including recruiting an additional LA specialising in this area) in the SOD.
12121	1		62		Climate Change checklist: 11-36 [Michael Wadleigh, United States of America]	Noted-not clear
4787	1	1	5	6	Africa and other developing world needs intensive capacity building on climate technology development for site-specificity. Through this,we will contribute to SDGs answers related to climate change and innovation [Archibong Akpan, Nigeria]	Accepted
19300	1	1	58	37	This is a very useful and very well written chapter. [Marco Mazzotti, Switzerland]	Noted - with appreciation
3659	1	1	62	3	General comment on Chapter 1: although the chapter does a reasonably good job of recognizing the importance of population growth to both generating climate change and magnifying vulnerability to its effects, there's a key missing ingredient here that needs to be at least briefly mentioned. Throughout this chapter, and most clearly in the passage over page 6 line 55 to page 7 line 2, the issue of population growth is treated as if it was a problem solely of poorer, developing nations. In the context of climate change, that isn't true. Though rich, developed nations (typically) have lower birth rates, the per capita impact of each additional birth on climate change is much larger. See (and cite) the seminal and widely cited study by Murtaugh and Schlax (2009, Global Environmental Change, 19: 14-20). They demonstrated that personal reproductive choices are - by far - the largest determinant of a person's individual carbon legacy. Indeed, they proved that having one less child has an order-of-magnitude greater reduction in personal carbon legacy than all other environmentally friendly choices combined. These ideas are rapidly gaining currency - for example, an NPR interview with the philosopher Travis Reider at the Berman Institute of Bioethics at Johns Hopkins University widely broadcast the idea that reducing family size, even in (actually, especially in) rich countries is a key personal responsiblity in responses to climate change. Of course, not everyone is fully on board with these ideas, but it is a rapidly growing concept that certainly deserves a brief mention, and certainly the calculations of Murtaugh and Schlax cited above need to be included here. [Sean Fleming, United States of America]	Accepted- text was reviewed
3660	1	1	62	3	General comment on Chapter 1: this overview chapter should aim to do a slightly better job of noting how certain types of climate change mitigation and adaptation steps can lead to poverty traps, or at least impact the poor disproportionately, and that in crafting climate change responses, such poverty traps need to be recognized and avoided. Other chapters of the document go into this in a little more detail, but in the lead chapter this is only mentioned once, somewhat obliquely, on line 31 of page 6. Particular climate change mitigation strategies that lead to such poverty traps deeply compromise the political and social acceptability and success of climate change responses. Note that this is an issue even within comparatively rich societies. A carbon tax on gasoline is a normally a flat tax, for example, in the sense that everyone pays the same $/gallon rate irrespective of their income level, but of course flat taxes are widely viewed to impact the poor more. This can contribute to resentment of carbon taxes across a broad cross-section of the population, and considerations like this seem likely to play a significant role in the ongoing challenges with successfully convincing societies to proactively and firmly alter their behaviors to mitigate GHG production. As such, this is a key point for policy makers (among others) that should be at least briefly mentioned. [Sean Fleming, United States of America]	This was handled in section 1.4

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4903	1	3	1	4	In the text: "This IPCC Special Report of global warming of 1.5°C assesses the conditions under which the global community could limit the rise in global temperatures to 1.5°C above pre-industrial levels", at least for this first time, it must be defined with more precision which is the time interval considered as a reference (for example, 1701-1750), since pre-industrial levels could be every value before about 1750 and ambient temperature changed a lot in the past (from only 0.02 C in a century in the second millenium, up to several degrees in thousand years period during integlaciar events). [Rubén Piacentini, Argentina]	Text revised, reverting to the 1850-1900 reference period as representative of pre-industrial for consistency with AR5
4789	1	3	11	6	1720-1800 interval for pre-industrial period might not be representative enough but its representative. If we step below that limit, we won't have empirical data to authenticate our realities [Archibong Akpan, Nigeria]	Text revised, reverting to the 1850-1900 reference period as representative of pre-industrial for consistency with AR5
2691	1	3	44	3	Chapter 1 is well written and on the whole the definitions and framing are clear. Unless I missed this, tipping points are not defined and this seems important, given the discussions of these in Chapter 3. It would also be useful to define low probability, high impacts events in Chapter 1. The author team could consider defining hazards versus risks (see Chapter 3, section 3.3). [Penny Urquhart, South Africa]	Hazards versus risks are addressed in the revised chapter 1, but specific discussion of tipping points is left to chapter 3 for reasons of space.
17809	1	3	5	49	In contrast to traditional IPCC reports, the Executive Summary does not make reference to sections or boxes from which the key messages are derived, making difficult to trace back the findings. Is there a special reason for this? [Wilfran Moufouma Okia, France]	Text revised in the SOD
17810	1	3	5	49	No statement is made on the certainty of the findings nor is used the IPCC certainty language. Is this a deliberate choice that indicates full consensus within the research communities? [Wilfran Moufouma Okia, France]	Text revised in the SOD
17808	1	6	1	9	Why can't this section be merged with the section 1.3 which deals with the multiple dimensions of the impacts under 1.5°C global warming? [Wilfran Moufouma Okia, France]	Text revised in the SOD
4785	1	9	4	9	Agreed we are dealing on Global Climate change but how do we analyse regional climate change? What are the techniques? [Archibong Akpan, Nigeria]	Differences between global and regional change addressed in the SOD - including figure.
4904	1	12	1	13	In the text: "Human-induced warming reached a global average of about 1°C above pre-industrial levels in 2016, increasing at 0.1-0.25 °C per decade", it is not clear this sentence, since in the 30-year reference period 1850-1879 (and of 1950-1979) the temperature was almost constant. [Rubén Piacentini, Argentina]	Text clarified in the SOD as referring to the current (2010s) rate of warming.
3455	1	13			a should be added along side significant…. , a significant change in rainfall…. [Chukwuma Anoruo, Nigeria]	Text revised in the SOD
9462	1	16	1	17	I don't understand the wording "20% reduction … from now on" - and if I don't uderstand it neither will many policymakers. Please look at reformulating this sentence so that it is easily understaood and with a clear meaning. [David Wratt, New Zealand]	This point is clarified in the SOD
4788	1	29	5	34	Mitigation and flexible adaptive strategies also require breaking social barriers, traditional norms,belief systems and cultural taboos to ensure Natural realities are being injected into these systems [Archibong Akpan, Nigeria]	Noted.
3322	1	35	1	42	Extreme events have existed not only in the current but also in pre-historical or pre-industry. It should be better to give a comparison between the recent decade and pre-industry, such as frequency and strengths of some specific events. At least, this should be studied more in the climate changes. More frequent and strong events, such as flooding and draught, could be an evidence for the climate change but the IPCC report needs to show these relationships explicitly. [Junye Wang, Canada]	Noted, and addressed in Chapter 3.
4786	1	48	4	49	The poor are already becoming more vulnerable; we need to reform our Local policies and act immediately [Archibong Akpan, Nigeria]	Noted, within the constraints of prescriptiveness.
10393	2		3		Table of Contents [Jonathan Lynn, Switzerland]	Editorial
1937	2	6	2	6	Use "Scope" instead of "Dimensions", or "Range", and also on lines 33 and 39 [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Noted
12441	2	18			You are comparing spatial resolution with temporal resolution! But they are different. I think it is better to devide the discussion to spatial(global&regional) and temporal(seasonal) warming. [Mohammad Rahimi, Iran]	Text revised and clarified in the SOD
5683	2	18	2	19	Section 1.2.2 only has one sub-section 1.2.2.1. Therefore, the sub-heading 1.2.2.1 is not needed. May be Section 1.2.2 can be moved to Section 1.2.1 for better coherence. [Hong Yang, Switzerland]	Sorted out in the SOD - thanks for the point
1942	3	1	5	49	Possible to include key steps required, or areas to focus on, that will have most impact in limiting to 1.5C in lay terms? May be outside scope of chapter 1 (and dealt with in Ch 2 summary), but relates to box 1.3. [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	lightly touched on with box 1.3
10394	3	2	3	3	line 2 and 3 standardize Oxford comma (comma before and in list) suggest drop [Jonathan Lynn, Switzerland]	Editorial
12442	3	10			Transformation of what? Transition of what? [Mohammad Rahimi, Iran]	edits were made to the text to highlight these terms
5684	3	11	3	11	Should be 'Feasibility of limiting….'. Not 'and'. [Hong Yang, Switzerland]	agreed, the text was edited
12443	3	25			what about probability? [Mohammad Rahimi, Iran]	Likelihood language developed in the SOD
9152	4		4		General comment on page the chapter 1 and page 4 in particular. The whole rationale behind this SR comes from the Paris Agreement and the ask from UNFCCC to IPCC at COP21. This is somehow mentioned in the chapter, but as the essence and the very beginning of the this work, this should be highlighted in the first sentences. This is probably a lack. The first time the Paris Agreement is mentionned is when refering to NDCs and saying this is not enough, which is very negative tone attached to the Paris Agreement. [Timothée OURBAK, France]	agreed, the text was edited to reflect this issue
9188	4		4		Is this the SPM? I don't know what the Ex Summary is to say, but it seems to try to be the SPM of the entire report? [Glen Peters, Norway]	agreed, the text was edited to reflect this issue
11664	4		43		I understand that the definition of 1.5 degrees of warming is problematic, but the terminology needs to be standardised thrughout. This might lead to less exciting writing, but it will improve clarity and understanding. Lines 1-5 of page 4 alone have three different formulations, and another appears in line 18, and another still ("in a global mean 1.5ºC world") on line 23...and it goes on. [David Schoeman, Australia]	Agreed. We have sought to make the terminology consistent.
9503	4		5		Needs brief mention to UNFCCC's concerns. Explanation of why this topic is policy relevant is important to audience. Of course, IPCC is independint scientific body, but this topic is common concern for IPCC and UNFCCC. [Shuzo Nishioka, Japan]	Unclear what "this topic" refers to
9534	4		5		Needs brief mention to UNFCCC's concerns. Explanation of why this topic is policy relevant is important to audience. Of course, IPCC is independint scientific body, but this topic is common concern for IPCC and UNFCCC. [Shuzo Nishioka, Japan]	Unclear what "this topic" refers to

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18775	4		5		Although chapter 1.2 discusses different ways of interpreting the Paris Agreement's 1.5C limit (stabilisation, overshoot etc.), the executive summary does not elaborate on these, which it should in my view, at least by mentioning the different interpretations of 1.5C as a limt to stay below, and overshoort interpretation. The Paris Agreement clearly speaks about "limit" and does not explicitly indicate overshooting which means the 1.5C limit would at least temporarily be breached [Sven Harmeling, Germany]	Agreed. A new bullet was added that mentions that different pathways to 1.5C exist.
9560	4		5		Needs brief mention to UNFCCC's concerns. Explanation of why this topic is policy relevant is important to audience. Of course, IPCC is independint scientific body, but this topic is common concern for IPCC and UNFCCC. [Shuzo Nishioka, Japan]	Unclear what "this topic" refers to
6275	4		5		Since temperature increases come with delay, emphasis needs to be on ppm of GHG in atmosphere. This is missing. I believe there are no Climate models that say the planet will stay under 1.5 (or 2) C at very high probability (over 95%) if we are over 450 ppm CO2 e - and we are already at 407 ppm CO2, and possibly oer 450 ppm CO2e. This does not come across in your report. [Mathis Wackernagel, United States of America]	Rejected. Emphasis of the report is on cumulative emissions (or carbon budgets) as these are directly related to policy.
6276	4		5		The idea of limited carbon budget is not explicit in the summary. Figueres et al (in Nature 2017) summarizes it well. [Mathis Wackernagel, United States of America]	Noted
6277	4		5		Boil it down to storylines that can easily be understood and verified. How much ppm do we have now - how much ppm are concentration is increasing per year currently (2-3 ppm), how much ppm is consistent with 1.5 (or 2C) high probability limit - give results in CO2 and CO2e. It is a very easy calculation and makes more obvious to IPCC's key audiences how tight the remaining carbon/GHG budget is. [Mathis Wackernagel, United States of America]	Addressed in section 1.2
7187	4		5		The executive summary must explicitly clarify that keeping global mean temperature increase below 1.5°C will come at a substantial and immediate global cost and that these costs will be distributed very unevenly. It must also be clarified that achieving the 1.5°C target will be a much greater effort/cost than achieving the 2°C target because there is a nonlinear relationship between the stringency of the climate change stabilization target and the effort/cost to achieve this target. This non-linearity has been repeatedly highliighted in previous IPCC reports (e.g. TAR WG3 Fig. 10.3). The executive summary of Ch. 1 talking about the opportunities of mitigation (page 5, line 8ff) without mentioning the costs of mitigation is necessarily incomplete. The report runs the risk to be criticised for turing a blind eye on mitigation costs. [Nico Bauer, Germany]	the text was heavily edited
9461	4		5		The Executive Summary is well structured, and I like the approach of bolded key findings as the lead sentence for each paragraph. However there are some places where langage is unclear or ambiguous, requiring further work. [David Wratt, New Zealand]	Noted the summary was extensively revised
12931	4		6		Consistency between chapter conclusions need careful consideration through coordination. It seems the chapter discusses various concepts which are not elaborated here for obvious reason. It is a framing chapter. But the concepts do not get developed in other chapters later. A general observation is this chapter raises the expectation of reader about the report beyond what could be achieved in chapters so far. The story line of the report which comes in section 1.7 of page 43 also shows this inconsistency. There inadequacy of cost -benefit analysis mentioned but chapter 2 starts with discussion on least cost solutions page 7 line 13. [Joyashree Roy, India]	This has be aligned as appropriate
12933	4		6		ES as they reads like more desirable imaginations and all are not grounded on findings in other chapters of the report. Reference to chapters may authenticate. Like all otherchapters are doing. So here it may be refering to various chapters. [Joyashree Roy, India]	This was done in the SOD
11663	4		8		Waiting is generally poor. Punctuation within sentences is largely missing, and sometimes misused. This leads to ambiguity and a general lack of clarity. This needs a thorough edit. Replace "discourse" (/jargon/vague well-meaning statements) with plain English, where possible. [David Schoeman, Australia]	editorial carried out
17285	4		4		I found the Executive Summary could be better balanced between development issues and climate science. There are lots of comments on how climate change relates to justice and development, but not very much is said on the fundamental climate change issues of risks to the climate system, risks to extremes and on the long-term climatic context. Fundamentally even 1.5C is a large perturbation of the climate system, and I would like to see it spelled out at the front as an issue to be addressed regardless of the additional issues (albeit critical ones) of the interference with development. The framing of technological limitation would also need to be presented, it is almost entirely missing at the moment (for example, some introduction of the key sectors such as transport, buildings, industry and land use and how all sectors need to decarbonise for an objective such as 1.5C. [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	the ES was extensively edited in way to reflect these comments
13576	4	1			Executive Summary should use simpler language and remove jargon formulations. This executive summary should address the concepts of the report and not its results. [Elvira Poloczanska, Germany]	the ES was extensively edited in way to reflect these comments
12326	4	1			The executive summary of this chapter reads like a summary of the full report. Please revisit every bullet and reassess whether or not it tackles issues specific to this chapter. [Bill Hare, Germany]	the ES was extensively edited in way to reflect these comments
4224	4	1			I think the executive summary makes important points. Yet the elephant in the room is missing and 4 big points need to be made. 1) The remaining carbon budget for 1.5C is very low, depending on calculation, and meaning that we will have exceeded emission levels for 1.5C in 2020 or 2021. 2) It follows that extremely strong action need to be taken, including an immediate phase-out of fossile fuels, strong energy-efficiency measures, and energy-saving settings of infrastructures. 3) It also means that nonetheless negative emissions technologies need to be deployed (but if the other measures are taken, then at perhaps not too excessive levels. 4) But negative emission technologies are problematic because they induce moral hazard (relying on the future to do the work, and giving up policy for now) --> requires governance of moral hazard. [Felix Creutzig, Germany]	Text clarified in the SOD
1755	4	1			Exec. summary: Unclear why there is no reference here to the fundamental “feasibility” issues so profoundly described under 1.4.3 (Box. 1.3 + Table 1). These enabling conditions for transformations compatible with a 1.5°C world is mentioned there as ‘one of the organizing principles for this 1.5°C report’ and apparently this feasibility approach is one of the most important aspects for the policy-makers and negotiators. [Tibor Farago, Hungary]	the ES was extensively edited in way to reflect these comments
6391	4	1			Chapter needs a couple of sentences at the beginning describing the intent of this chapter [Sybil Seitzinger, Canada]	agreed, the text of the chapter was extensively edited to reflect these changes

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3627	4	1	4	1	Climate modelling research is increasingly showing that reaching 2 degrees, let alone 1.5 degrees, will be physically impossible without deploying some form of CDR (or SRM for that matter) (e.g. Gasser, T., Guivarch, K., Tachiiri, C., Jones, C. and Ciais, P. (2015): Negative emissions physically needed to keep global warming below 2?°C. Nature Communications, 6, 7958). Yet CDR is noticably absent from the initial framing of this report. In my view CDR should be placed front and centre in this report or at the very least given a paragraph in the Executive Summary. [Rob Bellamy, United Kingdom (of Great Britain and Northern Ireland)]	Rejected: "physically impossible" not supported by the literature. The multiple dimensions of feasibility are addressed in the SOD.
20068	4	1	5	49	Overall, this is a well-balanced and informative executive summary, the authors have done a nice job. One topic I am, however, missing is the cost of mitigation associated with aiming to 1.5°C warming vs 2°C. These could be high in terms of e.g. food prices if land use is to be dedicated in part to the production of biofuels. It would be useful that this theme is at least mentioned. [Sonia Seneviratne, Switzerland]	Details about costs of mitigation, for example, are not included in Chapter 1, as this is a framing chapter, but rather in Chapter 2 or 4. The types of synergies and tradeoffs are introduced in section 1.4.7.
6328	4	1			The entire executive summary (as well as most of the underlying chapter) painfully misses any uncertainty language. This is a major issue. It is critical that the underlying chapter works hard to develop credible uncertainty and confidence assessments and that these are then used in the executive summary. I find it concerning that this was not attempted in the FOD so that reviewers have a chance to respond to the uncertainty assessment by the authors - this is a missed opportunity. Particularly striking given that this chapter includes a section that describes the approach to communicating uncertainty. [Andy Reisinger, New Zealand]	This comment is handled in two ways: a) in a number of places, factual conclusions currently given in this chapter will be removed, following the criticism that the chapter should restrict itself to the framing, not the conclusions of the assessment (framing per se does not come with uncertainties), b) where factual statements remain, these will be given with uncertainty language wherever possible.
14964	4	1	5	49	to present the findings of the report. These findings should be reflected in the eventual SPM, not in the first chapter of the report. I would recommend that the authors throughout his chapter focus on the scientific context and framing of this report, rather than making statements regarding the expected conclusions of the report. [Farhan Akhtar, United States of America]	agreed, the text of the chapter was extensively edited to reflect these changes
20346	4	1	5	49	AR5 used to list sections/subsections where evidence could be found for bullets of the Executive Summary. I think this was good practice and should be repeated for this report. [Olivier Boucher, France]	used in chapter 1 extensively
20095	4	1	5	49	3 and 5) address these sustainable development concerns of the response strategies and technologies employed in chapter 2, but the entire report must go beyond paying lip service to these considerations. This inconsistency undermines the integrity of the entire report. [Lili Fuhr, Germany]	Chapter 1 sets the stage including the SDGS, as commented by the reviewer
6390	4	1	5	49	very sharp and clear Executive Summary [Sybil Seitzinger, Canada]	thanks
12899	4	1	5	51	Could you provide a Table with a summary of main goals of the executive summary? [Mustapha Meftah, France]	space limitations did not allow this to be done
12900	4	1	5	51	Uncertainty of the main objective (1.5°C+/-0.1 at 2 sigma)? [Mustapha Meftah, France]	Ranges and uncertainties added in the SOD
12901	4	1	5	51	Can we say that the temperature represents the best proxy (or accurate knowledge of the Earth imbalance could help better, etc.)? [Mustapha Meftah, France]	Noted, but this is a contentious issue, left to AR6
6007	4	1	6	51	The executive summary focuses quite a bit on sustainable development. I think it might be useful to include more information on what is meant by 1.5C – perhaps including those issues in the first bullet on the outline “probability, transience, overshoot, stablisation”. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	the ES was extensively edited in way to reflect these comments
2894	4	1	9	21	The first few pages and executive summary of this chapter read as a Summary of the entire report. The framing chapter should focus on definitions and modes of evaluation. [Alice Alpert, United States of America]	agreed, the text of the chapter was extensively edited to reflect these changes
3111	4	3	4	10	This paragraph does not accurately state what the SR covers. It states that it assesses "the conditions under which the global community could limit the rise in global temperatures to 1.5 degrees C", but it does not. Limiting the temperature increase in all future years would constitute a non-overshoot scenario, by definition. But Chapter 2 does not include any non-overshoot scenarios at all. It only includes overshoot scenarios which do not limit the temperature increase to 1.5 degrees C. THIS IS A CRITICAL FLAW IN THE ENTIRE REPORT. Non-overshoot scenarios should be the primary focus of the entire report. [Richard Rosen, Germany]	agreed, the text of the chapter was extensively edited to reflect these changes
21291	4	3	4	10	Results of feasibility review of implementation options will critically depend on what you compare it to. Certainly for any economic assessment there is a need for a baseline and the way this is phrased implies that everything from run-away climate change to 2DS world is on the table. If so, this will make it difficult to say anything meaningful from a policy perspective. Isn't the key question about whether 1.5 C is feasible compared to 2DS? In Line 6 - there is redundancy as poverty reduction and increased equity are fully embedded in SD at least with we take SDGs as a starting point. [Jan Corfee-Morlot, France]	agreed, the feasibility box was presented as providing basic considering for feasibility rather than empirical comparisons
10949	4	3	4	10	I do not think assessing feasibility is a high level aim of the report. The UNFCCC invite doesn’t mention it, just impacts and pathways Srick to these two aims? [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	agreed, the text of the chapter was extensively edited to reflect these changes
10395	4	3	4	3	Capitalize (and italicize?) name of report in line 3 [Jonathan Lynn, Switzerland]	agreed, the text of the chapter was extensively edited to reflect these changes
14953	4	3	4	6	The initial key message should stick with the specific agreed upon title for the report and not expand the topics addressed by this report. The current key message adds additional terms not included in the Panel decision, including "increased equity." The authors should not expand the scope of the report, in particular on topics that do not have broad consensus within both the scientific literature and within policy discussions. Doing so, breaks from the principles of the IPCC and risks the acceptance of this report by some governments. [Farhan Akhtar, United States of America]	As suggested by the reviewer, we focus on the topics in the outline for chapter 1, including ethics and equity, SDGs and eradication of poverty.
7146	4	3	4	6	I believe the report is meant to assess the pathways to 1.5C, including their feasibility. Reformulate to reflect that feasibility is a secondary matter, which is approached as framed in Box.13, p31 (9-14) [Iulain Florin VLADU, Germany]	agreed, the feasibility box was edited to reflect these changes
4880	4	3	5		Begins with great clarity, without making it too simple. Being very clear that 1.0 has already been exceeded, and that there are variations across place, some regions easily experiencing more warming, already beyond 2 C. Important and correct to mention the justice and equity aspects also rightaway. [Marion Grau, Norway]	Noted - with appreciation
1756	4	4			rise in global temperatures to à rise in global temperature to [Tibor Farago, Hungary]	agreed, the text was edited
1757	4	5			the feasibility of meeting this target by means of relevant global greenhouse gas emission pathways while .. ((explanation: it is in line with Paris Decision para 21 and also in order to avoid here thoughts on “climate engineering” options)) [Tibor Farago, Hungary]	agreed, the text was edited
13135	4	5	4	5	wording of " of a 1.50C world" need to be eddited [Iman Babaeian, Iran]	agreed, the text was edited
11429	4	6			Sustainable development is premised on poverty reduction and increased equity. There is condequently no need to list all three. If the intent is to emphasise overty and inequality the wording should be changed to reflect this. [Stewart Lockie, Australia]	agreed, the text was edited

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19301	4	6	4	7	This is a rather weird comment in such a prominent position in the Exec Summary [Marco Mazzotti, Switzerland]	agreed, the text was edited
17815	4	6	4	7	Not all three special reports spann all three working groups. The SR on Oceans & Cryosphere only spans WG1 & WG2. [Wilfran Moufouma Okia, France]	agreed, the feasibility box was edited to reflect these changes
16048	4	6	4	7	It would help to give an indication of what the other Special Reports will be; or does this mean there will be chapters covering. Or perhaps the confusion is about what "It" is referring to and "This in the first sentence [Michael MacCracken, United States of America]	space limitations did not allow this to be done
1758	4	6	4	7	delete the sentence: “It is the first in a series of IPCC Special Reports to span all three IPCC working groups, and to include greater social science literature. ((explanation: it is irrelevant here and actually it happened already in the long history of the IPCC ..)) [Tibor Farago, Hungary]	agreed, the text was edited
9107	4	7	1	7	greater than what? Than previous IPCC reports? [Michael Oppenheimer, United States of America]	the text was edited
13079	4	7	4	7	insert the word 'the' : "and to include [the] greater social science literature" [Veryan Hann, Australia]	agreed, the text was edited
5411	4	7	4	7	It is suggested to substitute "greater" by "more". [Klaus Radunsky, Austria]	agreed, the text was edited
13648	4	7	4	7	The strength of the SR is that they span the three IPCC WGs so offer opportunity for an integrated view – this text should reflect that and not just focus on social science [Elvira Poloczanska, Germany]	agreed, the text was edited
15193	4	7	4	7	grammar: in the phrase "and to include greater social science literature", the adjective "greater" cannot qualify "social science literature". Suggest "a greater amount of" or "a broader range of" [Pauline Midgley, Germany]	agreed, the text was edited
10396	4	7	4	7	SROCC is only two working groups [Jonathan Lynn, Switzerland]	agreed, the text was edited
6602	4	7	4	10	The paragraph reads as if literature from the social sciences only has a role in informing thinking around implementation, which may or may not have been the intention. If it was, then I would argue that the social sciences (and humanities) have roles in: understanding how the climate change problem itself is conceptualised, the implications of various perspectives of what cimate change is and how it is thought about, exploring and understanding the roles of culture, values, human behaviour in responding to climate change, amongst others. These literatures help us to think about how we think. Authors include Shove, E. (2010a). Beyond the ABC: climate change policy and theories of social change. Environment and Planning, A(42), 1273–1285. http://doi.org/10.1068/a42282; Shove, E. (2010b). Social theory and climate change: questions often, sometimes and not yet asked. Theory, Culture and Society, 27, 277–288. http://doi.org/10.1177/0263276410361498; Leyshon, C. (2014). Critical issues in social science climate change research. Contemporary Social Science, 9(4), 359–373. http://doi.org/10.1080/21582041.2014.974890; Driessen, P. P., Behagel, J., Hegger, D., Heleen, M., Almesjo, L., Andresen, S., … Verbruggen, A. (2013). Societal transformations in the face of climate change Research priorities for the next decade. [Emily Tyler, South Africa]	the ES was extensively edited in way to reflect these comments
4408	4	8	4	10	what's new for this report compared to the AR5? [Jingyong Zhang, China]	agreed, the text was edited
14352	4	8	4	8	Change "in review" to "in reviewing" [Ioannis Daliakopoulos, Greece]	agreed, the text was edited
13080	4	8	4	8	change the word 'review' to 'reviewing' [Veryan Hann, Australia]	agreed, the text was edited
6472	4	8	4	8	Replace 'in' with 'to' [Roger Bodman, Australia]	agreed, the text was edited
15194	4	8	4	8	copy edit: change "in review" to "in reviewing" [Pauline Midgley, Germany]	agreed, the text was edited
5239	4	8	4	8	review --> "reviewing" [Bart Van den Hurk, Netherlands]	agreed, the text was edited
10360	4	8	4	8	line should end "in reviewing existing literature" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	agreed, the text was edited
10397	4	8	4	8	should be … goes beyond them to review existing… or …goes beyond them in reviewing existing… [Jonathan Lynn, Switzerland]	agreed, the text was edited
16049	4	8	4	8	Change "review" to "reviewing" [Michael MacCracken, United States of America]	agreed, the text was edited
5412	4	8	4	9	The following wording is suggested: This report builds on previous IPCC assessments but also goes beyond them in assessing published literature on potential implementation options. It would be appreciated if further specification of those implmentation options could be provided (e.g. related to mitigation and adaptation as well as carbon dioxide removal). [Klaus Radunsky, Austria]	agreed, the text was edited
14954	4	8	4	9	It is unclear in what way the report "goes beyond" previous IPCC assessment. Suggest explaining this further, or cutting this from a key message. [Farhan Akhtar, United States of America]	agreed, the text was edited
9842	4	8	4	9	This sentence reads as if only new literature on implementation options will be reviewed. [Christopher Reyer, Germany]	agreed, the text was edited
4410	4	9		14	What are the regional differences and what are factors responsible for those? [Jingyong Zhang, China]	Full discussion of the factors responsible for regional differences is deferred to AR6
5413	4	9	4	9	The following wording is suggested: The report is global in scope but includes also regional analyses. [Klaus Radunsky, Austria]	agreed, the text was edited
12444	4	10			….multi-century timescales: please add " past" before multi-century [Mohammad Rahimi, Iran]	Text clarified
1759	4	10			with some impacts considered à with some aspects considered ((explanation: the long-term consideration is relevant not only for the c.c. impacts but also for emission pathways and ghg-concentrations)) [Tibor Farago, Hungary]	Noted: Action required is unclear
5414	4	10	4	10	It might be more appropriate to say: The primary focus is on the 21st century, with some impacts considered on a multi-century timescale. [Klaus Radunsky, Austria]	Agreed, text was edited
7181	4	12			The rnage of 0.1 to .25 °C per decade appears large. Also because the total change of 1°c is not combined with an uncertainty range. Check the consistency of the two numbers and possibly narrow down range for the rate of change. [Nico Bauer, Germany]	The range emerges from the AR5 estimate of 0.3-0.7C over 30 years from 1986-2005.
12327	4	12			The bullet needs to be more precise eg. "Human-induced warming reached a single year global average of about 1°C above 30 year average pre-industrial levels in 2016…" [Bill Hare, Germany]	Noted - we have tried to tighten the wording.
5415	4	12	4	12	It is a very strong statement to say "human-induced" warming reached … Can this statement be based on attribution studies? If not, it would be recommended to say: Warming reached a global average of about …. [Klaus Radunsky, Austria]	We now focus on total warming, although the size of the anthropogenic contribution is discussed.
16050	4	12	4	12	Suggesting this occurred in the single year 2016 seems inconsistent with how "climate" is defined and the general imprecision of the observations and analyses, including uncertainties. Perhaps give a decade instead of a year. [Michael MacCracken, United States of America]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability.
13136	4	12	4	13	warming of .1-.25 per decade cause global average warming of 1.5-3.75oC not 1oC in 2016 [Iman Babaeian, Iran]	Noted, but the point is unclear. From when? This discussion has been clarified.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14955	4	12	4	13	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. The authors should present a solid rationale for the decision on the relationship between current temperatures and future warming of 1.5 degrees in the underlying chapter. [Farhan Akhtar, United States of America]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability.
7147	4	12	4	13	Suggest to provide the temperature increase with decimal points and in line with the new baseline for temperature increase and the definition used in this report. [Iulain Florin VLADU, Germany]	Point has been addressed.
6963	4	12	4	16	Some adjustment of wording is required to reconcile the two statements "human-induced warming reached a global average of about 1C above pre-industrial levels in 2016" and "warming relative to pre-industrial levels is defined as the increase in global average temperature averaged over a multi-decadal period relative to the 30-year reference period 1850-1879" since the first statement refers to the warming in a particular year which is at odds with the definition given in the second statement. [Sai Ming Lee, China]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability.
2896	4	12	4	12	Quantification of warming should always be in reference to a 30 yr period, not a single year. The base period for this statement is a thirty year period. The attribution of 1C of warming to human activities is inconsistent with the findings of AR5 repeated elsewhere in this report, that "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcings together" and the fact that "globally averaged combined land and ocean surface temperature data as calculated by a linear trend, showed a warming of 0.85 [0.65 to 1.06]°C, over the period 1880–2012" (Ch3 of this report) [Alice Alpert, United States of America]	This is an important point, but there is no inconsistency with the AR5 statements, as is made clear in the SOD. The problem with quantifying warming with respect to an observed 30-year period ending at the present time is that this would introduce 0.3C cool bias in the stated current level of warming if the rate of warming is 0.2C per decade. This is significant in the context of 1.5°C.
3723	4	12	4	12	I would recommend to replace “Human-induced” here with “Total” or a similar word. The warming of 1°C is the total global warming with regard to the reference period 1850–1879. Considering that the anthropogenic (e.g. human-induced) proportion of the warming that occurred during the first half of the 20th century (~0.4°C) is highly uncertain some caution is needed in the wording here. Model simulations and detection and attribution studies differ regarding the proportion of natural versus anthropogenic warming during the first half of the 20th century depending, among other things, on the amplitude of low-frequency variability in solar forcing data used (this has a very minor impact during the second half of the 20th century). [Fredrik Charpentier Ljungqvist, Sweden]	Accepted: warming refers to total (which also happens to coincide, albeit with greater uncertainty, with human-induced).
2252	4	12	4	12	It would be better not to draw attention to the year 2016, as it was one of record global warmth due in part to an El Nino event. This line could simply read "Human-induced warming has reached a global average of about 1 deg C over the industrial era". [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability. A number of methods might be used to estimate that average, this report does not endorse any specific method, but we prefer to avoid the use of a linear trend to quantify warming over a period in which the trend was clearly not linear. Using attribution methods to decompose total observed warming into natural and anthropogenic contributions is one approach.
2253	4	12	4	12	The above suggestion changes "above pre-industrial levels" to "over the industrial era". The plural "pre-industrial levels" used in the Paris Agreement introduces ambiguity in addition to the ambiguity over which "pre-industrial level" to choose. The target for global-mean surface temperature has to be with respect to a particular level, not a range of levels. The drafting of the Paris Agreement is what it is, but the IPCC should not perpetuate the plural word "levels" in discussing the 1.5 deg C target. Also, although it is not unreasonable for this paragraph to quote a figure for human-induced warming, the 1.5 and 2 deg C targets of the Paris Agreement refer to the net warming over the industrial era, not the human-induced warming. It is the net warming that has to be limited to avoid damaging climatic impacts, not the human-indiced warming, so if there is some natural warming over the industrial era, the human-induced component has to be more strongly limited than would otherwise be the case. This could be stated, to avoid misunderstanding. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	The interpretation of pre-industrial has now been clarified.
6329	4	12	4	14	Wording needs to be revised to avoiding mixing up climatology (which requires time spans of 20-30 years to define warming) and meteorology/climate variability, and attribution of causes. Suggest two separate statements, one about observed warming including variability, and one about attribution. I.e. the authors need to work harder to make clear that the 1 degree global average is the long-term trend once interannual variability has been smoothed out. Plus the statement that many regions "have experienced" greater changes doesn't clearly tell me whether this was a case of variability or trends that are signifficantly different in terms of their long-term warming and rainfall changes. [Andy Reisinger, New Zealand]	Noted, and this is unpacked in the SOD - the reviewer is correct that 1°C is indeed the long-term trend after accounting for internal variability.
20357	4	12	4	16	Isn't there a contradiction here in that the 1°C warming is for year 2016, but the definition of that warming provided a couple of lines below refers to a "multi-decadal average" ?? [Olivier Boucher, France]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability.
3631	4	12	4	18	This paragraph must be simplified to include it in an executive summary. In the last sentence, the two expressions for required reduction do not seem equivalent and are difficult to understand.. Also the formulation does not consider the lag time caused by the ocean buffering the rise in temperature. [Robert Shapiro, United States of America]	Paragraph has been deleted.
7991	4	12	4	18	This paragraph must be simplified to include it in an executive summary. In the last sentence, the two expressions for required reduction do not seem equivalent and are difficult to understand.. Also the formulation does not consider the lag time caused by the ocean buffering the rise in temperature. [Robert Shapiro, United States of America]	Paragraph has been deleted.
11877	4	12	4	18	The wording here of "consistent with AR5" implies that AR5 used an 1850-1879 reference period, but I don't believe that is correct. E.g. AR5 WG1 SPM B1 uses 1850-1900 reference. [Abram Nerilie, Australia]	Reference periods are all now harmonised to 1850-1900
10180	4	12	4	18	I support for focus on human induced warming but think it would benefit from an explanation/definition at ES level as perople will be meeting it for the first time [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Noted, but other comments requested a focus on total warming.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9800	4	12	4	16	This paragraph has a high potential of creating confusion in readers. While in the second sentence warming relative to pre-industrial levels is defined as 'the increase in global average temperature averaged over a multi-decadal period relative to the 30-year reference period 1850-1879' in the first sentence (human induced) warming relative to pre-industrial levels is related to a single year, i.e. 2016. You need careful reading of chapter 1.2.1.1 to understand that the given 1°C warming is 1) not an observed value, but the amount of warming attributed to human activities and 2) is not a multi-decadal average, as defined in the same paragraph just below, but the endpoint in 2016 of a curve calculated by a mathematical model using observations and different forcings. This may create a lot of trouble: 1) In all former reports, for observed warming until today, IPCC has used either a linear trend or a multi-decadal average (see e.g. AR5 WGI SPM p.5, first bullet point). It now uses the endpoint of a fitted curve, but only mentions the year 2016, without any explanation. Naming it "human induced warming" instead of observed warming does not help and only increases confusion. Therefore it is highly recommended to avoid the use of a single year when discussing past climate change. With such a statement there is a danger to disqualify all statements of the science community on the failure of any sceptic's comments using short term trends over a few years or the use of a single year with low values. When introducing a new approach (which makes sense in that context, to be clear), this should be briefly explained an the difference to the value used earlier should be given. I.e. observed trend and multi-decadal comparison should be given first. In a next paragraph, with a brief explanation (why it is used, why it is larger by about 0.15°C than the former approach, why it is different to a short-term trend) the new value can be presented. 2) Although the introduction of attribution related to observed warming does make sense, but also might create confusion and induce critique, since it involves the modelling of human induced warming, which includes more uncertainty than observations. It should be reflected in-depth if this is really necessary, since human induced warming currently is in fact hardly different from observed warming. For the purpose of this report, as already mentionned, the use of human induced warming makes sense (above all when looking for how much warming is still left from now before reaching 1.5°C and how much CO2 emission budget is left, respectively), but this can be explained in the report (as it is done) and then asserted, that there is no difference to observed warming. This would allow to stay with observations only when looking at past warming, which is easier to understand and much less prone to confusion and critique. [Urs Neu, Switzerland]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability. A number of methods might be used to estimate that average, this report does not endorse any specific method, but we prefer to avoid the use of a linear trend to quantify warming over a period in which the trend was clearly not linear. Using attribution methods to decompose total observed warming into natural and anthropogenic contributions is one approach.
3112	4	12	4	18	This paragraph is very confusing to even an expert reviewer, especially the last sentence. First of all, I think the 2-5% range is in linear rates per year, not exponential rates to be consistent with the rest of the paragraph. It should say so. Secondly, rather than give rates of decrease per year it would be much better to cite these results in terms of under which conditions of zero global emissions would have to occur in terms of the year. For example, I think the range cited here implies that emissions have to go to zero between 2035 and 2065. (from 20 - 50 years from the base year) Extrapolating figure 1.1 would get to 1.5 degrees about 2040. But this summary statement of 0.1-0.25 per decade also does not allow for any acceleration of the rate of increase. It is also a very wide range, which I doubt that recent historical data over the past few decades supports. All these issues have to be clarified and resolved here. For policy makers it would be best to say by which year emissions have to go to zero for CURRENT PLANNING PURPOSES. [Richard Rosen, Germany]	The paragraph was correct, but has been deleted.
20337	4	13	4	13	What does the range correspond to? Differences between decades? Uncertainty range? [Olivier Boucher, France]	Meaning is clarified - note table in SOD
6006	4	13	4	13	“increasing at 0.1-0.25°C per decade” is a little unclear on it’s own. Over what time period was the global temperature increasing at this rate? Perhaps clearer to remove this part, or add “since….”. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Meaning of current warming rate is now clarified.
642	4	13	4	13	Many regions should provide the key region names. [Zong-Ci Zhao, China]	Noted, given space constraints.
682	4	13	4	13	Many regions should provide the key region names. [Zong-Ci Zhao, China]	Noted, given space constraints.
3724	4	13	4	14	Maybe some caution is needed in the wording regarding changes in rainfall. Mentioning of precipitation here also seems a bit out of place considering that the rest of the paragraph only relates to temperature. Discussing hydroclimate changes should preferably be done separately since it is notoriously difficult to firmly separate changes in precipitation occurring due to anthropogenic global warming from those occurring from natural decadal to multi-decadal variability in the hydroclimate system. [Fredrik Charpentier Ljungqvist, Sweden]	Text has been edited accordingly.
14956	4	13	4	18	What is the increase in average multi-decadal global temperatures? [Farhan Akhtar, United States of America]	It is now made clear that "warming" in a particular year refers to the average temperatures in a 30-year period centred on that year, after accounting for any trend or short-term variability. A number of methods might be used to estimate that average, this report does not endorse any specific method, but we prefer to avoid the use of a linear trend to quantify warming over a period in which the trend was clearly not linear. Using attribution methods to decompose total observed warming into natural and anthropogenic contributions is one approach.
14957	4	13	4	18	The "framing and context" chapter should cite AR5 conclusions in order to set the context for this report, however, the authors should be careful in how much detail they go into, as this chapter is not to summarize information that will come in later chapters. [Farhan Akhtar, United States of America]	Noted.
2254	4	13	4	13	It is stated that human induced warming is (or has been) "increasing at 0.1 to 0.25 deg C per decade". This needs clarification, and probably correction. Firstly, it cannot refer to the early decades of the industrial era, because as industrialization began, warming must have increased very slowly at first. The average of 0.1 and 0.25 is 0.175, and this is indeed close to the rate of growth of global-mean surface temperature over the last thirty or so years, which is estimated quite robustly in a broader set of datasets than the FOD considers (Simmons et al.; 2017, doi 10.1002/qj.2949). But the human-induced warming shown by the yellow line in Figure 1.1 varies slowly over time, so the upper limit of 0.25 deg C per decade appears to be much too high for any period over the industrial era, while 0.1 deg C per decade is too low for recent decades. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Meaning of current warming rate is now clarified.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2255	4	13	4	13	I apologise for self-citation, but the peer-reviewed paper Simmons et al.(2017, doi 10.1002/qj.2949) discusses the estimation of global-mean surface temperature for datasets that extend to July 2016, and values for the remainder of 2016 are published by the EU's Copernicus Climate Change Service on the web (climate.copernicus.eu). The paper discusses its findings in the context of the Paris Agreement and the 1.5 deg C warming target. The paper predates papers cited in the report, notably that by Hawkins et al. (2017), but is not itself cited in the report. The following comments include a a few that are based on the paper, in addition to comment 3 above. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for drawing our attention to this article.
2905	4	14			Replace "rainfall" by "precipitation" [Sabine Wurzler, Germany]	Noted.
13649	4	14	4	14	Why highlight rainfall as well ? Iwhy not sea level rise as confidence in detected trends are in the higher bounds. or ocean acidification and upper ocean warming [Elvira Poloczanska, Germany]	Text has been edited accordingly.
10398	4	14	4	14	spell out Fifth (not 5th) [Jonathan Lynn, Switzerland]	Noted, given space constraints.
4409	4	14	4	16	Is the 30-year reference period 1850-1879 is for this report or the AR5? [Jingyong Zhang, China]	Reference periods are all now harmonised to 1850-1900. Use of earlier periods is problematic (as noted by Hawkins et al) because they are not directly observed and it is not clear how much pre-1850 warming is anthropogenic.
942	4	14	4	16	At this point, the palaeoclimatological context has to be briefly introduced, which is essential to understand current warming. Please add a statement such as the following: “Palaeoclimatic reconstructions indicate that pre-industrial temperatures underwent marked natural fluctuations. Present-day temperature levels have already been occasionally reached in the past, e.g. during the Holocene Thermal Maximum, 9000-5000 years before today (Marcott et al. 2013) and in the first Millennium AD (PAGES2k 2013).” [Sebastian Luening, Portugal]	Noted, however there is no space in the executive summary for this information.
2256	4	14	4	16	It is a best misleading, and at worst plainly wrong, to suggest that defing the pre-industrial level as 1850-1879 is consistent with AR5. Comment 6 below explains why. I urge the authors to consider instead adopting the definition given in the peer-reviewed and cited paper by Hawkins et al.(2017), which is much more consistent with AR5. The authors of the paper include many who contributed to AR4 and AR5, and include a current co-Chair of WGI. Using the non-standard period of 1850-1879 (for which a peer-reviewed paper does not, to my knowledge, exist) rather than something centred on 1750 or thereabouts, opens the IPCC to the charge of "moving the goal posts", as it shifts the present world 0.1 deg C further away from hitting the 1.5 deg C limit. Yes, 0.1 deg C is not scientifically significant given the uncertainties in estimating global temperature in the 18th, 19th and early 20th centuries, but the Paris Agreement is about more than geophysical science. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Reference periods are all now harmonised to 1850-1900. Use of earlier periods is problematic (as noted by Hawkins et al) because they are not directly observed and it is not clear how much pre-1850 warming is anthropogenic.
2257	4	14	4	16	The Paris Agreement, as noted in the report, does not define what it means by "pre-industrial level[s]". In the absence of a definition, the reasonable approach is to adopt the IPCC's definition as stated in AR5. The glossary of the AR5 WGI report states, under the heading "Industrial Revolution" : "In this report the terms preindustrial and industrial refer, somewhat arbitrarily, to the periods before and after 1750, respectively." Yes, it is somewhat arbitrary, but it is a definition, and much of the body of the AR5 report uses it. This is particularly the case for the important estimates of radiative forcing. The paper of Hawkins et al.(2017) is more-or-less consistent with this, defining the reference pre-industrial level as the 1720-1800 average. 1850-1879 is hardly consistent. A search through the pdf of the AR5 WGI report reveals no reference whatsover to the period 1850-1879. 1850-2000 does get quoted in places as a reference period, but tends not to be called "pre-industrial". There is already enough ambiguity around the target of the Paris Agreement without this new IPCC Report introduing its own definition of the pre-industrial level. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Reference periods are all now harmonised to 1850-1900. Use of earlier periods is problematic (as noted by Hawkins et al) because they are not directly observed and it is not clear how much pre-1850 warming is anthropogenic.
5576	4	15			"increase in global average temperature" is too vague considering the definitions made in 1.2.1.1 [Astrid Kiendler-Scharr, Germany]	Text has been tightened.
7182	4	16			I find the first half of the sentence starting with "This level and rate…" very difficult to understand. Please make language more comprehensible [Nico Bauer, Germany]	Text has been tightened.
9108	4	16	1	18	The sentence "This level…" is very improtant but far too complex. Break it up and simplify. [Michael Oppenheimer, United States of America]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
17811	4	16	4	16	The following sentence will need further clarification "This level and rate of warming imply that 20% reduction of global emissions from their present-day level for every tenth of a degree of warming from now on, or an average compound reduction rate of 2-5% per year, would be required to limit warming of 1.5°C" [Wilfran Moufouma Okia, France]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
4370	4	16	4	17	This could be misleading as "emissions" are not yet defined here; this summarizes discussion on page 18 in terms of CO2-fe, but because some of the CO2-only warming is masked by tropospheric aerosol cooling, reducing both CO2 and aerosols (since the aerosols are generally produced from burning fossil fuels) may not reduce CO2-fe as much, and the required rate of emissions reduction on CO2 is likely much higher (when people read this sentence, they won't realize that). [Douglas MacMartin, United States of America]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
13574	4	16	4	18	An interesting conceptual thought. Recommend adding a timeframe when these warming steps of 0.1°C likely occur. [Elvira Poloczanska, Germany]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
12328	4	16	4	18	This sentence belongs in Chapter 2. In addition its first part unclear (The meaning of this "This level and rate of warming imply that a 20% 17 reduction of global emissions from their present-day level for every tenth of a degree of warming from now 18 on" is not clear) and the low end of the rate given does not seem to match rates required to limit warming to 1.5°C. [Bill Hare, Germany]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
5418	4	16	4	18	It would be important to inform about the underlying assumptions with respect to overshooting/negative emissions. Without such specification the statement lacks the most relevant part. In addition this kind of scenario should be linked to the three main types of scenarios identified in box 3.12 of chapter 3. [Klaus Radunsky, Austria]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
21044	4	16	4	18	Not really clear: 20% emission reduction to achieve 0.1 C warming?! Please rewrite. Also synthetically explain here what global emissions are (line 17) [alessandra conversi, Italy]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5685	4	16	4	18	The sentence is too long and too complicated. It is difficult to understand. [Hong Yang, Switzerland]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
17733	4	16	4	18	This sentence is hard to understand. [Göran Finnveden, Sweden]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
1094	4	16	4	18	A single number like this combined with “Limit warming to 1.5oC” also ignores uncertainties. Maybe a less quantitative sentence about the “stopping distance” discussed in the chapter would be good here. [Rob Swart, Netherlands]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
20338	4	16	4	18	I read this sentence four times and couldn't make much sense of it. Global emissions of what? What does "from now on" refer to? Again what does the range correspond to? Can 2% year-on-year emission reduction of GHG suffice to meet 1.5°C? See also my comments below. [Olivier Boucher, France]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
5240	4	16	4	18	very complex sentence; please rephrase [Bart Van den Hurk, Netherlands]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
6008	4	16	4	18	“This level and rate of warming….” - should this have a separate paragraph with a summary in bold? It seems quite important. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
17286	4	16	4	18	I cannot understand what the numbers mean here but this very important information. Also here or elsewhere in the top paragraph there needs to be an acknoledgement that a target of 1.5C is inherently difficult also because there is large interannual to decadal variability of the order of a tenth of a degree, which will make it difficult to say when we have exceeded the self-imposed limit. [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
10399	4	16	4	18	doesn't that imply that if you reduce emissions to zero in 20% chunks there will be no further warming and you could stop at 1.5ºC. What about already committed warming? [Jonathan Lynn, Switzerland]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
12719	4	16	4	18	The sentence starting "This level and rate of warming imply…" is very difficult to follow. In particular it is very unlcear what "for every tenth of a degree of warming from now on" means… [Vassilis Daioglou, Netherlands]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
16051	4	16	4	18	This sentence seems a huge jump from the first sentence and topic of this point, which would seem to be about what has happened in the past and where we are. Are there not all sorts of issues involved here, including lag effects, loss of sulfate aerosol cooling offset, and much more. If anything like this stays, I would also suggest that it focus on the whole leap that must occur rather than on this 20% at a time leap. Thus say something to effect that past changes in the climate suggest that staying below 1.5 C will require phasing out fossil fuel emissions completely within x decades, requiring a cutback in emissions of 2-5%/year beginning this decade. [Michael MacCracken, United States of America]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
6330	4	16	4	18	This statement is out of place and poorly justified in this chapter including the underlying material, given the much more detailed discussion in chapter 2. Recommend deletion. [Andy Reisinger, New Zealand]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
2495	4	16	4	18	This sentence is essentially unintelligible. [Robert Koppu, United States of America]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
13005	4	16	4	18	The sentence: "This level.. to 1.5°C" seems t0o complex for an executive summary; I suggest rephrasing [Caserini Stefano, Italy]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
13524	4	16	4	18	Difficult to understand. Furthermore if we assume increasing of temperature at 0.1 per decade, the global temperature increase from 1880 results at 1.36 degree Celcius in 2016 and not 1.0 degree Celcius. Explanation in page 18 line 22-27 is more easy to understand. [Aditya Kartadikaria, Indonesia]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
20183	4	16	4	18	last sentence in second paragraph may need some rephrasing to make it more easily readable [Ton Wildenborg, Netherlands]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
7390	4	16	4	18	For us this sentence seems to include very policyrelevant information, but sadly in its current state we find it very difficult to read and understand. Please consider splitting the sentence in two or re-phrase it in a language that can be easier understood by policymakers. [Øyvind Christophersen, Norway]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
1004	4	16	4	18	20% reduction...does this consider the warming commitment (i.e., the fact that there is already warming in the "pipeline") so that even without any additional CO2 emissions, global warminig will continue until thermal equilibrium is reached? [Katsumi Matsumoto, United States of America]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
1008	4	16	4	18	The expression "This level and rate of warming imply that a 20% reduction of global emissions from their present-day level for every tenth of a degree of warming from now on would be required" is hard to understand. [Mitsutsune Yamaguchi, Japan]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
20182	4	17			for preventing every tenth... [Ton Wildenborg, Netherlands]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
13006	4	17	4	19	The sentence: "Governance,,, eradication" is too general; I suggest deleting or rephrasing [Caserini Stefano, Italy]	Text was revised
11430	4	18			would be required should be "will be required" [Stewart Lockie, Australia]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
5416	4	18	4	18	It is noted that the term "compound reduction rate" has not been used in chapter 2. The message should be conveyed in an easier language without using undefined terms. [Klaus Radunsky, Austria]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
14945	4	18	4	18	an average compound reduction rate of 2-5% per year, would be required to limit warming to 1.5°C: It is not clear till which year this rate of reduction needs to be maintained so that temp. rise is limited to 1.5°C. [LOKESH CHANDRA DUBE, India]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.
1009	4	18	4	18	The range of "reduction rate of 2-5% per year" is too wide. Need explanation why? [Mitsutsune Yamaguchi, Japan]	Bullet has been deleted as it was clearly too dense and arguably out of place in a scoping chapter, despite policy relevance.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7183	4	20			The statement starts with a reference to above average warming in human settlements, then it shifts to more local and traditional knowledge being important for the relevance of 1.5°C temperature change (is this refering to adaptation), which is due to the occurence of exceeding the 1.5°C temperature increase already in one season of the year. The flow of arguments makes not really sense to me. In my understanding global warming is unprecedent relative to human memory and experience (incl. written). Traditional knowledge is threatned to be depreciated and becomeing useless because climate changes too quickly and too strongly. If it were possible to continue with traditional knowledge in a 1.5°C warmer world, why should we even care about this moderate level of climate change? Alternatively, is 1.5°C the domain of temperature increase within which traditional knowledge is still valid, but at 2°C and beyond traditional knowledge becomes irrelevant and misleading? [Please do not get this comment wrong. It is not saying that traditional knowledge is useless. It says that global warming makes traditional knowledge increasingly useless. If you say traditional knowledge is important for understanding 1.5°C temperature increase, the argument simply suggests that 1.5°C is within the human experience, so what is the problem about it and its impacts?] The authors must put more thought into the question what the meaning of traditional knowledge in a rapidly warming world is. [Nico Bauer, Germany]	This executive summary point has been completely re-written and revised accordingly
4161	4	20		52	I think that it needs to be noted that climate change is also having a large impact on developed countries and that the Earth's warming is having great and varied impacts, all of which impact ecosystems and populations. IE: Harvey and the Gulf Coast. As reported by NOAA, as SST's increase, Hurricanes will have the potential for heavier rainfall and to maintain intensity further north. With Harvey, you are witnessing widescale impacts to ecosystems, the economy, disruption of people and even the question about whether or not industry and infrastructure needs to be redesigned to withstand such severe events which are expected to become more regular. This is just one example but I think it needs to be stressed that the developed world is not immune and the impacts are far reaching. [Michelle Leslie, Canada]	This executive summary point has been completely re-written and revised accordingly
13650	4	20	4	20	Why highlight rainfall as well ? Iwhy not sea level rise as confidence in detected trends are in the higher bounds. or ocean acidification and upper ocean warming [Elvira Poloczanska, Germany]	This executive summary point has been completely re-written and revised accordingly
10533	4	20	4	21	Sentences overriding. [Linda Yanti Sulistiawati, Indonesia]	This executive summary point has been completely re-written and revised accordingly
2906	4	20	4	21	The headline is misleading. You write nothing about precipitation in the lines below. Furthermore it shoult be precipitation and not rainfall. Futhermore what you write here is contradictionary to what you write on page 1-12 lines 38-45 about the signal to noise ratio with regard to precipitation and also with your findings on page 5.3.28. I suggest that either you state here something about the confidence of the findings with regard to precipitation or omitt it from the headline. [Sabine Wurzler, Germany]	This executive summary point has been completely re-written and revised accordingly
1734	4	20	4	21	Is 'different' levels of change referring to spatial heterogeneity in climate change over the globe? Or that depending on existing temperature and level of rainfall, a given amount of change will have a differing level of impact? [Levi Golston, United States of America]	This executive summary point has been completely re-written and revised accordingly
5417	4	20	4	26	These statements are valid for any warming level. [Klaus Radunsky, Austria]	This executive summary point has been completely re-written and revised accordingly
14958	4	20	4	26	The authors appear to be confusing climate change with seasonal weather. Temperatures cannot be compared across these scales directly. This paragraph should be significantly revised or deleted altogether. [Farhan Akhtar, United States of America]	This executive summary point has been completely re-written and revised accordingly
6009	4	20	4	26	There is quite a lot contained in this paragraph. Might be a little confusing. Perhaps could have 1 paragraph which highlights that 1.5C will have different levels of warming and other climate changes locally, and then another paragraph which mentions the understanding of recent changes as a way to interpret future change. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	This executive summary point has been completely re-written and revised accordingly
19650	4	20	4	26	The reference to local and traditional knowledge shoud also be applied to responses to climate change (ie not just impacts) both in terms of adaptation and mitigation. [Tara Shine, Ireland]	This executive summary point has been completely re-written and revised accordingly
1733	4	20	4	26	Would be helpful to clarify the rationale behind why "warming in regions with human settlements will often exceed 1.5°C." Is this a temporal effect, like has been mentioned some months have more warning than others? Is this a spatial effect in the way settlements are distributed on the globe? And finally what of the urban heat island, which should make this even worse in parts? [Levi Golston, United States of America]	This executive summary point has been completely re-written and revised accordingly
2258	4	20	4	26	The discussion in this paragraph is correct taken at face value, but neglects to link the rise in global-mean surface temperature to the rise in sea-level. Moreover, a change in evaporation at one place may result in a change in precipitation somewhere else. Damaging impacts at one location may result from temperature change at a different location. My understanding (which may well be flawed) is that the 2 deg C limit originally came to prominence as it was the level of global warming beyond which models indicated a risk of serious sea-level rise from the melting of the Greenland ice sheet, and a key factor in the emergence of 1.5 deg C was the more immediate threat of sea-level rise for small island states. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	This executive summary point has been completely re-written and revised accordingly
2026	4	20	4	26	I suggest it should be clearly pointed out that 1.5°C warmer in the global corresponds to how much on land surface, and how much in ocean. [Tao Yang, China]	This executive summary point has been completely re-written and revised accordingly
7930	4	20	4	26	It might also be worth mentioning here that the global average is unlikely to be uniform, with a higher warming effect expected over land (as mentioned on page 12 in this chapter, line 28 - 29 [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	This executive summary point has been completely re-written and revised accordingly
4375	4	21	4	21	the available budget for CO2 depends on the assumed aerosol forcing, can you be more explicit about what that assumption was? [Douglas MacMartin, United States of America]	Not for an executive summary point
13651	4	21	4	21	There is a need to standardise terms among chapters :, various combinations of local, traditional and indigenous knowledge are used [Elvira Poloczanska, Germany]	Revised
17734	4	21	4	22	What does "…traditional knowledge of recent cimate changes…" mean? [Göran Finnveden, Sweden]	This executive summary point has been completely re-written and revised accordingly
7391	4	21	4	22	Please consider rephrasing, substance of this sentence is not clear. Please consider to include "of and experiences with" after "knowledge", if so delete "of" in the current wording, include "impacts" after "climate change", substitute "bears" with "have" and subsititute "a 1.5C climate" with "global warming of 1.5C". The full sentence will then be clearer in our view, and would read "Local and traditional knowledge of and experiences with recent climate change impacts have direct relevance to the impacts of global warming of 1.5C." [Øyvind Christophersen, Norway]	This executive summary point has been completely re-written and revised accordingly

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1735	4	21	4	23	These two sentences contradict one another. Is the point that local experience of climate is not indicative of what the world will look like in that same location at 1.5 C, but that there are others parts of the world that already have experienced such conditions? [Levi Golston, United States of America]	Revised
14919	4	21	4	26	Needs rephrasing. Not sure what these two sentences are trying to convey. Also, important to note here that the land regions that have not yet crossed 1.5C in any season are also likley to cross the 1.5C locally much before of global warming of 1.5C. [Ambarish Karmalkar, United States of America]	Revised
9801	4	21	4	26	Maybe it would be worth mentioning that already over land masses the warming will be several tenths of degrees larger than the global average [Urs Neu, Switzerland]	Noted
1760	4	22			twice: climate changes à recent climate variability (or fluctuations) [Tibor Farago, Hungary]	We don't understand this comment
16052	4	22	4	23	Is this sentence referring to the regional and seasonal patterns of climate change? If so, this should be said explicitly. As written, it is not really clear what it means, and is it really true? Won't high latitudes always show greater warming than tropics; land greater warming than oceans; and nighttime warming greater than daytime except, perhaps, where land dries out? I just don't understand the point here. [Michael MacCracken, United States of America]	Revised
12773	4	22	4	23	The sentence is unclear and can have several meanings [Robert Vautard, France]	Revised
643	4	24	4	24	large parts of the world should give the key region names. [Zong-Ci Zhao, China]	Term no longer used
683	4	24	4	24	large parts of the world should give the key region names. [Zong-Ci Zhao, China]	Term no longer used
16053	4	24	4	24	Why say "However"? Sentence is fine without it. [Michael MacCracken, United States of America]	Revised
4509	4	24	4	25	The comparison of global temperature change with seasonal difference is not right. [Radim Tolasz, Czech Republic]	Revised
19084	4	24	4	26	To me this sentence is confusing: it suggests that the local warming response in a 1.5°C world can only be computed for those areas where historical (seasonal) warming already exceeded 1.5°C? But isn't it possible to compute - with a given uncertainty - (i) historical observed warming trends for every location where sufficient data is available, (ii) modelled/reanalysed warming trends in every location? [Wim Thiery, Switzerland]	Revised
13652	4	25	4	26	This is not clear, 50% of the human population live in regions where warming in excess of 1.5 has ben experienced in at least one season of the year ? [Elvira Poloczanska, Germany]	Sentence rephrased.
6011	4	25	4	35	What is meant by "disproportionately" here? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	The term is now explained in more detail
7185	4	28			The statement must comprise that the NDCs have not been compatible with the 2°C target and the cost-efficient paths (as has been mentioned in Paris 2015 by the COP), and with the 1.5°C target the gap is even larger. It is not sufficient to refer here only to the 1.5°C target. There must be a comparison with the gap for the 2°C target, particularly since the policy makers have officially acknowledged the gap for the 2°C target. [Nico Bauer, Germany]	This information is beyond the scope of Chapter 1.
5577	4	28			- the temperature increase associated with current NDCs should be explicitly given here. [Astrid Kiendler-Scharr, Germany]	The NDCs do not imply a specific temperature increase because they only extend to 2030.
1761	4	28			Currently defined Nationally Determined Contributions (NDCs) specified under the Paris Agreement à Currently defined national contributions (INDCs and NDCs) specified in relation to the Paris Agreement ((explanation: in many cases there are still the INDCs submitted before the adoption of the PM and which will be updated 5 years later)) [Tibor Farago, Hungary]	Noted, thanks.
4411	4	28		29	Whatis the the gap for creating a 1.5C world? [Jingyong Zhang, China]	Discussion of NDCs is in chapter 2.
1041	4	28	4	29	Opportunity here to highlight possibility of increased ambition in future rounds of NDC submissions. Could include a sentence like “However, countries are encouraged to re-submit NDCs ever 5 years (or required to resubmit every 10 years) with increased ambition. It is possible that future rounds of NDC submissions may be sufficient to create conditions for a 1.5c world.” The Yale Program on Climate Change Communication has found that including messages that convey hope are better received than those that engender feelings of hopelessness. The iterative process of the Paris Agreement (Global Stocktake and ability to resubmit NDCs with increased ambition) is a narrative often neglected in broader discourse about the agreement. It is also missing from this report. It could be included with 1-2 sentences here. [Martini Catherine, United States of America]	This information is beyond the scope of Chapter 1.
17434	4	28	4	29	Along with the not that "Currently defined Nationally Determined Contributions (NDCs) specified under the Paris Ageement will not be sufficient to create conditions for a 1.5C world" it should also be highlighted that current mitigation policies in the ICAO and IMO for international transport emissions are not sufficient for a 1.5C world. [Aki Kachi, Germany]	This information is beyond the scope of Chapter 1.
9829	4	28	4	29	It is a better sentence to "(…) the Paris Agreement will not meet the emission pathways for a 1.5 C world" rather than "(…) the Paris Agreement will not be sufficient to create conditions for a 1.5 C world". [Keigo Akimoto, Japan]	Sentence has been rephrased.
14959	4	28	4	29	The NDCs were not specified "under the Paris Agreement." They are communications by parties to the Paris Agreement on their contributions towards emissions reductions. [Farhan Akhtar, United States of America]	Noted
7148	4	28	4	29	This type of message does not reflect the fact that the Paris Agreement includes a cycle/mechanism meant to increase the ambition of NDCs overtime. Second, the ambition of the NDCs is not defined in the Paris Agreement. Suggest to reformulate - The ambition of the current Nationally Determined Contributions (NDCs) should be increased to create conditions for a 1.5 °C world. [Iulain Florin VLADU, Germany]	Noted.
5419	4	28	4	33	It is apprecaited to assess the current NDCs in the context of a temperature goal of 1.5 degrees C. However, it might be more appropriate to say that current NDCs might overshoot even the 2 degrees target and result in a temperature increase of 3 degrees C by 2100 unless significant negative global emissions are generated that can reduce the global carbon budget to a level corresponding to a 1.5 degrees goal. Again such scenario should be linked to the appropriate narrative included in box 3.12 of chapter 3. It might be useful to highlight the limitations of deploying such huge amount of negative emissions. [Klaus Radunsky, Austria]	The NDCs do not imply a specific temperature increase because they only extend to 2030.
21043	4	28	4	33	For a more logical flow, I suggest to move this sentence above the previous paragraph, i.e., starting on line 20 [alessandra conversi, Italy]	Text has been rewritten.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12122	4	28	4	33	Since the beginning of the Industrial Age, 1780 to now, there have been about 2,100 billion tonnes (GtCO2) of anthropogenic CO2 emissions, the Paris Agreement intention is to cut a about a near miniscule 40 GtCO2 maximum between now and 2030 (compared to current policies), less than 1 year of current emissions. [Michael Wadleigh, United States of America]	Noted. Unclear what revision is required.
12123	4	28	4	33	By 2030, after 2,700 GtCO2, it will have taken world governments 38 years (UNFCCC 1992 - 2030) to cut emissions 40 GtCO2, if they do. [Michael Wadleigh, United States of America]	Noted. Unclear what revision is required.
12124	4	28	4	33	Since UNFCCC began in 1992, annual emissions from fuel and cement have increased 60% and overall anthropogenic CO2 emissions have increased 44%. [Michael Wadleigh, United States of America]	Noted. Unclear what revision is required.
12125	4	28	4	33	If Paris Agreement NDCs are fully implemented, annual greenhouse gas emissions will continue to increase until after 2030. [Michael Wadleigh, United States of America]	Noted. Unclear what revision is required.
12126	4	28	4	33	One of the two Paris temperature goals is gone, it is now not possible to avoid exceeding 1.5°C, 1.5°C global warming is basically locked into the atmosphere (no overshoot, >66% probability accounting for all GHG forcings) [re see point 75-79 Richard J. Millar et all, Nature Geoscience (2017) doi:10.1038/ngeo3031]. [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12127	4	28	4	33	The other Paris temperature goal will soon be gone: with Paris Agreement NDCs fully implemented, 2°C global warming will be locked into the atmosphere by 2036, only 19 years (>66%, all GHG). [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12128	4	28	4	33	This does not take into account "feedback responses", e.g. permafrost thaw releasing CO2 and CH4 into the atmosphere, greatly reducing the remaining "carbon budget" for well below 2°C. [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12129	4	28	4	33	If geophysical climate targets beyond mean global temperature rise, e.g. ocean acidification, were to be taken into account, "carbon budgets" for well below 2°C would be greatly further reduced. [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12130	4	28	4	33	Returning to below 1.5°C by 2100 requires "negative" emissions - removing hundreds of billions of tonnes of CO2 from the atmosphere -which are not scientific reality and may never be. [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12131	4	28	4	33	If humanity has not had the will to reduce its emissions, it is unlikely they will achieve the more complicated and expensive "negative emissions"; [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature. Some estimates put the cost of negative emissions relatively low.
12132	4	28	4	33	To realize the Paris goals of 1.5°C / well below 2°C requires unprecedented reduction of natural resource extraction-consumption and extraordinary rapid reduction of human population growth [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12133	4	28	4	33	4°C global warming will be locked into the atmosphere by 2100 (>66%, all GHG, current policies) - and it won't stop there; together with relentless rise in massive natural resource extractions (see below) civilization will likely "collapse" . [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12134	4	28	4	33	"Adaptation" to >2°C global warming is not a meaningful option; humans are biology, a sustained rise of only 3°C in body temperature will kill every human; food, other biology and freshwater which humans rely upon for survival are likewise severely affected by small temperature increase; [Michael Wadleigh, United States of America]	Rejected: not supported by the cited literature.
12135	4	28	4	33	To stay below the agreed dangerous 2°C global warming (>66%, all GHG, no overshoot, no negative emissions, with intergenerational equity which the UN has called for) 300 GtCO2 must be cut from a projected cumulative 800 GtCO2 between now and 2035; [Michael Wadleigh, United States of America]	Noted: the report makes clear the ambition required to meet the LTTG of the Paris Agreement.
12136	4	28	4	33	The Paris Agreement is "irresponsible"- "cut whatever emissions you like, not what you have caused" [Michael Wadleigh, United States of America]	Rejected: out of scope for IPCC.
12181	4	28	4	33	Richard J. Millar et all, Nature Geoscience (2017) doi:10.1038/ngeo3031, this paper suggests that the IPCC AR5 emission limit required to not exceed 1.5°C global warming might be underestimated and that there could be about 19 more years of emissions until 1.5°C is locked, essentially equal to the (old) <2°C lock date of 2036 (>66% all GHG) [Michael Wadleigh, United States of America]	Noted.
12182	4	28	4	33	Not exceeding 1.5°C (excluding overshoot and unproven negative emissions, and with intergenerational equity which the UN has called for) requires that the Paris Agreement intended reduction of about 10 GtC must be increased a very difficult 6 times, to a cumulative reduction of about 60 GtC between now and 2030 (>66% all GHG) [Michael Wadleigh, United States of America]	Noted. Unclear what revision is required.
1943	4	28	4	33	State also estimate of temperature expected under current NDCs to demonstrate additional effort required? [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	The NDCs do not imply a specific temperature increase because they only extend to 2030.
12183	4	28	4	33	To do so requires informing global electorates now of the cost of inaction and the benefits of paying now to avoid potential collapse of civilization later (see previous checklist), to empower the public to cause their inactive governments to make laws - not voluntary actions - based on national responsibility for causing climate change, to practically, rapidly and equitably realize the required reduction of 60 GtC between now and 2030 [Michael Wadleigh, United States of America]	Noted. Unclear what revision is required.
9931	4	28	4	33	This report responds to the invitation made in Article 21 of the Paris Decisions. In this package of decisions (Article 17) it says that: "17. Notes with concern that the estimated aggregate greenhouse gas emission levels in 2025 and 2030 resulting from the intended nationally determined contributions do not fall within least-cost 2 ?C scenarios but rather lead to a projected level of 55 gigatonnes in 2030, and also notes that much greater emission reduction efforts will be required than those associated with the intended nationally determined contributions in order to hold the increase in the global average temperature to below 2 ?C above pre-industrial levels by reducing emissions to 40 gigatonnes or to 1.5 ?C above pre-industrial levels by reducing to a level to be identified in the special report referred to in paragraph 21 below". This article identifies the level of 55 GtCO2eq in 2030 in the INDCs scenario and points out a necessary reduction of 40 Gt to achieve the 2 ?C goal. Moreover, it says that the SR15 has to identify the reduction level to achieve the 1.5 ?C goal. This reduction could be a figure that enlightens the decision-makers; and although is given in chapter 2 (pag. 2, 39-45), I suggest to put this figure also in this paragraph. [Olga Alcaraz, Spain]	This information is beyond the scope of Chapter 1.
7928	4	28	4	33	Is it possible to make this statement even stronger by saying that we are on track for 3 degrees warming even if all current NDCs are met? (IEA ETP 2017) [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	The NDCs do not imply a specific temperature increase because they only extend to 2030.
7149	4	29	4	29	Global emissions of what? [Iulain Florin VLADU, Germany]	Sentence has been deleted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13525	4	29	4	30	Please add emission in the following sentence: "...that give all climate drivers a similar global temperature impact as CO2, must be reduced to net zero "emission" ..." [Aditya Kartadikaria, Indonesia]	Sentence has been deleted.
9463	4	29	4	30	The phrase "Total global emissions, if expressed in terms that give all climate drivers a similar global impact to CO2" is very terse, and may not be understood by high-level readers who do not read the rest of this chapter. It is explained later in the chapter, and I think that even at the expense of lengthening the Exec Summery it would be helpful to expand this wording here with some further explnatory material [David Wratt, New Zealand]	Sentence has been deleted.
14960	4	29	4	31	Unclear what "if expressed in terms that give all climate drivers a similar global temperature impact as CO2" means. [Farhan Akhtar, United States of America]	Concept of CO2-fe emissions has been removed (although useful)
20339	4	29	4	31	Pretty opaque as a self-standing sentence in an executive summary. It only makes sense after reading the chapter. [Olivier Boucher, France]	Sentence has been deleted.
12720	4	29	4	31	Simply stating that emissions of climate forcers should be reduced to net zero is meaningless unless a time frame is specified (what if we reduce them to net zero by 2300, are we OK then?). Perhaps it would be better to phrase this argument from the perspective of GHG budgets? [Vassilis Daioglou, Netherlands]	Sentence has been deleted.
19651	4	30			Include a deadline for reaching net zero emisisons - ie 2050 or mid century [Tara Shine, Ireland]	Now addressed in Chapter 2
1095	4	30	4	30	Also this sentence seems more appropriate for other chapters. This chapter mainly discussed the definition of “balance” and “net zero”, furthermore, the statement here seems to ignore that emissions may also have to go below zero and no indication of time is given. [Rob Swart, Netherlands]	Agreed: now addressed in chapter 2
15195	4	30	4	30	grammar: "a similar global temperature impact as CO2" should be "a similar global temperature impact to CO2" [Pauline Midgley, Germany]	Sentence has been deleted.
1762	4	31			“average temperatures. Current patterns of”: I propose to insert here (between these 2 sentences) a short additional sentence on the ‘warming commitment’ issue, i.e. a minimum explanation on the inertia of the global climate system that should be taken into account in order to avoid the “overshoot” effect, e.g. (from 1.2.5 on page 21): It should also be taken into consideration that after the total global emissions are eliminated there will be some further warming as the climate system response to past emissions. [Tibor Farago, Hungary]	Discussion of warming commitment is expanded in the SOD.
1763	4	31			Current patterns of global population growth, fossil fuel consumption, production activities of some economic sectors (agriculture, transport etc.) and .. [Tibor Farago, Hungary]	Noted. Sentence has been revised.
20340	4	31	4	31	Here and elsewhere, why plural for "global temperatures". Are there several? [Olivier Boucher, France]	We think this is consistent with common practice.
16054	4	31	4	31	temperatures should be "temperature"--there is only one stabilized global average value (so a range around a central value), at least it would be clearer if this is the case. It might be useful to say one would still have year-to-year fluctuations, just around a new multi-decadal average. More important, is the objective to stabilize at some value like 1.5 C or to peak at the value and come down afterward, which would be hoped for as GHG concentrations drop (more rapidly for non-CO2 species than CO2)? Given that the ice sheet loss will continue for many centuries thereafter, somehow making clear that just stabilizing temperature is not really enough needs to be made clear--what is implied in the UNFCCC objective is a situation that is stabilized, not just the global average temperature, and this will be quite challenging--but just has to be explained. [Michael MacCracken, United States of America]	Noted. Sentence has been revised.
5420	4	31	4	32	Risk assessments, e.g. of big investment companies that manage assets in the range of 500 bio US$, could inform the report about policies of key actors beyond the oil and gas industry that are not coherent with a 2 degrees C goal of the Paris Agreement. Such risk assessment looked also e.g. at the finance sector, transport, renewable capacity, carbon prices, carbon capture and storage. [Klaus Radunsky, Austria]	Noted. Unclear what revision is required.
7287	4	31	4	32	The text focuses on energy-related emissions only. The text should be deleted and a more general statement could be that 'Existing infrastructure, technologies, policies, institutions, and behavioural and social norms constraint the rate and magnitude of future GHG emission reductions". [Eleni Kaditi, Austria]	Noted. Sentence has been revised.
2066	4	32	4	32	“structural impediments" seems like severe language. Can this be 'toned down' a little e.g. “structural incompatibilities" i.e. a more 'neutral' tone? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Sentence has been revised.
20342	4	35	4	35	disproportionally? I'm not sure to what this refers. Basically are you saying that additional impacts of climate change on a range of systems are no longer proportional to T change between say 1°C warming (where we are now) and 1.5°C warming (the topic of this report)? [Olivier Boucher, France]	We make this clearer now
6010	4	35	4	35	Is there a missing link here? The sentence in bold states that the NDCs are not sufficient for 1.5C, and the sentences below highlight that we are not on track for ambitious global targets, but the latter could include the targets associated with the NDCs. Would it be worth adding an estimate of the global temperature change which would result from meeting the NDCs? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
9464	4	35	4	35	I don't understand what is meant here by "dispproportionally". Could this word just be removeed from this sentence? [David Wratt, New Zealand]	Revised
2907	4	35	4	37	Please rephrase to: ..... disasters, decreasing food security, ..., and missing access to fresh water. [Sabine Wurzler, Germany]	Noted.
16055	4	35	4	37	Sea level rise needs to be included here--or perhaps say coastal inundation, impacts of storm surges, etc. No way will 1.5 C stabilize the ice sheets--sea level rise will go on for centuries at this level of warming. [Michael MacCracken, United States of America]	We now explain this
2067	4	35	4	42	good points though it may be a good idea to provide a citations for the 'sendai framework..."? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Not in an executive summary
14961	4	35	4	42	This is an inappropriate paragraph for this chapter as it seems to be better suited for a SPM. These messages should come from the later chapters in the report where they can be appropriately placed in a full discussion of the underlying literature. [Farhan Akhtar, United States of America]	noted
1010	4	35	4	52	What is necessary is to compare the cases between 2 degree and 1.5 degree and show readers the difference of those two. We need to know how damages will be reduced by achieving 1.5 degree target in comparison to 2 degree target. [Mitsutsune Yamaguchi, Japan]	This is for Ch3
20341	4	36	4	36	Are disease outbreaks increasing? [Olivier Boucher, France]	This is for Ch3

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1164	4	36	4	36	ES: for consistency, it should read 'food insecurity' here. [Petra Tschakert, Australia]	Noted.
3725	4	36	4	36	Consider replacing “degradation” with “transformation” since, in some cases, the ecosystem zones shift position but are not degraded per se. Thus, “transformation” – or alternatively “change” – is more inclusive with regard to the impacts of global warming on ecosystems. [Fredrik Charpentier Ljungqvist, Sweden]	Noted
11431	4	36	4	37	Food security is not a problem. This should be "food insecurity". Likewise, "inadequate" access to fresh water is a problem, not fresh water itself. These errors are repeated on Page 7 and possibly elsewhere. [Stewart Lockie, Australia]	Noted
4256	4	37			The term "extreme events" is mentioned for the first time here, including as examples droughts and floods. I think that a specific definition about what is considered an "extreme event" should be included here. Are "extreme events" the same than "extreme weather events"?. Both terms are frequently mentioned across the text, with different examples of them (sometimes droughts and floods, sometimes floods, droughts and heat waves). Chapter 3, defines in Section 3.6.2.2 as extreme weather events: temperature, heavy precipitation, droughts and fire. I think that it should be taken into account in order to standardize criteria for dealing with this term across the document. [Pedro Salvador, Spain]	Will ensure consistency with Ch3
1096	4	37	4	37	this statement suggests that 1.5 degrees has serious impacts without noting that these are likely to be less than higher temperature changes. Someone not knowledgeable about the context would think that 1.5 degrees is something to be avoided! It is unclear what “disproportionally” means (to what?). [Rob Swart, Netherlands]	Sentence revised for clarity
13526	4	37	4	37	Increases in extreme events (e.g. droughts, floods, and typhoon) [Aditya Kartadikaria, Indonesia]	Noted
963	4	37	4	39	increases in extremes "that result" implies a direct cause-effect relationship that the literature does not support. There is some literature that suggests a cause-effect relationship under some conditions. [Victor Davd, United States of America]	We are referring to instances when there is a direct relationship
9156	4	37	4	39	introducing the Sendai framework is a good idea, but doing it in this phrase is unexpected and related to concepts (e.g conflicts, forced migrations) which are a little far fetched from the essence of this framework [Timothée OURBAK, France]	Noted
11432	4	38			Extreme events also encourage ostensibly voluntary migration as people move for the sake of more secure livlihoods. Note though that the strong statements here on migration are not consistent with the more equivocal statements in Chapter 3, Page 96. [Stewart Lockie, Australia]	noted
19652	4	38			conflict, forced migration, resource depletion - these are all signs of climate injustice. The people who experience these impacts are the least responsible for the causes of climate change. It is often helpful to signal the injustice when promoting a climate justice approach. [Tara Shine, Ireland]	noted
12948	4	39			Add after Sendai "and to Sustainable Development Goals". [Johanna Nalau, Australia]	Noted
1764	4	39			present a challenge to addressing the SDGs of the 2030 Agenda for „Transforming our World” and .. [Tibor Farago, Hungary]	noted
7711	4	39	4	39	Since the Sendai Framework is not the only global programme on climate change, it is important to add “and other global and regional climate change mitigation and adaptation agendas” [Hilary Inyang, Nigeria]	Revised
1765	4	40			economic growth has been accompanied by à sustainable economic development has been accompanied by ((explanation: already the first Development Decades of the UN proved that prioritizing economic growth could not solve the critical social – poverty, inequity etc. – problems of majority of developing countries, that is why a different approach is followed by the MDGs and SDGs, i.e. here at least better to refer to sustainable the economic development)) [Tibor Farago, Hungary]	We don't understand this comment
14351	4	41	4	41	Change "But" to "Nevertheless," [Ioannis Daliakopoulos, Greece]	Sentence rewritten.
17287	4	41	4	42	This sentence is very general and seems unconnected to the rest of the paragraph. In general this paragraph is very broad and seems to have no real direction. Is is about extremes, or vulnerability, or environmental services? [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rewritten.
2897	4	44	4	44	There are many ways to evaluate justice and equity and it is vital to carefully define the use of these terms in this report. "asymmetry in the contributions to the problem" is a broad and normative statement. [Alice Alpert, United States of America]	Noted - See response to note 14962. The use of the terms is in line with the UNFCC text and previous IPCC reports. Further, it should be noted that the 'asymmetry in contribution' is an empirical (and uncontroversial) statement, rather than normative on.
7150	4	44	4	44	Suggest - Justice and equity are central to understanding the ambition of the long-term temperature goal of the Paris Agreement. [Iulain Florin VLADU, Germany]	Noted - See response to note 311.
5421	4	44	4	46	This key message might be already true now - for a warming of 1 degree. The poor are more vulnerable - whatever the change of temperature will be. [Klaus Radunsky, Austria]	Noted. The amendment has been made
9828	4	44	4	46	Justice and equity are central to understanding the ambition of the Paris Agreement, recognising that the impacts of climate change for warming levels beyond 1.5°C could fall disproportionately on the poor and vulnerable.: The "justice" is very complex terminology and is not scientific one, and should be avoided. [Keigo Akimoto, Japan]	Rejected - See response to 311.
14962	4	44	4	46	The terms "justice and equity," while often raised by some, do not have common agreed upon definitions or application in the context of climate change. Moreover, the term "justice" does not appear in the adopted outline for the report or in the UNFCCC COP's invitation to the IPCC, so it is unclear that this is an appropriate framing for the report. Rather, the The IPCC should be careful in not ascribing weight to a single sided view of these terms, as this may compromise the principles of the IPCC in presenting a balanced and objective assessment of scientific information and lead to unacceptable policy perscriptive outcomes. The first clause in line 44 ("Justice and equity are central to understanding the ambition of the Paris Agreement") also appears to characterize motivations behind the Agreement - not clear the basis for these statements which may not be universally shared and which are not within the expertise of the IPCC. [Farhan Akhtar, United States of America]	Equity' is a longstanding term within the UNFCCC text and process and is examined in previous IPCC reports notably AR5 (WGIII, Ch 3), where it explicitly linked to the 'impacts' of a warming climate (see para. 21 of the Paris Decision, providing mandate for SR1.5). Also, IPCC AR5 explicitly treats ethical questions (WGIII, chs 3 and 4; WGII, ch 12). In SOD the term 'equity' and related ethical matters must be firmly grounded in concrete references to UNFCCC, Paris and IPCC reports.
10950	4	44	4	46	The centrality of justice and equity are not findings of the report. The finding is that impacts fall disproportinately on the poor. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - the appropriate amendment has been made to reflect this perspective.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21045	4	44	4	52	Another IMPORTANT point (possibly a 4th KEY point) is Asimmetry in knowledge transfer: the populations more at risk are also those who live nearer to zero emissions (example, Indios living in the Andes, Inuit in the Arctic). The knowledge transfer of their skills, essential in this context, should go from them to those who consume more, yet it does not happen, as the cultural life style model is the consumptive one. The possibility of their (cultural) disappearance means the risk of total loss of this knowledge. See this article: Levene M and Conversi D. (2014) Subsistence societies, globalisation, climate change and genocide: discourses of vulnerability and resilience. The International Journal of Human Rights 18(3): 281-297. [alessandra conversi, Italy]	TBD (see point 348 below)
12137	4	44	4	52	Very High Developed (VHD) nations - the best educated, healthiest and wealthiest - are 18% of global population but are responsible for an extraordinary 68% of CO2 emissions which have now basically locked 1.5°C [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12138	4	44	4	52	Low Developed nations - the poorest, least healthy and educated - are 13% of population and have caused only 1% of emissions locking 1.5°C [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12139	4	44	4	52	Globally, the richest 10% ($8,300+ per year income) cause about 50% of consumption emissions; [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12140	4	44	4	52	By global income the poorest 90% cause only 50% of consumption emissions [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12141	4	44	4	52	VHD advances may have contributed to extend and improve the lives of less developed nations, this does not give VHD the right to cause mortality and potentially civilization collapse by their high emissions - which dangers have been known since the 1970s, after which most emissions have been made [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12172	4	44	4	52	About 10% of humans live in “extreme poverty”, if rampant rise in extractions and emissions is not stopped and reversed now, all humanity could be reduced to poverty in the extreme, with closed mass natural resources degraded, depleted, destroyed [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12173	4	44	4	52	The most (perhaps only) likely, practical, rapid, equitable way that billions of tonnes of extractions be reduced in time is by laws for consumption extraction reduction by responsibility; [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12176	4	44	4	52	Important note on Asymmetry: Of scientist’s nationalities credited on this IPCC Report, 7 scientists are from Low Developed -, 16 from Medium Developed -, 17 from High Developed -, and an overwhelming 97 are from Very High Developed Nations (classification from 2016 UNDP Human Development Index) [Michael Wadleigh, United States of America]	Noted
12177	4	44	4	52	Very High Developed - the wealthiest, healthiest and best educated - are just 18% of population but have caused an overwhelming 68% of cumulative emissions. Low Developed - the poorest, least healthy and educated - are 13% of the population but have caused a miniscule 1% of cumulative emissions (data: Development Classification UNDP HDR 2016, Population, UN Population Division World Population Prospects 2017 revision, Cumulative emissions World Resource Institute CAIT Climate Data Explorer 2015, Global carbon Project 2016) [Michael Wadleigh, United States of America]	Rejected - it does not alter the meaning. Also deciding and implementing are different.
12178	4	44	4	52	“Asymmetry in the contributions to the problem… and asymmetry in the power to decide solutions”: the rich / Very High Developed (18% causing 68%) are never mentioned in the Summaries or the 600 page Report, all emphasis is on the poor / developing (13% causing 1%). [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
3987	4	44	4	52	The fourth key point of connection between climate change and justice are associated with the conditions under which a 1.5°C world can achieved: asymmetry in an access to knowledge to generate, document and share mitigation and adaptation policies that were adapted time-to-time at local-national regional interlinkages. [Dilipsing Bayas, India]	TBD (see points 7 and 348 below).
12179	4	44	4	52	The asymmetry in responsibility and power is reversely reflected in the Report which mentions “equity” synonyms and antonyms more than 500 times, “development” nearly 1,000 times, “less developed”, "poor" and synonyms nearly 600 times, however “developed”, “rich”, "OECD", "Industrialized" "Kyoto Annex I" and synonyms are nearly absent, mentioned only 14 times. [Michael Wadleigh, United States of America]	These concepts are included in the framing chapter in chapter 1, as well as in explicitly considered in Sections 1.4.2 and chapter 5.
12180	4	44	4	52	This is important because there cannot be omissions or misrepresentations of the rich / Very High Developed asymmetric “contributions to the problem” or it is unlikely that there will be “solutions” to climate change / sustainable development. [Michael Wadleigh, United States of America]	Noted
10400	4	44	4	52	had to read this a couple of times especially “Three key points of connection between climate change and justice are associated with the conditions under which a 1.5ºC world can be achieved:” [Jonathan Lynn, Switzerland]	Accepted - the amendment has been made.
16046	4	44	4	52	Justice and Equity for achieving the 1.5 degree celsius limit cannot be overemphasized. Justice needs to address intragenerational and intergenerational equity concerns because for a given global emissions trajectory, the distribution of emissions across nations is independent of emissions profile of each nation, also the impacts are being felt over long periods of time due to the lasting impact of green house gases.There is currently a justice issue when it comes to the distribution of climate entitlements. The current balance of power is being distributed in favor of developed countries, which happen to be the primary players when it comes to emitting green house gases. This situation has kept developing and underdeveloped countries in an unfavourable bargainging position. The major concern for developing and under developed is to ensure that climate change mitigation burden is as evenly distributed across all nations as possible. [Denise Okpala, Nigeria]	Accepted - This text has been revised.
19653	4	44	4	52	The asymmetry in contributions and impacts also relates to climate responses. Climate responses need to be designed to be inclusive and fair to avoid contributing to further inequalities (e.g. access to renewable energy). There are also inequities in the scale of the challenges posed by 1.5 pathways. The challenge facing devellopping countries is the greatest challenge as they have to develop and lift their people out of poverty without fossil fuels (all industralised nations achieved development based on fossil fuel exploitation). So the challenge facing developing countries is unprecedented. [Tara Shine, Ireland]	Noted - the amendment has been made.
13575	4	45	4	45	impacts beyind 1.5 could fall' - impacts are already affecting groups differently i.e 'will' not 'could' [Elvira Poloczanska, Germany]	could is removed from new executive summary, as suggested.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16056	4	45	4	45	could seems very weak. How about "are projected to" or rephrase and say that impact studies make clear that the poor and vulnerable (rather obvious--so maybe say those in developing nations) will be most impacted. Line 48 is also far too weakly stated--"may fall" is a meaningless phrase as "may" can mean from 1 to 99%. The sentence needs to use the IPCC lexicon and say at least "likely" and probably more correctly "very likely"--or "virtually certain" with respect to future generations. [Michael MacCracken, United States of America]	could is removed from new executive summary, as suggested.
14920	4	45	4	46	This is true in general and not just for warming 'beyond 1.5C'. Rephrase: 'warming levels to and beyond 1.5C'? [Ambarish Karmalkar, United States of America]	Since the report deals with 1.5C it seems useful to draw a line here.
20343	4	45	4	46	could? Beyond 1.5°C? Isn't this the case of most impacts? [Olivier Boucher, France]	Since the report deals with 1.5C it seems useful to draw a line here.
1643	4	46	4	46	I would change "vulnerable" to "most vulnerable." Everyone has some degree of vulnerability. I believe that intent is to speak to those who are most vulnerable or exceptionally vulnerable and do not have the means to easily mitigation their risk. [Jesse Keenan, United States of America]	Noted, and considered, but all vulnerabilities are important to include.
6395	4	46	4	50	Can you simplify/clarify sentence. These asymmetries would prevent achieving 1.5 C, or these assymetries must be considered to align climate change and justice? -- very important sentence [Sybil Seitzinger, Canada]	Asymmetries clarified in new executive summary
11081	4	46	4	50	The different responsibility between developed and developing countries for human-made climate change is stil a very relevant topic, however this rhetoric locks the conversation in an unhelpful situation where countries continue to blame one another, without taking meaninglf action until developed countries will act against climate change. It is pivotal that an authoritative report such as the IPCC report on climate change sends a message of unity against the threat posed by climate change and the immediacy of action required. I would hence add a line to this paragraph stressing this concept of unity rather than different responsibilities. [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Rewrite emphasizes unified approach (previously paragraph) in addition to differential response. Note that other reviewers want more emphasis on differential responsibility.
2908	4	47			Please rephrase to: ... under which a 1.5°C world might be ..... [Sabine Wurzler, Germany]	Accepted - rephrased
17735	4	47	4	47	There seems to be a "be" missing between "can" and "achieved". [Göran Finnveden, Sweden]	Accepted
6473	4	47	4	47	world can achieved' > 'world can be achieved [Roger Bodman, Australia]	copyedited
5241	4	47	4	47	insert "be" before "achieved" [Bart Van den Hurk, Netherlands]	Accepted - rephrased
16057	4	47	4	47	Change to "can be achieved" [Michael MacCracken, United States of America]	Accepted - rephrased
1766	4	47	4	49	asymmetry in the contributions to the problem .. .. à differentiated contributions to the problem; differences in impacts and vulnerability, such that worse impacts may fall on those that are less responsible for the problem, including future generations; and differences in respective capacities to decide solutions .. ((explanation: asymmetrytwo halves, sides, or parts that are not exactly the same of two things/sides, but in this complex case it is much more correct to use the CBDR-wording from the UNFCCC)) [Tibor Farago, Hungary]	Rejected - the term 'asymmetry' is widely used to explain unequal contributions. It's not obvious that an improvement would be achieved by the suggested changes.
7288	4	47	4	51	Reference to the principle of common-but-differentiated-responsibilities (CBDR) and historical responsibilities (HR) of the Convention should be made. [Eleni Kaditi, Austria]	Rejected - reference to CBRD was made in section 1.1. There is no need to cite here since the context for it does not exist.
14194	4	48	4	48	“such that the worst impacts may fall on those that are least responsible”. This language is too weak, the impacts will almost certainly fall on those least responsible: the poor. Could the evidence/certainty language used elsewhere be used here? [Jason Donev, Canada]	Accepted - rephrased
13653	4	48	4	49	already hapeening [Elvira Poloczanska, Germany]	Accepted - rephrased
16058	4	49	4	49	How about changing "decide" to "implement"--deciding is easy, implementing is the real challenge. [Michael MacCracken, United States of America]	Accepted: sentence rephrased.
15014	4	50	4	52	Consideration of human rights is not included in the adopted outline for the report. Moreover, human rights is fundamentally a topic related to legal obligations and not of science, and the relevance and application of human rights in the context of climate change is not universally agreed and not within the IPCC's mandate or the subject of scientific inquiry. Thus, discussion of human rights - and in particular statements that appear to assert as fact the relevance or application of human rights - are not appropriate for this report. [Farhan Akhtar, United States of America]	Rejected - Human rights have recently emerged as a language relevant to the principle of equity, repeated in the UNFCCC, the Paris Agreement, and in successive IPCC reports. Human rights are specifically mentioned in both the Paris Agreement and IPCC AR5.
16059	4	50	4	52	I'm not clear why you leave off global implications--consider health, refugee, sea level rise, ocean acidification, and many other impacts and risks. [Michael MacCracken, United States of America]	Noted - regional adjusted to regional and global linkages
13654	4	52	4	52	To be defined by common language [Elvira Poloczanska, Germany]	Rejected - not clear what the request is
10401	4	54	4	54	“The connection … is complex and multifaceted” (not are) (or the connections are) [Jonathan Lynn, Switzerland]	Sentence fixed.
10951	4	54	4	55	This headline statement is practically content free - it just says its difficult without imparting any substantial information [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rewritten.
1042	4	54	5	6	The World Resources Institute has quantitative information on overlap between NDCs and SDGs. This information could be included to provide more detailed information on gaps and opportunities in alignment. Please see: https://www.wri.org/sites/default/files/WRI_INDCs_v5.pdf [Martini Catherine, United States of America]	Chapter 1 frames the questions, but does not assess the literature, such as proposed by reviewer. We introduce the idea of synergies and tradeoffs in 1.4.7.
12106	4	54	5	6	It is stated that SDGs includes Climate Action and, at Chapter 5, trade-off between mitigation and adaptation and sustainable development. SDG is not equal to sustainable development but confusion may be occurred. One idea avoid confusion is to change sustainable development at some section to economic development. [Takashi Hongo, Japan]	In chapter 1 we clarify the differences between sustainable development and SDGs in 1.1 and 1.4.7.
12146	4	54	5	6	Earth is a closed mass system, there are no meaningful material imports, or exports – including of destructive GHG emissions – or emigrations that are scientifically probable in any century soon, perhaps ever [Michael Wadleigh, United States of America]	Noted.
12147	4	54	5	6	Moreover, by the laws of nature including entropy and the actions of humans closed mass finite natural resources - from which humans and all their products are made - are evermore rapidly degraded, depleted, destroyed, importantly by climate change [Michael Wadleigh, United States of America]	Noted.
12148	4	54	5	6	See Sheet Closed Mass for table and figures [Michael Wadleigh, United States of America]	Noted.
12150	4	54	5	6	All 17 UN Sustainable Development Goals including climate change depend upon 1 goal, sustainable extraction, production and consumption of natural resources (see Sheet SD Goals for figure) [Michael Wadleigh, United States of America]	Noted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12151	4	54	5	6	Climate change - caused by greenhouse gases production from extracted natural resources - is the most destructive unsustainable development [Michael Wadleigh, United States of America]	Noted.
12152	4	54	5	6	The related climate objective is “stabilization of atmospheric greenhouse gas concentrations to prevent dangerous anthropogenic interference with the climate system”; [Michael Wadleigh, United States of America]	Noted.
12153	4	54	5	6	The “gaps” of “climate interference” and “needs compromised” are interrelated and widening at an accelerating rate [Michael Wadleigh, United States of America]	Noted.
12154	4	54	5	6	Natural resources are humanity’s existential “need” which cannot be compromised [Michael Wadleigh, United States of America]	Noted.
12155	4	54	5	6	3,200 billion tonnes (Gt) of natural resources (used) have been extracted from the beginning of the Industrial Age 1780 to now (data from Social Ecology: Society-Nature Relations across Time and Space, edited by Helmut Haberl et all, WorldMaterialFlows.net data download, UNEP live data download 2015) [Michael Wadleigh, United States of America]	Noted.
12156	4	54	5	6	“Climate change is humanity’s greatest material achievement”: by mass the 2,100 GtCO2 of cumulative emissions are equal to an extraordinary 2/3rds of 3,200 Gt cumulative material extractions; [Michael Wadleigh, United States of America]	Noted.
12157	4	54	5	6	Extractions from which emissions are produced – fossil fuels, cement materials, land-use and forestry, etc – are more than 50% of resource extractions [Michael Wadleigh, United States of America]	Noted.
12158	4	54	5	6	After 3,200 Gt of global cumulative extractions there is no global agreement to meaningfully reduce extraction, depletion, destruction, including climate changing materials [Michael Wadleigh, United States of America]	Noted.
12159	4	54	5	6	The unwritten global agreement is to “extract as much as possible as rapidly as possible” which will inevitably, imminently lead to civilization collapse. (The price of natural resources is not determined by their value but by the cost of their extraction.) [Michael Wadleigh, United States of America]	Noted.
12160	4	54	5	6	“Resource efficiency” – fewer resources input for the same product value output – is the principal global policy, it has not succeeded, before 1990 resource efficiency was slightly increasing, from 1990 to 2000 there was no meaningful resource efficiency, but since 2000 there has been resource in-efficiency increase of 0.8% per year (International Resource Panel, IRP Global material flows and resource productivity, summary for policymakers 2016, IRP Resource efficiency: potential and economic implications, summary for policymakers 2016) [Michael Wadleigh, United States of America]	Noted.
12161	4	54	5	6	Resource efficiency, often defined as “more and better from less” in fact gets “less and worse from more”; [Michael Wadleigh, United States of America]	Noted.
12162	4	54	5	6	Global recycling tonnes are an extremely small 0.6% of extraction tonnes and show no sign of meaningful increase ((International Resource Panel, IRP Global material flows and resource productivity, summary for policymakers 2016, IRP Resource efficiency: potential and economic implications, summary for policymakers 2016) [Michael Wadleigh, United States of America]	Noted.
12163	4	54	5	6	Resource efficiency, recycling-reusing-reducing are producing an increase, not decrease in current extractions, a growth of 2.5%+ per year, 89 Gt in 2017 [Michael Wadleigh, United States of America]	Noted.
12164	4	54	5	6	Today the equivalent of 1.7 Earths’ natural resources are required for humanity to sustain [Michael Wadleigh, United States of America]	Noted.
12165	4	54	5	6	By 2035 annual extractions are projected to be 141 Gt, cumulative extractions 5,350 Gt, 2 Earths will be). required to sustain, 1 of which is not available (International Resource Panel, IRP Global material flows and resource productivity, summary for policymakers 2016, IRP Resource efficiency: potential and economic implications, summary for policymakers 2016 [Michael Wadleigh, United States of America]	Noted.
12166	4	54	5	6	By 2100 the annual extraction projection is an extraordinary 329 Gt, cumulative extractions 21,230 Gt, 4 Earths will be required, 3 not available – and it won’t stop there [Michael Wadleigh, United States of America]	Noted.
12167	4	54	5	6	By 2100 average lifetime natural resource extractions will be an extraordinary 2.4 million kilograms per person, globally this is the equivalent of stripping the top 20 centimeters, 1/5th of a meter, off all ice-free land [Michael Wadleigh, United States of America]	Noted.
12170	4	54	5	6	Combined with 4°C global warming extreme extraction will cause food, freshwater and other essential resource shortages resulting in famines, pandemics, wars; a billion plus refugees, hundreds of millions of deaths, quintillions of dollars of damage [Michael Wadleigh, United States of America]	Noted.
12171	4	54	5	6	Great portions of nature will be irreversibly degraded, depleted, destroyed; inevitably, imminently civilization will collapse, complete, sudden failure [Michael Wadleigh, United States of America]	Noted.
3988	4	54	5	6	We need to vehemence the need for an integrated approach to develop baseline for targets that are be tracked across the SDGs with 1.5°C warming. [Dilipsing Bayas, India]	Chapter 1 frames the questions, but does not raise specific solutions , such as proposed by reviewer. We discuss the ideas of synergies and tradeoffs.
7712	4	55	4	55	For consistency, replace the word “over time” with the word “temporally” [Hilary Inyang, Nigeria]	Sentence rephrased to avoid.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12097	5				Barriers include limited and distorted public perceptions about climate change, short term political payoff structures (that reward short term political actions to get re-elected in democracies over solving long term problems like climate change), barriers to collective action of various sorts (including opposition from the corporate sector in democracies, and opposition from governments in non-democratic societies to civil society engaging in collective action), lobbying by corporate actors with vested interests in the status quo (which is arguably the central problem in western developed countries, and “is the elephant in the room” in this report, that is not talked about much). These particular barriers are underplayed in this chapter, and in chapter 5. In terms of lobbying by corporate actors with vested interest, some of the work by Dunlap and McCright should be cited. McCright, A. M., & Dunlap, R. E. (2011). The politicization of climate change and polarization in the American public's views of global warming, 2001-2010. The Sociological Quarterly, 52(2), Dunlap, Riley E., and Aaron M. McCright. 2015. “Challenging Climate Change: The Denial Countermovement.” Pp. 300-332 in Climate Change and Society: Sociological Perspectives, edited by Riley E. Dunlap and Robert J. Brulle. New York: Oxford University Press. Dunlap, Riley, E., and Aaron M . McCright. 2011. “Organized Climate Change Denial.” Pp. 144-160 in Oxford Handbook of Climate Change and Society, edited by John Dryzek, Richard Norgaard, and David Schlosberg. Cambridge: Oxford University Press. Dunlap, Riley E., and Aaron M. M cCright. 2010. “Climate Change Denial: Sources, Actors, and Strategies.” Pp. 240-259 in Routledge Handbook of Climate Change and Society, edited by Constance Lever-Tracy. New York: Routledge Press. Dunlap, Riley E. 2013. “Climate Change Skepticism and Denial: An Introduction.” American Behavioral Scientist 57: 691-698. Dunlap, Riley E. and Peter J. Jacques. 2013. “Climate Change Denial Books and Conservative Think Tanks: Exploring the Connection.” American Behavioral Scientist 57: 699 -731. [Tindall David, Canada]	Thank you for the references although the text was extensively revised
964	5		5		for my taste, most of these main findings are written in code that will be hard for non-experts to understand. [Victor Davd, United States of America]	Not a clear comment
17375	5	1			current sustainable development' and 'future sustainable development' are refered to, whereas there is no dichotomy here, with Brundtland's definition being used - to clarify, better to use an 'severe threat to sustainable development in the future' [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	agreed, the text was edited to reflect this issue
19654	5	1	5	6	Important links to SDGs - give special attention to target 13 b on marginalised groups, women etc. [Tara Shine, Ireland]	Due to the space constraints in the executive summary we cannot call out each group, but we note the reviewer's concern.
701	5	1	6	55	This is a very important part since, as the first development of the report, it appears to shape its global philosophy. It is not clear if Global Warming is simply an argument for obtaining a deep change of society or if a deep change in society is necessary for respecting the 1,5 °C. In this last case it is clear that the objective will not be reached since all conservative governments (a majority in the world) will disagree with such a deep change towards equalitarism. In fact this reflects the philosophy of the green parties which represent a marginal part of the electorate when free elections are possible and nothing elsewhere. The limitation of the rate of warming of the atmosphere is an absolute necessity and should not be a stake for idelogical conflicts [Herve Nifenecker, France]	thank you for the statement, this was considered when developing edits in section 1.1.
6019	5	1	9	21	In general, from reading the first few pages of the report, it seems that there is an assumption that mitigating to 1.5C will be more equitable. This is reinforced by a few strong statements e.g. p. 6 line 50-51. I think it is good that discussion of equity is so embedded in the report, but perhaps this needs to be accompanied by acknowledgement that (at least prior to this report) there are genuine questions about whether 1.5C will be more equitable. The report is designed to tackle these difficult questions: is there that much difference between 1.5C and 2C in terms of impacts? Assuming a 2C warming has greater risks than 1.5C, how does that compare to the risks associated with mitigation technologies which might be required to limit to 1.5C? And, what about equitable access to energy? Assuming mitigating to 1.5C over 2C is desirable at the outset dismisses these important questions, and also potentially brings into question the scientific status of the report. Some policy-makers / negotiators have already avoided discussion of 1.5C for a long time, and may associate arguments for 1.5C as campaigning. I think it's important that the report is not seen as advocacy but scientific assessment - so it doesn't make any assumptions, and avoids normative statements where possible, instead starting from scientific questions. This could be addressed by noting that there are genuine questions about whether 1.5C or 2C would be more equitable (at least, prior to the assessment in this report). [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text has been revised.
16060	5	2	5	2	AS A GENERAL COMMENT, the chapter should be scrubbed of the words "could" and "may" as not acceptable given the IPCC lexicon--indeed, the whole point of the likelihood lexicon is to give some indication of what is really meant instead of vague words like could and may. [Michael MacCracken, United States of America]	Noted
12932	5	2	5	3	Along with synergies tradeoff also needs mention and strategic action for elimination or reduction of tradeoff to strengthen synergies. Chapter 5 conclusion mentions both as well as this chapter in section 1.4 also mentions that. [Joyashree Roy, India]	We agree and frame in more detail in section 1.4.7.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4247	5	2	5	3	One of the main aims of the report is assess the feasibility of meeting the 1.5ºC world while promoting Sustainable Development Goals. Although there are synergies between achieving the UN Sustainable Development Goals (SDGs) and climate responses, as mentioned in Chapter 1, page 1-5, lines 2-3, there are also incompatibilities between them. One example is air conditioning, affordable by only part of the population. Since both goals are different, a better differenciation between them should be included in the report, as sometimes, only one of them might be attainable, for instance, if SRM proves to be a suitable solution, an assesment about accepting it and reaching the SDGs by other means, must be an open option [Francisco Molero, Spain]	We frame these questions in Chapter 1, especially 1.4.7 and the box on SDGS.
9955	5	2	5	3	Refrase recognising that "climate action" is indeed an SDG, i.a. "However, synergies exist between achieving "climate action" and other SDGs [Carmenza Robledo Abad, Switzerland]	Good point, but it is difficult to rephrase without adding text, and we are already over, so we will leave.
9157	5	2	5	6	It should be mentionned that climate is already embedded in one of the SDG (SDG13) and that overall, it has transversal impacts on most, if not all, SDGs. This is done in the next sentence and those two could be streamlined into one to clealry demonstrate and enlight the interactions and holistic dimensions of SDGs. Moreover, at he end of the second sentence, some concepts are not SDG per se, it should be corrected. [Timothée OURBAK, France]	Sentence rephrased.
18773	5	3	5	3	the SDG on energy is SDG7, not SDG17 [Sven Harmeling, Germany]	Sentence rephrased.
17288	5	3	5	3	If this is the first time the SDGs are mentioned in the document they would need introduction. Same for the Sendai framework mentioned previously. These are critical frameworks that come back throughout this chapter. Is this report trying to bring the Paris Agreement, SDGs and Sendai framework together? the extent to which it is needs to be very clear. Personally I would favour a focus on the Paris Agreement with links to the other two frameworks. This needs to be said up front. [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	Cannot add text here, so do not describe SDGs in executive summary
18774	5	3	5	6	Generally I welcome very much the attention to the SDG and climate change link. Although it might be too much to add all SDGs here, some important ones are missing, in particular "sustainable food systems" (SDG2), health (SDG3), water (SDG6), Decent work and economic growth (SDG8), "Sustainable infrastructure" (SDG9), Life below water (SDG14), Life on land (SDG15) ; it would be appropriate to add them given the central roles in mitigation and adaptation [Sven Harmeling, Germany]	Cannot add text here, so do not describe SDGs in executive summary
9926	5	3	5	6	A reference to 'Good health and well-being' (SDG3) should be added. [Olga Alcaraz, Spain]	Cannot add text here, so do not describe SDGs in executive summary
9956	5	3	5	6	Complete the list of SDGs as climate action is clearly related to other SDGs as no hunger (SDG2), Health (SDG3), Industry, innovation and infrastructure (SDG9), life on land (SDG15) and partnerships (SDG 17). This linkages between SDGs is at the same time opportunity and challenge, bacause one given climate action can have co-benefits to some SDGs as well as trade-offs to others. I hope the report includes more on how to assess trade-offs [Carmenza Robledo Abad, Switzerland]	Cannot add text here, so do not describe SDGs in executive summary
21282	5	4			sustainable energy goal is SDG7 - not SDG17. also check wording for SDGs referenced against final phrasing in agenda 2030 - [Jan Corfee-Morlot, France]	Cannot add text here, so do not describe SDGs in executive summary
12445	5	4			...Affordable and clean energy' (SDGl7)… SDG7 is Correct. [Mohammad Rahimi, Iran]	Cannot add text here, so do not describe SDGs in executive summary
11889	5	4	5	4	Extra 'l' is incorrectly included in 'SDGl7'. [Junichi Tsutsui, Japan]	Cannot add text here, so do not describe SDGs in executive summary
7289	5	4	5	4	Correct text so that instead of "SDG17" on clean energy, it should be "SDG7". [Eleni Kaditi, Austria]	Cannot add text here, so do not describe SDGs in executive summary
1767	5	4	5	6	but also many other closely related goals. ((explanation: and delete further part of that sentence because goals on hunger, freshwater, ecosystems etc. are also closely related to the climate change and actions)) [Tibor Farago, Hungary]	Cannot add text here, so do not describe SDGs in executive summary
15708	5	5	40	9	SDG 12 is "Ensure sustainable consumption and production patterns", not "Responsible consumption and production" as written in this Executive Summary This should be corrected throughout the Report, in line with the official formulation as negotiated and agreed by UN member-states. See: https://sustainabledevelopment.un.org/sdg12 [Elenita Daño, Philippines]	Cannot add text here, so do not describe SDGs in executive summary
15460	5	5	40	9	SDG 12 is "Ensure sustainable consumption and production patterns", not "Responsible consumption and production" as written in this Executive Summary This should be corrected throughout the Report, in line with the official formulation as negotiated and agreed by UN member-states. See: https://sustainabledevelopment.un.org/sdg12 [Elenita Daño, Philippines]	Cannot add text here, so do not describe SDGs in executive summary
13081	5	6	5	6	insert the word 'and' instead of the forward slash, i.e. change "equality/equity" to "equality and equity" [they are related but different concepts]. [Veryan Hann, Australia]	Sentence rephrased.
21283	5	8		19	1st sentence: why not just say something like transformative change to achieve SD? This "framework" seems to be just a long list of things already hammered out in the Agenda 2030 framework so suggest we use this as a starting point. Following this the governance points that follow are not wrong but seem to come out of no where and are not well connected to start of this para. [Jan Corfee-Morlot, France]	the text was heavily edited
12300	5	8	5	12	The first sentence of this para (in bold) is very long and heavy; I suggest splitting and simplifying. [Jan Fuglestvedt, Norway]	it reflects the full title of the report, the text was heavily edited
5686	5	8	5	12	The sentence is too long and too complicated. It should be more concise. [Hong Yang, Switzerland]	the text was heavily edited
9832	5	8	5	12	It was difficult for me to understand this sentence in total. Clearer discriptions will be needed. [Keigo Akimoto, Japan]	agreed, the text was edited to reflect this issue
14195	5	8	5	12	“Limiting global warming to 1.5°C is associated with an opportunity for innovative global, national and subnational governance, enhancing adaptation and mitigation within the framework of sustainable development, poverty eradication, rights, justice and equity, and synergistically linking with global scale trends including increased urbanization and decoupling of economic growth from greenhouse gas forcing." The tone of this sentence is inconsistent with the severity of the difficulties being discussed in this report. Chapter 5 talks extensively about ‘balancing’ rather than ‘opportunity’. Framing this idea in terms of a balance would be far more in line with what this report says. The current phrasing may be more politically palatable, but is disingenuous. [Jason Donev, Canada]	the text was heavily edited
10945	5	8	5	12	Economic decoupling from greenhouse gas emissions has not been proven. Many countries who have exhibited relative or total decoupling when using production-based emissions have not done so when measured by their consumption-based emissions, indicating that decoupling is not being achieved, rather wealthy nations are disclocating their emissions-intensive industries along with the emissions generated by them to other nations, and then importing more goods and services. Since decoupling is not an established phenomenon, it should not be implied to be a "global scale trend" and I feel strongly that this wording be removed. [Daniel Horen Greenford, Canada]	thank you for the statement, this was considered when developing edits in section 1.1.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10946	5	8	5	12	Additionally, the wording "greenhouse gas forcing" being used in place of "greenhouse gas emissions" is highly troubling. In my previous comment I inidcate the skeptism that decoupling is occuring when decoupling is defined as the rate of emissions growing more slowly (relative decoupling) or not growing (total decoupling) relative to economic growth. Using "forcing" instead of "emissions" opens to door to redefining decoupling to mean deacoupling economic growth from temperature change, which could mean using goe-engineering like Solar Radiation Management (SRM) to make such a scenario work. I insist that the wording be changed from "greenhouse gas forcing" to greenhouse gas emissions" since this is a debauched and manipulative definition, or if this was not the intnetion, it opens the door to such exploitation and more problematic legitimization of including SRM as part of the Plan A options for achieving climate goals. Relying on untestes technologies when direct mitigation of emissions is safer and more effective is folly. I feel that this precautionary approach should applied throughout the document to ensure that possibly dangerous routes to 1.5 are explicitly discussed as what they should be — last ditch efforts to be used only in the event that all others fail. [Daniel Horen Greenford, Canada]	thank you for the statement, this was considered when developing edits in section 1.1.
3113	5	8	5	19	Since there is no non-overshoot scenario which limits global warming to 1.5 degrees C developed in a meaningful way for policy makers to follow if they wanted to, this paragraph does not describe anything in the report, and especially nothing of consequence in chapter 1. [Richard Rosen, Germany]	good point. thank you for the statement, this was considered when developing edits .
1097	5	8	5	19	this statement (and the associated text in the chapter) emphasises the governance aspects of the transitions required to achieve a 1.5 degrees goal. Simultaneous technological, economic and behavioural changes are not included in the summary and get little attention in the chapter (e.g., section 1.4.3 about transitions is very meagre). It suggests a framing of the problem with top-down “governance” (with a large role for government) having to solve the problem, while “bottom-up” changes (citizens, companies, etc.) are at least equally important but get scant attention in the chapter. [Rob Swart, Netherlands]	agreed, the text was edited to reflect this issue
12142	5	8	5	19	Reliance on individual voluntary emission reduction has had no meaningful result, national laws for emission reduction are required [Michael Wadleigh, United States of America]	not fully understanding the comment
12143	5	8	5	19	The most likely, practical, rapid, equitable way that emissions may be cut in time is through laws for national emission reduction by responsibility now [Michael Wadleigh, United States of America]	agreed, too policy prescriptive
12144	5	8	5	19	For this, global electorates must be informed so they can cause inactive governments to enact laws now [Michael Wadleigh, United States of America]	too policy prescriptive
12174	5	8	5	19	Very High Developed nations are 18% of population but have caused 51% of the extractions – this does not include imports and exports which would increase the amount [Michael Wadleigh, United States of America]	thank you for the statement
12175	5	8	5	19	National consumption extraction laws are required, reliance on individual voluntary action has had no meaningful result [Michael Wadleigh, United States of America]	the text was heavily edited
2454	5	8	5	19	Be more clear about the importance of integrating top-down and bottom-up strategies--to which you allude in chapter 5 [Lisa Lucero, United States of America]	thank you for the statement, this was considered when developing edits in section 1.1.
3990	5	8	5	19	The framework of sustainable development needs to ensure an access to thematic and programmatic knowledge and mechanism to imbue by creating knowledge sharing society. [Dilipsing Bayas, India]	thank you for the statement, this was considered when developing edits in section 1.1.
13577	5	8	5	8	misleading phrasing - it presents an opportunity, it is not inherently an opportunity [Elvira Poloczanska, Germany]	the text was heavily edited
7569	5	8	5	8	Should "is associated with an opportunity for" not be "requires"? [Andries Hof, Netherlands]	the text was heavily edited
9158	5	8	5	8	is associated with should be removed [Timothée OURBAK, France]	the text was heavily edited
9250	5	9			Add cities explicitly here [Cynthia Rosenzweig, United States of America]	agreed, the text was edited to reflect this issue
17289	5	9	5	10	the bit of sentence 'enhancing adaptation … justice and equity' is distracting I find. Governance is critical even if we did not have these other issues. Also politics rather than governance could be mentioned here. [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	the text was heavily edited
10402	5	9	5	9	subnational line 25 sub-national – standardize (suggest subnational no hyphen) [Jonathan Lynn, Switzerland]	the text was heavily edited
1644	5	10	5	10	I would be specific as it relates to "rights." I think the intent is "human rights." If so, I would say that. It would be consistent with Page, Line 41. [Jesse Keenan, United States of America]	the focus is on equity and ethics
14963	5	10	5	19	rights, justice, and equity are ill defined terms (see previous comments) and their placement as specific goals is not within the mandate and scope of this report. [Farhan Akhtar, United States of America]	agreed, the text was edited to reflect this issue
20096	5	11	5	12	It has been disproved, not least by data on the historically inextricable relationship of greenhouse gas emissions and economic growth as assessed in AR5 that absolute (rather than relative or marginal) and system-wide/all sectors encompassing decoupling of economic growth from GHG forcing is possible. This implies that absolute reductions in resource and energy consumption will be necessary, and in the overindustrialised Global North, some measure of degrowth. See T. Jackson, Prosperity Without growth? The Transition to a Sustainable Economy (London: Sustainable Development Commission, 2009); N. Pidgeon and C. Butler. “Risk Analysis and Climate Change,” Environmental Politics 18, no. 5 (2009): 670–688. [Lili Fuhr, Germany]	thank you for the statement, this was considered when developing edits .
12329	5	12			forcing should be "emissions" (decoupling of economic growth from greenhouse gas emissions) [Bill Hare, Germany]	agreed, the text was edited to reflect this issue
16061	5	12	5	13	Really? By the time any such "work" or research is done, we'll be committed to well past 1.5 C; indeed we are essentailly already committed to going well beyond 1.5 C. Such work could be said to be useful to stabilizing the climate--indeed, may well be essential, but it just is not going to be available in time to get to 1.5 C given where we are now. [Michael MacCracken, United States of America]	thank you for the statement, this was considered when developing edits .
11082	5	12	5	19	It is also important to stress the short-term impacts of climate change. In particular, the prospected escalation of impacts of climate and environmental change will likely translate into more frequent short-term symptoms, which will likely absorb an increasing amount of energy and attention from policy- and decision-makers. Driven by a short-term outlook and and a crisis-management attitude, policy- and decision-makers will be forced to neglect the long-term planning that is vital to promote and design actions aimed at achieving long-term sustainable development. [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	not clear what short-term is referencing here
1768	5	13			transitioning to a maximum 1.5°C global warming and avoiding further temperature increase. [Tibor Farago, Hungary]	the text was heavily edited

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9159	5	13	5	19	I don't understand why, sundenly, the future is used? [Timothée OURBAK, France]	agreed, the text was edited to reflect this issue
14946	5	14	5	17	Significant governance challenges include the ability to incorporate multiple stakeholder perspectives in the 15 decision-making process…..: Ability to create an enabling environment for sustained mitigation action is also an important challenge. [LOKESH CHANDRA DUBE, India]	thank you for the statement, this was considered when developing edits .
13578	5	14	5	19	Also - the challenge of getting support (political, societal, business) to make the societal changes necessary for achieving 1.5. see also p7 line 36 [Elvira Poloczanska, Germany]	agreed, the text was edited to reflect this issue
13579	5	15	5	15	what is 'scalar'? not simple English [Elvira Poloczanska, Germany]	involving scales, the text was edited
5422	5	15	5	15	What is "scalar interaction"? Will it be defined? It would be better to use simple language and not introduce such new terms that are not self-explanatory. [Klaus Radunsky, Austria]	involving scales, the text was edited
11666	5	15	5	15	What is a "scalar interaction"? This seems like jargon. [David Schoeman, Australia]	involving scales, the text was edited
16062	5	16	5	16	Need to eliminate either the first comma or the first "and" for the sentence to make sense gramatically. [Michael MacCracken, United States of America]	the text was edited
13580	5	16	5	17	meaning of 'support for… human resource development for such actions' not clear [Elvira Poloczanska, Germany]	the text was edited
7290	5	16	5	17	Reference to the provisions of the Paris Agreement in regards to support expected to be provided by developed countries to developing countries on technology, finance and capacity-building should be made. [Eleni Kaditi, Austria]	Good point, but it is difficult to rephrase without adding text, and we are already over, so we will leave.
5423	5	17	5	19	The key problem is not to design what is needed but to motivate key players - and this means all - to do the right things and to reduce their carbon footprint in a speedy manner and to reduce their vulnerability to unavoidable climate change risks. A key problem seems to be that investors still expect sometimes a higher return of investment by exploring and selling fossil fuels or by selling traditional vehicles instead of electric cars. Smart fiscal policies could help to speed up transformation. In this context the following study might include reletaive information: The Ostrich Paradox; Why We Underprepare for Disasters. By Robert Meyer and Howard Kunreuther [Klaus Radunsky, Austria]	thank you for the statement, this was considered when developing edits in section 1.1.
2693	5	17	5	19	Suggest that sentence is changed to read "… efforts needed to develop and implement coordinated climate …". Current wording suggests that governance capacity is only related to planning. [Penny Urquhart, South Africa]	the text was edited
3979	5	21			devolution of power and resources to sub-national and local governments' recommend add a line 'with the support of national government' as need all levels of government - working together i.e. not one or the other but an integrated approach by all levels of government - worth referencing the reseearch by the OECD on Cities and Climate Change which discusses governance [Barbara Norman, Australia]	comment taken into consideration as suggested
1769	5	21			Transitioning from climate policy planning [Tibor Farago, Hungary]	planning and policy
21284	5	21		27	what about policy gaps? I would mention policy failures here somewhere - in fact no where here to you have a clear point on the need to ramp up policy responses, yet one of the biggest barriers identified in the literature is lack of strong and stable policies and related institutional frameworks to mitigate and adapt to climate...and/or to align non-climate policies to be make sense for climate change. [Jan Corfee-Morlot, France]	important remark on the policy level; will consider its inclusion
19655	5	21		27	Availability of support is critical to enabing developing countries to deliver on their climate ambition. Without international support developing countries will not be able to play their role in achieving the 1.5. goal. This is an issue of collective self interest and solidarity for the international community. [Tara Shine, Ireland]	Out of scope: This is a statement of a suggested finding, addressed in Chapter 5.
3343	5	21	5	21	Change a major challenge to "the" major challenge [Paul Doyle, Canada]	stays as it is: "a major challenge"
9843	5	21	5	21	Does this refer to mitigation and adaptation? The term "climate planning" seems unspecific [Christopher Reyer, Germany]	already addressed in 462-above; changes will be made accordingly
6012	5	21	5	21	What is meant by "climate planning"? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	considering replacing with "...climate change adaptation and mitigation policy and planning"
12934	5	21	5	21	climate planning . The term sounds very new not appearing in any other chapter [Joyashree Roy, India]	already addressed in 462-above; changes will be made accordingly
16064	5	21	5	21	This seems an understatement--perhaps change "practical" to "aggressive" in that this sentence imagines being able to limit warming to 1.5 C. [Michael MacCracken, United States of America]	Practical is a more neutral term. In the policy and planning language, aggressive is not used and can be read as a value-laden meaning. IPCC language is neutral.
4879	5	21	5	27	Barriers include effective market mechanisms, finance, …. [Wilfried Maas, Netherlands]	noted
2068	5	21	5	27	"devolution of power and resources to sub-national and local governments" - again, no citation (even though its an executive summary such bold assertions must be backed up with the literature) [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	the backup literature is assessed in the corpus of the text.
3114	5	21	5	27	Another barrier that should be mentioned is political will. In fact, this might be the most important barrier preventing sufficient mitigation of climate change. Countries are unwilling to do what is necessary to mitigate climate change. [Richard Rosen, Germany]	IPCC language is not prescriptive nor politically loaded even though it is recognised in the chapter that politics play a fundamental role during the implementation phase.
9802	5	21	5	27	Barriers to implement climate planning also include the inertia of societal values and world views or political programs which have to be overcome, at least in democratic First World Countries [Urs Neu, Switzerland]	already addressed in 462-above
7278	5	21	5	27	The Higher Education Institutions 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]	It is very important the role of HEI in promoting climate change research and communication; a mention of it will be inserted
20344	5	21	5	27	Is it just a "major challenge"? That sounds a pretty gentle paragraph to me. [Olivier Boucher, France]	major challenge encapsulates the high level of commitment
3991	5	21	5	27	Incorporating strong linkages needs to be inclusive of knowledge ecosystem on how to transitioning from climate planning to practical implementation. [Dilipsing Bayas, India]	implicitly stated in the paragraph under "regional diversity" phrase
4836	5	21	5	27	For practial implementation strong global, regional and local support for all contributing technologies will be required: renweables, efficiency, biomass, CCS & BECCS (As separatekey message in Ex Summary) [Wilfried Maas, Netherlands]	will turn to the Ch One expert on the matter

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7135	5	21	5	23	Comment - the human psychological, social and cultural interaction are key barriers to any successful transition. My suggested addition therefore is to amend the current text to read: Transitioning from climate planning to practical implementation is a major challenge in constraining global temperature to 1.5°C. Barriers include finance, technology, public attitudes, social practices and human resource constrains plus institutional capacity to strategically deploy available knowledge and resources. References: Whitmarsh, L. E., O'Neill, S., Lorenzoni, I. (2011) Engaging the public with climate change. Abingdon: Earthscan., Spurling N, McMeekin A, Shove E, Southerton D, Welch D. (2013). Interventions in practice: re-framing policy approaches to consumer behaviour. Sustainable Practices Research Group. Corner, A. & Clarke, J. (2016). Talking Climate: From Research to Practice in Public Engagement. Oxford: Palgrave. [Jamie Clarke, United Kingdom (of Great Britain and Northern Ireland)]	Important remark to highlight the issue of public attitudes and social practices. To be taken into account in the bold statement as suggested
7929	5	21	5	27	Could we add the need for long term policy signals on reducing emissions - this is essential to enable action - without strong and sustained policy signals then there is no incentive to invest in new/emerging technologies to tackle emissions. Regulatory challenges also need to be overcome and could be mentioned here. [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	this is important but let´s keep in mind that this is one paragraph of the executive summary that encapsulates challenges and barriers in general terms. More developed ideas are found in the body of the text.
5424	5	21	5	41	These two paragraphs do not provide a clear direction for the policy level how to speed up transformation in order to speed up mitigation to enhance the probability to meet the temperature goals. It is recommended to identify those few large corporates that have strong internal climate policies and ask them what would be required to trigger similar policies in those companies that try to slow down transformation. It must be a political goal to minimize over-shooting due to the significant costs of producing net negative emissions - compared to the much cheaper mitigation options we have already now. Setting more aggressive goals will definitely not be enough - what is needed is a change in the enabling environment. Examples would be economic incentives to use renewables and disincentives to emit CO2 - e.g. a carbon tax. Without a reasonable price of carbon that is increasing steadily it seems unlikely to speed up decarbonization. [Klaus Radunsky, Austria]	the idea of speed and direction of changes is well developed in the chapter
13581	5	22	5	22	what are 'human resource constrain(t)s'? see also p37 line 28 [Elvira Poloczanska, Germany]	change made
3344	5	22	5	22	TYPO constraints [Paul Doyle, Canada]	change made
6417	5	22	5	22	The word 'contrains' should read 'constraints'. [Jonny Williams, New Zealand]	change made
7713	5	22	5	22	“constraints” rather than “constrains” [Hilary Inyang, Nigeria]	change made
6474	5	22	5	22	constrains' > 'constraints' [Roger Bodman, Australia]	change made
15196	5	22	5	22	copy edit: "constrains" should be "constraints" [Pauline Midgley, Germany]	change made
10361	5	22	5	22	should read "human resource constraints" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	change made
11667	5	22	5	22	“Constraints" misspelled [David Schoeman, Australia]	change made
15019	5	22	5	22	The authors should avoid a one-sided reference to "barriers" for finance, technology, human resource constraints. Authors should instead discuss barriers and enabling environments to include a positive framing as well -- e.g., "challenges and opportunities created by technology innovation and rapidly falling costs of low-emission and resilient technologies" -- drawing on, literature around technology innovation and/or falling technology costs. [Farhan Akhtar, United States of America]	Noted
16063	5	22	5	22	constrains to "constraints" [Michael MacCracken, United States of America]	change made
6397	5	22	5	22	typo - constraints [Sybil Seitzinger, Canada]	change made
519	5	22	5	23	Please add that social, political, and informational barriers exist as well. While some technologies (e.g., long-distance electric/hydrogen fuel cell aircraft) have not been developed yet, it is not because of a technology barrier but because no policies have been put in place to encourage such aircraft. In other words, I don't believe technology is a barrier as stated as virtually all technologies needed for a transition (solar panels, CSP plants, wind turbines, heat pumps, electric arc furnaces, electric cars, dielectric heaters, induction cooktops, LED lightbulbs) exist. It is primarily a deployment issue, not a technological issue. [Mark Jacobson, United States of America]	would that be: "lack of technology deployment"? To consider this suggestion
13582	5	22	5	27	Also - resistance to change from vested interests (mentioned in AR5 WGII report), cultural and psychosocial barriers [Elvira Poloczanska, Germany]	some barriers are enlisted and mentioned in general terms. Details are developed in the main text
17290	5	23	5	23	consider adding public acceptability and behaviour to the list of potential obstacles [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	changed accordingly
9251	5	25			Add cities explicitly here [Cynthia Rosenzweig, United States of America]	this is the executive summary
3989	5	26	5	27	Incorporating strong linkages across sectors, devolution of power and resources to sub-national and local governments and facilitating partnerships among public, civic, and private sectors will be a key to implementing identified response options. [Dilipsing Bayas, India]	remains as it is
16065	5	27	5	27	At end of sentence it might be worth saying "to stabilize the CO2 concentration and climate" as we are on a path to blow past 1.5 C and giving a more general objective might be worth mentioining. [Michael MacCracken, United States of America]	Noted
21285	5	29		34	not sure what this is supposed to convey - feasibility is always important - lots of different drivers of feasibility. Isn't the more important point here about managing trade-offs and finding and cultivating synergies between mit, ad & other SD policy agendas? overall this para does not do justice to the sections in back of chapter / box which has elements of an emerging framework (NB: this comment also relevant to framework box 1.3 at back of chapter). [Jan Corfee-Morlot, France]	thank you for the statement, this was considered when developing edits .
11433	5	29	4	34	A summary of mitigation-adaptation synergies and tradeoffs would be more useful than the definition of feasibility (and generic statement about its multi-scalar and integratated character) that dominates this paragraph and reiterates points already made above. [Stewart Lockie, Australia]	thank you for the statement, this was considered when developing edits .
10952	5	29	5	30	Another content-free statement [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
3992	5	29	5	34	A complete vision of the feasibility question needs to be inclusive of managing knowledge scenarios too. [Dilipsing Bayas, India]	not clear about what this is referencing
2027	5	29	5	34	Sugget adding "culture, customs and habits" [Tao Yang, China]	the text was edited
6475	5	33	5	33	indication' > 'recognition' [Roger Bodman, Australia]	the text was edited
16066	5	33	5	33	Perhaps change "indication" to "understanding" [Michael MacCracken, United States of America]	the text was edited
12446	5	34			across spatial, social, and temporal scales. [Mohammad Rahimi, Iran]	the text was edited

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3345	5	34	5	34	spatial, social, and temporal [Paul Doyle, Canada]	the text was edited
7714	5	34	5	34	Coma after the word “social” [Hilary Inyang, Nigeria]	the text was edited
7186	5	36			The statement is insufficient and it appears to the sceptical reader that the relevant information is not transparent. The lead statment simply says - in the language of environmental economics - that the 1.5°C target is not justified. Then the statement contiues with some general critique about monetization of environemental/climatique impacts, which is not really convincing because it is not substantiated. In particular, it is not substantiated by making clear what the problems are of going beyond 1.5°C, which is the ultimate reason to avoid higher global warming. The last sentence is also not convincing because the aggregation and comparison of damages in different points of time and different locations is exactly what the cost-benefit analysis is made for. The argument that it is "difficult to justify" is much too weak. It must be substantiated. It must also be clarified which other paradigm (which needs to be mentioned) justifies the 1.5°C target instead (or maybe a bit weaker: helps to justify the 1.5°C target). It would also be very useful, if the authors could clarify and match the different paradigms in evaluating global environmental targets with different paradigms of international order and levels of international cooperation (or national sovereignity). [Nico Bauer, Germany]	Noted - This being a focused special report such extensive coverage will be picked up in AR6
3980	5	36			totally agree with comment on cost benefit anaylsis - should be an integrated assessment framework based on the SDGs with an intergenerational timeframe [Barbara Norman, Australia]	This is handled in Chapter 5
21286	5	36		41	somewhere here need to mention uncertainty and risk of catastrophic change which also does not lend itself to CBA. Last 2 IPCC reports dealt with this issue extensively and this treatment does not reflect this. [Jan Corfee-Morlot, France]	Noted
19656	5	36		41	Another way of communicating costs is human rights, e.g. inability to enjoy rights like the right to food, water, health. [Tara Shine, Ireland]	taken into account
1098	5	36	5	36	tools are not for “making decisions" but for informing decision-making. The usefulness of CBA was already questioned in the SAR (Munasinghe chapter 1996) which did not prevent a lot of work on it afterwards. [Rob Swart, Netherlands]	Thank you- noted
9465	5	36	5	36	… insufficient for a 1.5°C target is too terse. Do you mean " … insufficient for ADRESSING a 1.5°C target"? [David Wratt, New Zealand]	Text was revised
11020	5	36	5	37	It's doubtful that cost-benefit analyses are a common tool for making complex policy decisions. They are only presented as such in the literature [Oliver Geden, Germany]	Noted
9830	5	36	5	37	The limitation of cost-benefit analyses is not only for the 1.5 C target, but for all the levels of target. This sentence should be revised. [Keigo Akimoto, Japan]	Accepted
6265	5	36	5	40	A tool that may be more reliable is the social cost and benefit analysis [Milton Nogueira da Silva, Brazil]	Noted
3115	5	36	5	41	While I basically agree with this paragraph, it should be noted explicitly that in most cost/benefit analyses of mitigating climate change the avoided damages to people and the planet are usually omitted, as they were in the AR5 WGIII analyses. In addition, it should be clarified that the correct concern in the last sentence about costs and benefits occurring at different times implies that if any cost/benefit analysis is done, the value used for a discount rate is a very important policy decision, and not a decision that should be left up to integrated assessment modelers to make on their own, since those models usually do cost/benefit analyses. [Richard Rosen, Germany]	Noted, thank you-
21046	5	36	5	41	… hence? [alessandra conversi, Italy]	attended
20594	5	36	5	41	Cost-benefit analysis can even be a problematic tool to evaluate and take decision. This tools transforms an unknown and unrecognizable situation (a world at more than 2, 4 or 6 ° C) into a controllable situation where arbitrations can still have a meaning. In some cases, comparison of economic impact in very distant periods of time for instance, this tools should not be used (Pottier, 2015) https://hal.archives-ouvertes.fr/tel-01101591/document [Eric Vidalenc, France]	Noted
20345	5	36	5	41	Are you saying that 1.5°C is not (and cannot be) the result of a global cost-benefit analysis? Or that individual decisions needed to reach 1.5°C cannot be taken under cost-benefit analysis for the individual stakeholders ? The whole paragraph is quite opaque to me. [Olivier Boucher, France]	The text was extensively revised to improve clarity
20097	5	36	5	41	1 does just that. Chapter 1 authors should ensure that their attempt at framing climate change as a broader societal, not purely economic, technical or engineering, problem, is implemented consistently throughout the report, including trajectories for a socio-ecological transformation that should be developed in Chapter 2. [Lili Fuhr, Germany]	Noted-The matter was raised with other chapters
3993	5	36	5	41	The difficulty to justify cost and benefit analyses is majorly due to absence of the standard knowledge products of the time on how to calculate CBA and how it is being measured. [Dilipsing Bayas, India]	Noted
11434	5	36	5	41	As this is an executive summary, it would be more useful to identify some of the alternatives to cost-benefit analysis rather than summarising all its limitations. [Stewart Lockie, Australia]	Noted
15020	5	36	5	41	A problem with cost-benefit analyses is identified here; however, there's no discussion of a solution. Is there literature on more appropriate ways of informing policy decisions that use more sophisticated means than cost-benefit? [Farhan Akhtar, United States of America]	The text was revised and the cost benefit issue was tackled in other chapters too and could be further developed in AR6
2775	5	36	5	41	I like the summary statement on cost-benefit analysis but believe the supporting text on p. 38 is much weaker. [Erik Haites, Canada]	Noted and adjusted
4837	5	36	5	41	The question which tools would be more approprate (iso cost benefit analysis) is not adressed [Wilfried Maas, Netherlands]	Noted - it is taken up in Chapter 2 and 4 too
1012	5	36	5	41	Though we understand the difficulty of applying CBA to climate change, just denying CBA will put readers puzzled. If authors think CBA is inappropriate, they should show alternative methodology to judge to what extent we should cope with climate change, as it is very clear we cannot do it "regardlss of cost". [Mitsutsune Yamaguchi, Japan]	Noted - Text was revised accordingly
12332	5	37			I strongly disagree with the statement on CBA and the 'relatively easy to calculate costs' as it also relates to future costs of climate change. It might be true insofar as that scholars have come up with various numbers, creating headlines, but the scientific credibility of those is often questionable. Most importantly, such methods disguise the amount of value judgement that underlies there analysis (e.g. by the choice of the discount rate, valuation of human life, valuation of non-economic impacts eg biodiversity, ecosystem services, or the choice of which impacts are actually costed in). Authors should revisit the discussion in the AR5 on tools such as CBA. [Bill Hare, Germany]	Noted- CBA is also treated in other chapters of this report

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16067	5	37	5	37	I think it needs to say "costs of transformation of the energy system" or something similar to indicate what is being referred to. I would also suggest not saying "easily" as there are many options, etc. And again, it would ge good to avoid the word "may" as this is really a meaningless indicator of the level of difficulty. Also, "may" should be replaced on line 38. [Michael MacCracken, United States of America]	Taken into account
9109	5	39	5	39	making "it difficulty to quantify…" rewrite to avoid using "it". [Michael Oppenheimer, United States of America]	Attended
9831	5	39	5	41	No silver bullet analyses exist. Cost-benefit analysis has also an important role, althoug is has shortcoming. The words of "difficult to justify" seem to be too strong, and should be modified. [Keigo Akimoto, Japan]	Noted
1645	5	40	5	41	I believe it is important to note that cost and benefits may borne and may acrue to different parties and this is not captured in a BCA methodology. [Jesse Keenan, United States of America]	Text was reviewed
9252	5	43			Change 'setting' to 'developing' [Cynthia Rosenzweig, United States of America]	Taken into account
19657	5	43			Important references to local and indigenous knowledge should be mainstreamed throughout all chapters of the report. [Tara Shine, Ireland]	Noted
21288	5	43		49	why does this para close only with mention of combining expert and local knowledge to build better climate scenarios and scientific data? You could also usefully extend the point to highlight that the co-production process will matter to design and implementation of successful policy responses to achieve a 1.5 C world [Jan Corfee-Morlot, France]	Point taken- text was revised
4162	5	43		49	Reliable climate data is also insufficient in rural, remote areas. Promoting and awareness raising with partnership building of Indigenous and local communities is critical to help understand the climate impacts on a specific region. IE: Lubicon in N. Alberta or Ranchers in Southern AB. [Michelle Leslie, Canada]	Point taken- text was revised
1099	5	43	5	43	what is a multi-faceted information channel (could be Facebook, but probably something else is meant). [Rob Swart, Netherlands]	Noted and adjusted
11435	5	43	5	45	This is a statement of the obvious wrapped up in unnecessarily convoluted language. At the very least, delete "setting a multifaceted information channel". [Stewart Lockie, Australia]	Noted
7279	5	43	5	49	LEK and Indigenous knowledges could be mentioned (e.g.,] SETTI, A.F.F., RIBEIRO, H., GALLO, E., ALVES, F., AZEITEIRO, U.M., 2016. Climate change and health: governance mechanisms in traditional communities of Mosaico Bocaina/Brazil in LEAL FILHO, W., AZEITEIRO, U.M., ALVES, F. (Eds) 2015. “Climate Change and Health: improving resilience and reducing risks", SPRINGER, volume produced as part of the "Climate Change Management Series" published by Springer Pp: 329-352. DOI 10.1007/978-3-319-24660-4_19 http://www.springer.com/us/book/9783319246581 [Ulisses Azeiteiro, Portugal]	Thank you for the references - text was also reviewed extensively
5242	5	43	5	49	I would have expected a statement on the overall role of knowledge in the decision making process. It is not just the notion that climate information is not sufficient, it is also important to acknowledge that knowledge as such is only a partial driver for decisions. Political and cultural attitudes, windows of opportunity and trade-offs between short- and longterm action and rewards are as important [Bart Van den Hurk, Netherlands]	Point taken though the section was revised
12168	5	43	5	49	Extraction. Humans and all products - including GHG emissions the cause of climate change - are exclusiverly made from natural resources. “Resource extraction” is the source of all “production” and “consumption" and yet in the 625 page Report it has only 1 inconsequential mention (“Trade-offs include loss of other economic land use types and resource extraction”). “Sustainable development”, appearing 330 times, is wholly dependant upon “natural resources” which are mentioned only 16 times, generally in inconsequential context. [Michael Wadleigh, United States of America]	Point taken
12169	5	43	5	49	Annual and cumulative resource extraction facts must also be known, importantly “resource efficiency” - the policy which governments and business rely upon - is not happening, “resource in-efficiency” is currently increasing at 0.8% per year. Global “recycling” tonnes are a miniscule 0.6% of “extraction” tonnes - as resource extraction increases 2.5%+ per year, 83 Gt in 2015, projected by IRP to be 183 Gt in 2050, continuing on to 329 Gt by 2100. [Michael Wadleigh, United States of America]	Point taken
3994	5	43	5	49	The standard yet flexible knowledge management framework needs to be incorporated in-accordance with climate models and evaluating climate change scenarios for 1.5°C warming. [Dilipsing Bayas, India]	Thank you - this covered in more detail in Chapter 2
16047	5	43	5	49	Knowledge sources including the use of ICT and GIS Applications have been used as information channels for climate change in developed and some developing countries. ICT is envisaged to be a very essential tool for communiting climate change mitigation technologies. New and emerging ICT and Smart applications such as the smart grid and mobile apps are being used for forestry emission mitigation, enhancing carbon foot print reduction in building technology and for Land Use Change. It is strongly recommended that ICT experts collaborate with policy makers, and private sector in order to improve their use especially in developing and less developed countries. [Denise Okpala, Nigeria]	Noted - some of these details are better left for AR6
9844	5	44	5	44	at various levels of what? Society? [Christopher Reyer, Germany]	Attended to
16068	5	44	5	44	will advance seems terribly optimistic--perhaps say "has the potential to advance" and then later add a phrase suggesting that there is a significant chance tht the practicalities seem likely to have the potential to overwhelm the likelihood of actually achieving the emissions reductions. [Michael MacCracken, United States of America]	Text was revised
9253	5	46			Reliable climate data also insufficient in many urban areas [Cynthia Rosenzweig, United States of America]	Accepted
1770	5	46			Reliable climate, related socio-economic and environmental data .. [Tibor Farago, Hungary]	Thank you
16069	5	46	5	46	data is plural, so change "is" to "are". Also on line 48 as the subject is "precision and detail" [Michael MacCracken, United States of America]	Attended
20098	5	46	5	47	Indigenous and local knowledge and experience should not only complement scientific data on climate change and impacts, but also serve as core input for climate just and resilient response strategies and pathways. Chapter 1 authors should ensure the role of local and indigenous knowledge is taken seriously throughout the report, in particular with regard to Chapter 2 on response strategies. [Lili Fuhr, Germany]	thanks, we attempted to strengthen the statements regarding indigenous knowledge

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4249	5	46	5	47	The statement "Indigenous and local knowledge and experience can complement scientific data" (Chapter 1, page 1-5, lines 46-47) should be considered very carefully. If non-scientific information is used to verify climate models, the well-stablished scientific method is at stake [Francisco Molero, Spain]	Noted
11668	5	46	5	49	This is a strong statement to make in the executive summary - it doesn't seem to be adequately supported by material in the remainder of the Chapter. This statement should be softened or caveated. [David Schoeman, Australia]	Noted but the text was revised
12949	5	46	5	49	Important to note that indigenous and local knowledge provide also a source for monitoring and evaluation of climatic changes e.g. changes in indicator species also in the future. [Johanna Nalau, Australia]	Accepted
2259	5	46	5	49	It is indeed true that "reliable climate data" are (not "is") "insufficient in many areas". It is a good point that indigenous and local knowledge can help to some extent, and right to make it. But if the point is going to be made, then there should also be a balancing call for better instrumental observations to be made where indigenous knowledge cannot help. The glacial outflow of West Antarctica springs to mind. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
13007	5	46	5	50	Although indigenous and local knowledge are useful, it seems unrealistic that have the precision and details that can allow to "verify climate models" [Caserini Stefano, Italy]	This is partly so
21287	5	47			suggest to replace "scientific data" which is quite narrow with the broader term "expert knowledge" [Jan Corfee-Morlot, France]	Rejected as this can for ever be debated
3346	5	48	5	48	Change is critical to "could be" critical [Paul Doyle, Canada]	Done
3116	5	50	5	51	There needs to be a concluding paragraph or two for this Executive Summary which states what the recommendations are or at least what the choices are for policy makers that flow from the analyses presented in this chapter. As it stands, policy makers would have no idea of what lessons they should learn from all of chapter 1. [Richard Rosen, Germany]	The chapter and the ES were revised
12098	6				On 1-6 the unequal distribution of risk is discussed. Various sociologists have discussed this, in particular, Ulrich Beck has developed a theoretical framework about this idea: Beck, U., 1992. Risk society: Towards a new modernity. Sage. [Tindall David, Canada]	thank you for the statement, this was considered when developing edits .
12447	6				There is no introduction section for the chapter. I think it is necessary. [Mohammad Rahimi, Iran]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
11665	6		43		The use of the term "Anthropocene" is problematic, especially in terms of the prominence it is accorded here. I understand that it is an emerging and unifying "theme", but it has not been formally recognised, and until it has been, it should be used sparingly and with care. [David Schoeman, Australia]	the text was edited to reflect this point
1100	6		6		section 1-1. Here also attention to the positive aspects of 1.5 degrees (lower risk, opportunities for SD) is required for a more balanced introduction. [Rob Swart, Netherlands]	the text was edited to reflect this point
9466	6		6	5	I suggest you replace " … monthly average temperatures …: with "…monthly GLOBAL average temperatures …" (assuming this is what you mean). [David Wratt, New Zealand]	yes, the text was edited to reflect this
4412	6	1			Why not include "economic"? [Jingyong Zhang, China]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1736	6	1			Regarding the section headings: "1.1 - Human, ecological, and physical dimensions of 1.5°C: building a knowledge base for this report" and "1.3 - Multiple dimensions of impacts at 1.5° C and beyond" seem very similar to one another, and as a reader I had difficulty navigating Article 1. Section 1.1 title is too specific - more than than just the dimensions are described. On the other hand, one expects 1.3 to describe the impacts of 1.5 C but it actually describes the dimensions. [Levi Golston, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
7392	6	3	6	38	have a section 1.7 that is currently called "Storyline of the report". Please consider to move this section to a more prominent place in chapter 1. We suggest that you incorporate this text under currently section 1.1 "Human, ecological and physical dimension ...". Please consider to rename this title so also the storyline of the report can be included upfront. [Øyvind Christophersen, Norway]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
5921	6	3	6	5	Although I agree that we have reached approximately 1° C warming, I think citing IPCC (2013) is not the best choice. Significant warming have happened after the IPCC report, and the number they give is 0.85° C. [Borgar Aamaas, Norway]	the text was edited
14965	6	3	6	5	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. While AR5 found that this was insignificant for the past century, we have seen significant variations in the rate of warming. The role of natural and internal variability should be considered as a part of the discussion of 1.5 and 2.0 degree scenarios. [Farhan Akhtar, United States of America]	the text was edited
2599	6	3	6	9	perhaps mention that part of the motivation was concern from small island states and the impacts they are already observing? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
3117	6	3	6	9	The temperature increases cited need to be updated to 2016 actual data. I believe they are too low. We may already be closer to a 1.5 degree C increase than this paragraph indicates. [Richard Rosen, Germany]	the text was edited
17812	6	3	7	4	The following references are repeated too often in the section: Dryzek and Pickering 2017, Lovbrand et al . 2017, Backstrand et al . 2017. Are these the only sources to back the points raised by the authors' team? [Wilfran Moufouma Okia, France]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
3120	6	3	9	21	To shorten the whole chapter which is necessary so it does not ramble, this three pages of material can be drastically shortened. [Richard Rosen, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
12448	6	4			please add annual after surface [Mohammad Rahimi, Iran]	the text was edited
9190	6	4			approximately 1C. Can we have a range and a reference? [Glen Peters, Norway]	the text was edited

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14912	6	4	6	4	Useful to explicitly mention how 'pre-industrial' is defined. Suggestion: '…above pre-industrial (1850-1879 average) levels ...' [Ambarish Karmalkar, United States of America]	the text was edited to reflect this point
7151	6	4	6	4	Provide the exact value of temperature increase from AR5 - 0.85C (SMP WGI page 5 first bullet) [Iulain Florin VLADU, Germany]	the text was edited
13583	6	4	6	5	Inconsistency in dates with Executive Summary which gives 2016 as year of reaching 1 degree warming [Elvira Poloczanska, Germany]	the text was edited
20069	6	4	6	6	Isn't there a more recent assessment regarding present-day global warming compared to the AR5? [Sonia Seneviratne, Switzerland]	ar5 was used as a key reference but additional references were added
4510	6	5			Add "some" between "and" and "month". Not all months were 1.4 °C above pre industrial level. [Radim Tolasz, Czech Republic]	the text was edited to reflect this point
3248	6	5			Which months? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Text was reviewed to clarify
15227	6	5	6	5	Only one IPCC 2013 citation is given in the list of references on p48 (WGI AR5 SPM) but the citation IPCC 2013a appears several times in this Chapter and IPCC 2013b appears once (see comment to p.30); please check/correct [Pauline Midgley, Germany]	the text was edited to reflect this point
17816	6	5	6	5	Reference: IPCC 2013a is not listed in the references (it is IPCC 2013). [Wilfran Moufouma Okia, France]	thanks, we added the reference
2260	6	5	6	5	The uncited peer-reviewed paper Simmons et al.(2017, doi 10.1002/qj.2949) concludes that "early in 2016 the global temperature appears to have first touched or briefly breached a level 1.5 deg C above that early in the Industrial Revolution", so the reference here to 1.4 deg C could be increased to 1.5 deg C, which is symbollically significant if not scientifically significant. To be more specific, of seven datasets studied (three of which are the conventional three used in the FOD), five give temperatures for February 2016 that round (up or down) to 1.5 deg C above the central value of the warming estimate using the pre-industrial definition of Hawkins et al.(2017), while two (the two with the poorest resolution of the unusually warm Arctic) give 1.4 deg C. Relative to an 1850-2000 reference period, three datasets still give February 2016 temperatures that round to 1.5 deg C warmer. All values are subject to uncertainties, of course, but the uncertainties mean that the February 2016 temperature could just as likely be higher than these values than lower. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
9803	6	5	6	6	The use of maximum monthly average temperatures in this context has the same problem as using single years as described in comment no 1, it's even worse. Recommendation to omit the corresponding sentence. [Urs Neu, Switzerland]	thank you for the statement, this was considered when developing edits .
14966	6	5	6	6	See previous comments. The authors should describe the difference between subseasonal weather and global mean temperature increase as these are not comparable on the basis of a simple degree temperature change. [Farhan Akhtar, United States of America]	the text was edited
4250	6	5	6	6	The following statement lacks a supporting reference: "monthly average temperatures of 1.4°C above these same levels have been observed" (Chapter 1, page 1-6, lines 5-6), [Francisco Molero, Spain]	references were included
2261	6	6	6	6	Global average temperatures are described in this line to be "observed". This is the wrong word. "estimated", "estimated from observations" or something similar would be better. Temperatures are observed at many locations around the world, but there are gaps. These may be filled in a number of ways as discussed later in section 1.2.1.1 (and my comments on that). But the resulting global average is something that is estimated. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
19048	6	7	6	7	The words "It is this this rising risk" is not understood [Heba Elbasiouny, Egypt]	the text was edited
15015	6	7	6	9	Again, ascribing things as the underpinning of the Agreement is not the role of the IPCC. Could say instead that this risk "provides context for the Paris Agreement." In addition, in reciting the temperature goal here and in other places as appropriate, should cite the full language of the Paris Agreement article 2.1(a) for context/completeness. [Farhan Akhtar, United States of America]	the text was edited to reflect this point
1771	6	8			Paris COP21 agreement à 2015 Paris Agreement or Paris Agreement adopted by the COP21 ((explanation: pls, use the official title of that agreement)) [Tibor Farago, Hungary]	the text was edited to reflect this point
1772	6	8			'pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels' ((explanation: if quoted then use the exact wording from PA)) [Tibor Farago, Hungary]	the text was edited to reflect this point
6418	6	8	6	8	The 'Paris COP21 agreement' should have a reference associated with it. [Jonny Williams, New Zealand]	the text was edited to reflect this point
14913	6	8	6	8	Should 'the rise in global temperatures' be 'the rise in average global temperature'? [Ambarish Karmalkar, United States of America]	the text was edited to reflect this point
15246	6	8	6	8	Consider spelling out what COP21 in "Paris COP21 agreement" stands for, at this first time of use [Pauline Midgley, Germany]	the text was edited to reflect this point
10403	6	8	6	8	For first reference (apart from exec summary) Paris COP21 agreement might not be precise enough. Either Paris Agreement or the Paris Agreement reached at the 21st Conference of Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) (then just UNFCCC in line 16-17) [Jonathan Lynn, Switzerland]	the text was edited to reflect this point
16070	6	8	6	9	Again, there is one global average temperature (so singular), likely averaged over 2-3 decades, that one is trying to limit. Climate variability might take some individual year temperatures to above 1.5 C (so the series of global average temperatures will presumably vary about the 1.5 C average). I assume you are not meaning that the local temperatures must all be less than 1.5 C on average. And then you have plural for reindustrial temperatures--what is meant here? Is not the baseline to be one value for the preindustrial period--not some range of values? And then plural appears on line 11-12 do the same thing--the chapter/document needs to be scrubbed on this. [Michael MacCracken, United States of America]	the text was edited to reflect this point
3249	6	9			Reference for COP21 document [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
2262	6	9	6	9	Here (and also in line 11) the plural "pre-industrial levels" is used. It would be better to avoid the plural, as noted in comment 2. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
9189	6	11			report assess feasibility. Does it? [Glen Peters, Norway]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
10953	6	11	6	11	Feasibility did not form part of the invite from UNFCCC. This can be subsumed in the "pathways" element of tehe invite. The specific wording of the invite needs to be used right up front in this chapter. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
14914	6	11	6	12	limit the rise to 1.5C by when? I suppose the Paris Agreement is fuzzy no this, but it will helpful to the reader if the timing is clarified here. Or simply say '(see Section 1.2 for definitions)'. [Ambarish Karmalkar, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
13137	6	11	6	17	The subject of this paragraph is duplicated, it can be deleted [Iman Babaeian, Iran]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12187	6	12	1	12	effects and impacts: I guess you use both words in order to cover the physical effects (precip, evap, extremes etc) and the further impacts on human and natural systems. I suggest to specify this more clearly. [Jan Fuglestvedt, Norway]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1773	6	13			warming target à warming limit ((explanation: it is NOT a target; the target is not too exceed that threshold)) [Tibor Farago, Hungary]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
12188	6	14	6	14	I think the report should be about our _knowledge_ about the potential global response, so I suggest inserting this word here. [Jan Fuglestvedt, Norway]	the text was edited to reflect this point
3347	6	15	6	15	Change as concrete to as "a" concrete [Paul Doyle, Canada]	the text was edited
14968	6	15	6	17	justice, equity and ethics as concrete means to articulate the long-standing ethical dilemmas posed by climate justice and the United Nations Framework Convention on Climate Change (UNFCCC) notion of equity. is all outside the scope of this report. There is no defined "notion of equity" under the UNFCCC. Likewise, "climate justice" is an ill defined term which has multiple meanings to multiple people. The IPCC should not prescribe meanings for these concepts. [Farhan Akhtar, United States of America]	thank you for the statement, this was considered when developing edits .
6419	6	17	6	17	This 'notion of equity' should be briefly explained or a reference provided. [Jonny Williams, New Zealand]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
2028	6	19	6	20	I think the sentence would be "To seek encompassing solutions to achieving a 1.5°C warming world,…" [Tao Yang, China]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
2496	6	19	6	22	The Anthropocene is needs a definition when it is introduced. [Robert Koppu, United States of America]	thank you for the statement, this was considered when developing edits .
13655	6	19	6	26	This paragraph is a conceptually inconsistent, climate drivers and impacts are confused. Ocean acidification should not be placed outside of climate change, it is one of the key climate drivers in the ocean. Sea level rise is a physical consequence of climate warming and mediates impacts on natural and human systems that are clearly climate impacts. [Elvira Poloczanska, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1774	6	19	6	26	Besides the references to the “Anthropocene”, I think, it is equally important to refer to the concept of the “Planetary Boundaries” introduced by J. Rockström (2009) and recently updated by W. Steffen (2015). [Tibor Farago, Hungary]	thank you for the statement, this was considered when developing edits .
12862	6	20			Need a better definition of anthropocene [Jorge Carrasco, Chile]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
11436	6	20			The concept of the Anthropocene is an unnecessary distraction. While the idea has traction among scientists as a way of naming the times in which we live it is questionable whether: (1) it genuinely adds to our scientific understanding of global environmental change; or (2) whether it is recognised and understood by the policy and civil society audience for this report. Given the polarised politics around climate change it is not helpful to be seen to be talking in jargon. I also note the term does not appear in subsequent chapters and recommend its removal from this one. See: Stewart Lockie (2017) A better Anthropocene?, Environmental Sociology, 3(3): 167-172, http://dx.doi.org/10.1080/23251042.2017.1357096 [Stewart Lockie, Australia]	thank you for the statement, this was considered when developing edits .
20070	6	20	6	20	Anthropocene: The average reader might not be familiar with this term. It should be explained. Maybe having a box on this theme within Chapter 1 could also be useful. [Sonia Seneviratne, Switzerland]	thank you for the statement, this was considered when developing edits .
13584	6	20	6	21	Use of The Anthropocene as a frame - was critiqued in internal draft, is it needed? Check consistency of framing with other chapters [Elvira Poloczanska, Germany]	thank you for the statement, this was considered when developing edits .
10954	6	20	6	21	This is already a very complex and difficut report. I do not see the need to add the Anthropocene - that’s for reseach papers/think pieces not an assessment. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	thank you for the statement, this was considered when developing edits .
12186	6	20	6	22	I do not see a need for using the concept anthropocene here, and suggest deleting from "as defined" to end of next sentence "….Olsson et al., 2017)". If decided to keep, then a better introduction of the concept and its utility is needed. [Jan Fuglestvedt, Norway]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
4248	6	20	6	38	The anthropocene is mentioned in several parts of the report, for instance "as defined within the frame of the Anthropocene" Chapter 1, page 1-6, lines 20. The term "anthropocene" is informally used in scientific contexts.The new epoch has no agreed start-date. Several dates has been suggested based on globally present stratigraphic evidence, such as the radionuclide fallout from midtwentieth-century nuclear weapons tests. In this case, the anthropocene epoch would start in 1950 or 1964, when the climate change was well-established. On the other hand, the date 1800 has been suggested as the beginning of the Anthropocene but there are no corresponding global geological markers. More details can be found in Lewis, Simon L.; Maslin, Mark A. (March 2015). "Defining the Anthropocene" (PDF). Nature. 519: 171–180. Bibcode:2015Natur.519..171L. doi:10.1038/nature14258 [Francisco Molero, Spain]	thank you for the statement, this was considered when developing edits .
15213	6	21	6	21	copy edit: in "past-present-future", change first dash to be identical with the second one [Pauline Midgley, Germany]	the text was edited
16071	6	21	6	21	Might "descriptor" be a better word choice than "interpretation"? [Michael MacCracken, United States of America]	the text was edited
21047	6	21	6	26	biodversity loss in my opinion a result, and should move fom line 24 to line 25. Anthropocene is usually a time period, not an interpretation or knowledge base (p.9), or at least the different usages of the word should be mentioned [alessandra conversi, Italy]	thank you for the statement, this was considered when developing edits .
10404	6	21	6	26	not sure these adequately explain that the Anthropocene is a new geological era just started characterized by human impacts on the planet [Jonathan Lynn, Switzerland]	thank you for the statement, this was considered when developing edits .
19049	6	22	6	26	the sentence "Climate change and other….." is very long and if it is devided to to sentences it will be more clear [Heba Elbasiouny, Egypt]	the text was edited
13497	6	22	6	26	It would be appreciated if you mention the part that has been discussed before (i.e., AR5) and why these are related to climate change. [Soonuk Yoon, Republic of Korea]	the text was edited
15214	6	23	6	23	In "other significant human imprints", should this be "impacts"? [Pauline Midgley, Germany]	the text was edited
11890	6	23	6	24	I think that 'land use change' in this context should be moved somewhere after 'are linked to'. [Junichi Tsutsui, Japan]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations

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2263	6	23	6	24	In these lines, ocean acidification and sea-level rise can be read as "other significant human imprints" not part of "climate change". Both are consequences of increased CO2, as is the increase in surface air temperatures, and they can be regarded (sea-level rise especially) as part of climate change. The AR5 glossary notes there are both narrow (weather-related) and wider (climate-system-related) definitions of climate (and by implication climate change). This sentence could benefit from being redrafted. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
4225	6	24			Maybe add urbanization after population growth [Felix Creutzig, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
3981	6	24			high population growth, unprecedented fossil fuel consumption' - suggest add 'urbanisation' into the equation [Barbara Norman, Australia]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
12935	6	24	6	24	…high population growth …. AR5 showed bigger contributor is economic growth compared to population growth . Also population growth rate is declining over sevral decades. So may be needs to be appropriately phrased. [Joyashree Roy, India]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
16072	6	24	6	24	It would help to say "and sea level" [Michael MacCracken, United States of America]	the text was edited to reflect this point
7291	6	24	6	25	The text focuses on energy-related emissions only. The text should be deleted and a more general statement could be that 'Existing infrastructure, technologies, policies, institutions, and behavioural and social norms constraint the rate and magnitude of future GHG emission reductions". [Eleni Kaditi, Austria]	the text was edited to reflect this point
5083	6	24	6	25	Ideal to reference high and unsustainable consumption of natural resources -- not just fossil fuels. References to high pop growth (which is largely in developing countries facing extreme poverty) must be balanced with references to unsustainable consumption of natural resources in developed countries. [Tonya Rawe, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
20347	6	25	6	25	unequal exploitation of natural resources. No doubt that exploitation of natural resources (please define) is unequal, but I would say it is the high level of exploitation or over-exploitation, rather than the unequal exploitation, that relates to climate change. [Olivier Boucher, France]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
15313	6	25	6	25	The exploitation of resources is not only "unequal". It also "unsustainable". [Francisco Javier Hurtado Albir, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
16073	6	28	6	28	How about replacing "help the comprehension of" with "assist in comprehending" [Michael MacCracken, United States of America]	the text was edited to reflect this point
12805	6	28	6	30	On the interlinkages, 'finance' dimension is missing, yet it is aptly captured in other sections in the chapter. Suggestion: to include it [Kennedy Mbeva, Australia]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
21292	6	28	6	38	This is an example of a paragraph that is largely incomprehensible without reading the back part of the report and even then it is somewhat inconsistent - suggest to rework this with authors from the back sections. One challenge is that "feasibility" is not typically an analytical framework yet it seems to be the centre of what you are aiming to assess for this report. Given that you need to use this front section to unpack the notion of feasibility in this report - e.g. 37: use simple language around implementation strategies or pathways for implementation which by definition deal with feasibility - technical, social, economic constraints embeded in that [Jan Corfee-Morlot, France]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1922	6	29	6	29	The authors might want to include political requirements in the list of requirements of climate change. [Judith Kreuter, Germany]	thank you for the statement, this was considered when developing edits. Efforts were made to ensure that the requirements were not prescriptive
13585	6	29	6	30	requirements that climate change raises - or is it that limiting to 1.5 degrees warming raises [Elvira Poloczanska, Germany]	limiting warming was the focus
3250	6	30			Missing semicolon or colon after ‘fore’ [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
1043	6	30	6	30	Sugest are instead of is: "raises. Complex ethical issues are brought to the fore that are both climate change and potential responses to it" [Martini Catherine, United States of America]	the text was edited
3348	6	30	6	30	INSERT dash between fore and that is "fore - that is" [Paul Doyle, Canada]	the text was edited
6476	6	30	6	30	Complex …' sentence hard to understand [Roger Bodman, Australia]	the text was edited
15197	6	30	6	31	There is something wrong with this sentence gramatically. It is not clear what "that is" refers to; perhaps it should be "that show that"? In the next line I think "has" should be "have". [Pauline Midgley, Germany]	the text was edited
6398	6	30	6	31	Sentence structure - words missing? [Sybil Seitzinger, Canada]	the text was edited
13586	6	30	6	32	The sentence is unclear and could benefit from rephrasing [Elvira Poloczanska, Germany]	the text was edited
13082	6	30	6	32	Vague and akward expression in this sentence. I would consider slightly re-wording for clarity. For example "Complex ethical issues are brought to [bear as a result o]f climate change and potential responses [which may] exacerbate poverty, inequality, and justice; globally and locally, and has implications on intergenerational justice." I would also suggest using the Oxford comma as it also increases clarity of expression [as added to this sentence as a suggestion]. [Veryan Hann, Australia]	the text was edited
3632	6	30	6	32	Ungrammatical: My suggestion is :Complex ethical issues are brought to the fore. Both climate change and potential responses to it may exacerbate poverty, inequality and injustice, globally and locally and have implications on intergenerational justice. [Robert Shapiro, United States of America]	the text was edited
7992	6	30	6	32	Ungrammatical: My suggestion is :Complex ethical issues are brought to the fore. Both climate change and potential responses to it may exacerbate poverty, inequality and injustice, globally and locally and have implications on intergenerational justice. [Robert Shapiro, United States of America]	the text was edited
21048	6	30	6	32	check the English. [alessandra conversi, Italy]	the text was edited
10405	6	30	6	32	sentence “Complex ethical issues…intergenerational justice.” does not read [Jonathan Lynn, Switzerland]	the text was edited
16074	6	30	6	32	Phrasing needs clarification--not comprehensible at present [Michael MacCracken, United States of America]	the text was edited
2264	6	30	6	32	The sentence that spans these lines is ungrammatical. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited

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10362	6	30	6	33	needs rephrasing to make sense. Suggest "Complex ethical issues are brought to the fore. Both climate change and potential responses to it may exacerbate poverty, inequality and injustice, both globally and locally; and have implications for intergenerational justice. These present profound challenges to path-dependent governance and invite interdisciplinary research and reflection..." [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
11437	6	31			implications for not "implications on" [Stewart Lockie, Australia]	the text was edited
3251	6	31			Change 'has' to 'have' considering 'climate change and potential responses' as plural [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
14353	6	31	6	31	Add comma after "locally" [Ioannis Daliakopoulos, Greece]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
15314	6	31	6	31	In the reviewer´s opinion the list should include "political instability", "jeopardized governance" [Francisco Javier Hurtado Albir, Germany]	the text was edited to reflect this point with slightly different terms
3252	6	32			Change 'invites' to 'invite' to match 'These' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
13587	6	32	6	32	what is 'path-dependent' governance? [Elvira Poloczanska, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
15198	6	32	6	32	These present - it is not clear what "these" refers to - "poverty, inequality and injustice" or the complex ethical issues. Perhaps try "These issues present" [Pauline Midgley, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
15199	6	32	6	32	copy edit: "These invites" should be "These invite" [Pauline Midgley, Germany]	the text was edited
19075	6	32	6	32	The word (invites) should be (invite) [Fathy Elbehiry, Egypt]	the text was edited
10406	6	32	6	32	"invite" not "invites" [Jonathan Lynn, Switzerland]	the text was edited
16075	6	32	6	32	Change "invites" to "invite" [Michael MacCracken, United States of America]	the text was edited
6399	6	32	6	32	invite should be singular [Sybil Seitzinger, Canada]	agreed, this was considered when developing edits
3253	6	34			What's the difference between social inequality and unequal distribution of risks? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1044	6	35	6	36	Since there are thousands of possible policy scenarios and futures, sugest adding the phrase "non exhaustive" to read: "As a result, this assessment builds on the previous IPCC assessments to povide a non-exhaustive range of pathways, including implemntation strategies…." [Martini Catherine, United States of America]	Good point. This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
10363	6	35	6	38	this is rather dense prose. Suggest "As a result, this assessment builds on the previous IPCC assessments to provide a range of pathways and strategies aimed at achieving substantive societal transformation to limit global warming to 1.5°C. These are framed within the context of the 2030 Agenda for Sustainable Development and the complexity of the Anthropocene". [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
16076	6	35	6	38	Phrasing needs clarification, expecially on line 36-37 [Michael MacCracken, United States of America]	the text was edited
12936	6	37	6	38	on the feasibility of achieving the required substantive transformation of society to limit global warming to 1.5°C in the context of the 2030 Agenda for Sustainable Development . One can think while reading this sentence that 1.5 is also a target to be achieved by 2030 along with SDG targets. May be needs careful framing. [Joyashree Roy, India]	agreed, this was considered when developing edits
13656	6	41			The flow of section titles would lead to the expectation that ecosystem impacts are dealt with first and in their own right. They are considered in the SDGs but not mentioned here. Avoid being too anthropocentric. [Elvira Poloczanska, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
15017	6	41	6	41	as noted, "human rights" is not an appropriate topic for the report and should be omitted from this section heading [Farhan Akhtar, United States of America]	the text was edited to reflect this point
12449	6	41	6	45	I suggest this part to be moved to Introduction section if you agree with Introduction section to be added. [Mohammad Rahimi, Iran]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
9110	6	41	7	44	This section has plenty of good and necessary content but needs some reframing. For example, "livelihoods" is a frame used by IPCC previously. Leading with this and orgnaizing the discussion around it would help the reader connect SR1.5 with earlier IPCC reports. On p.7, line 25, "human rights..." is dropped into the middle of a long discussion when it should provide another key framing. I suggest this section be better organized by introducing livelihoods, human rights, governance, and perhaps other frames together, connect each to earlier assessments, then working through the connection to 1.5 for each. [Michael Oppenheimer, United States of America]	the text was edited to reflect this point
5084	6	41	7	44	The references to ethics and governance in the title are not fleshed out in the text below. There is a lack of adequate discussion of governance particularly -- devolution of decision-making to vulnerable populations themselves (or participatory approaches, which are called for in adaptation per the Paris Agreement); equitable distribution of resources (economic, political, social); and efforts to address inequality as an underlying driver of vulnerability. It would also be worth discussing the way in which a lack of human rights (not realized or protected) is a source of vulnerability to climate impacts. This would also help to link up the human rights and governance aspects of the discussion. [Tonya Rawe, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
2265	6	41	9	21	Sections 1.1.1, 1.1.2 and 1.1.3 could be reordered, as 1.1.1 and 1.1.3 might be better to appear together, followed by 1.1.2. These are good sections, but I was disappointed not to find a complementary section on economics. The later section (1.5.1) on costs and benefits did little to offset this disappointment. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
10955	6	43	6	43	This shoud be the first sentence of the entire report and it should spell out the invite! [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
15016	6	43	6	44	The invitation was not in the Paris Agreement itself. Rather than say it was part of the Paris Agreement, it would be accurate to say that the invitation was in the COP decision that adopted the Paris Agreement. [Farhan Akhtar, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1775	6	43	6	44	invitation extended to IPCC by the Parties to the UNFCCC as part of the decisions adopted in Paris during the COP21. Those decisions and the Paris Agreement were negotiated by 195 countries. ((explanation: that 'invitation' is included not in the Agreement but in the 1st decision of the COP)) [Tibor Farago, Hungary]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations

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14970	6	43	6	45	When referring to Article 2 of the Paris Agreement, authors should be careful to quote directly from the Agreement. Here, the authors write that the Paris aspires to limit warming to 1.5 which is not what was agreed. Article 2 says: This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;" and so on. This should guide the framing of the report and in particular any discussions of the aims of the Paris Agreement. [Farhan Akhtar, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
13138	6	43	6	46	These line is repetive [Iman Babaeian, Iran]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
12330	6	44			The description of the LTTG in the Paris Agreement as "aspirational" is legally not correct and as such this description falls outside the mandate of the IPCC, which is to be policy relevant and not prescriptibe [Bill Hare, Germany]	the text was edited to reflect this point
6420	6	44	6	44	Agreement that' should be changed to 'Agreemetn which'. [Jonny Williams, New Zealand]	the text was edited to reflect this point
14336	6	44	6	45	It would be useful to add that, according to most scientists, not just the 1.5 ° looks like a challenge but also the limitation to 2° (see e.g. Raftery et al., 2017. "Less than 2° warmingby 2100 unlikely". Journal Nature Climate Change) [Alessio Giardino, Netherlands]	the text was edited to reflect this point
6278	6	44	6	45	progress towards achieving this ambition is uncertain - rather lack of progress is quite obvious. It should say something, given current trends, which are all inconsistent with conditions necessary to reach 1.5C makes achieving goal highly unlikely. Efforts to change the trends continue to be weak. National goals are inconsistent with goal, and national efforts even to reach their goals is spotty (some nations do much better than others). IN essence: the word "uncertain" may be misleading in this context. [Mathis Wackernagel, United States of America]	the text was edited to reflect this point
14196	6	44	6	51	“The Paris aspiration to limit warming to 1.5°C is highly ambitious and progress towards achieving this ambition is uncertain (Falkner 2016; Marquardt 2017).” – How is progress uncertain? This sentence and sentiment doesn’t make sense within the context of the ‘challenge’. The report makes it quite clear that our current trajectory is not in line with achieving 1.5oC warming, and really, I don’t think we’re currently in line to keep it at 2oC. Even the rest of that paragraph (line 49) talks about the global decarbonization rate is 1.3%, well below what is needed (6.3%) to keep it at 2oC. [Jason Donev, Canada]	the text was edited to reflect this point
1776	6	44			countries. The Paris aspiration à countries. According to that, the countries aim to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C. The Paris aspiration to limit warming to 1.5°C or even to 2°C is highly ambitious and progress towards achieving this ambition is uncertain (Falkner 2016; Farago 2016; Marquardt 2017). ((explanation: it is important to mention both thresholds from the Paris Agreement; there are problems to achieve even the “softer” goal, i.e. to stay below 2°C as demonstrated by AR5, UNEP EGR and Farago 2016. Farago T., 2016: The anthropogenic climate change hazard: role of precedents and the increasing science-policy gap. Id?járás (ISSN 0324-6329), 120, 1, 1-40 http://real.mtak.hu/60726/1/Climate_Change.pdf ((‘Id?járás’: OA peer-reviewed English-language sci. journal)) [Tibor Farago, Hungary]	the text was edited to reflect this point
13588	6	45	6	45	progress towards achieving this ambition is uncertain' - does this sentence mean to say that it is uncertain how progress is/ will be made? If so, that is a clearer phrasing. [Elvira Poloczanska, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
16077	6	45	6	45	progress .. is uncertain--awkward phrasing, needs reviwion. [Michael MacCracken, United States of America]	the text was edited
12331	6	45	6	51	These sentences do not properly contextualise the difference between the Cancun "hold below 2oC" and the Paris Agreement A2.1 LTTG as the differences between the former and the latter are not as fundamental as is implied in these texts [Bill Hare, Germany]	the text was edited to reflect this point
14354	6	47	6	47	Add comma after "few" [Ioannis Daliakopoulos, Greece]	the text was edited
17817	6	47	6	47	Reference: IPCC 2014a refers to WGII but as this sentence is refering to 'model-based scenarios' should this be WGIII? [Wilfran Moufouma Okia, France]	the text was edited
4838	6	47	6	47	and rapid scaling up of all mitigation technologies [Wilfried Maas, Netherlands]	the text was edited
16078	6	47	6	48	Sentence needs some fine tuning--perhaps: "These few scenarios each assumed an immediate and rapid scaling up of mitigation coupled with greatly increased efforts to improve efficiency to reduce the demand for energy." [Michael MacCracken, United States of America]	the text was edited
5151	6	47	6	51	The review and presentation of (energy) related climate mitigation pathways and scenarios, throughout the entire report is biased and incomplete. The models cited are almost exclusively models developed by the IPCC lead authors itself, while other energy models - especially the increasing amount of 100% renewable energy models which do not use unproven CCS - are not at all considered. Furthermore, the energy pathway models used in AR5 mainly REMIND, MESSAGE and IMAGE, have proven to be misleading and biased in regard to low carbon technologies. Constantly wrong cost projections and biased technology choices , have led to results which have nothing to do with the development of the energy markets over the past years. The AR 6 should take the opportunity to correct its approach and widen the scope of the considered and cited energy models. The models above are fundamentally flawed and biased in regard to their technology and policy choices. The latest scientific knowledge indicates that 100% renewable energy scenarios are more realistic to achieve 1.5C mitigation pathways due to low cost renewable energy technologies and successful acceleration of market volumes of the past decade. I therefore request to add another category of scenarios - SSP0 - which entirely focuses on temperature stabilisation pathways on the basis of renewable energy and energy efficiency [Sven Teske, Australia]	thank you for the statement, this was considered when developing edits .
21293	6	47	6	51	rework these sentences to simplify & clarify the message [Jan Corfee-Morlot, France]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
3254	6	48			Useful to quantify the ‘scaling up’ and ‘plunging’ to reinforce the scale of the change necessary [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	thank you for the statement, this was considered when developing edits .
19658	6	48		49	The failure to meet climate targets results in climate injustice as the most vulnerable people in society are unable to enjoy their human rights. [Tara Shine, Ireland]	agreed, this was considered when developing edits

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1045	6	48	6	49	One of the successful aspects of AR5 was bolding high level messages that were easy take aways for media. Suggest continuing that in this report as has been done in the Executive Summary. The following sentence is highly relevant for private sector investment,, provides clear market signals and offers a high level take away. Suggest putting it in bold: “Global decarbonisation now stands at a rate of 1.3% per year, far below the estimated 6.3% required to stay within a 2c target” [Martini Catherine, United States of America]	agreed, this was considered when developing edits
20348	6	48	6	49	I understand what "decarbonisation" means, but "decarbonisation rate" requires a definition which I haven't found neither in Chapter 1 nor in Chapter 2. I couldn't relate the 1.3% current rate of decarbonisation to Figure 2.9. Where does this number come from? [Olivier Boucher, France]	thank you for the statement, this was considered when developing edits .
12902	6	48	6	50	Could you provide a reference (rate of 1.3% per year with uncertainty?)? [Mustapha Meftah, France]	the text was edited to reflect this point
4251	6	48	6	50	The following statement lacks a supporting reference, "global decarbonisation now stands at a rate of 1.3% per year, far below the estimated 6.3% required to stay within even a 2°C target (see Figure 2.9)" (Chapter 1, page 1-6, lines 48-50) [Francisco Molero, Spain]	the text was edited to reflect this point
17818	6	49	6	49	Where does the value 6.6% come from? This is not mentioned anywhere in Figure 2.9. This could this be made clearer. [Wilfran Moufouma Okia, France]	the text was edited to reflect this point
12721	6	49	6	49	It is stated that annual decarbonisation rates need to be 6.3% to stay within a 2 degree target. This disagrees with the range of 2-5% needed for 1.5 degree, quoted on page 4 line 18. Why the difference? It should be stated clearly. [Vassilis Daioglou, Netherlands]	the text was edited to reflect this point
2600	6	49	6	51	add a reference for 1.3% decarbonisation per year? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
3119	6	49	6	51	You should define "decarbonization rate". Is the cited 6.3% needed a linear rate or an exponential rate? I assume it must be a linear rate, because if it is an exponential rate it would never get to zero, which the report says must be reached at some point in the future (see above). [Richard Rosen, Germany]	the text was edited to reflect this point
9535	6	50			It is difficult to find 6.3% from Fig.2.9. Is it Net CO2 2050? [Shuzo Nishioka, Japan]	the text was edited
9561	6	50			It is difficult to find 6.3% from Fig.2.9. Is it Net CO2 2050? [Shuzo Nishioka, Japan]	the text was edited
3255	6	50			This statement does not add any value - it’s obvious the more ambitious target will differ from less ambitious ones. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited to reflect this point
1101	6	50	6	50	Interpretation of Figure 2.9 is not straightforward and the number (6.3%) too precise to be credible, I would delete these sentences and leave this complex discussion to Chapter2. [Rob Swart, Netherlands]	the text was edited to reflect this point
20349	6	50	6	50	A scenario is a different beast to a target. Rephrase. [Olivier Boucher, France]	the text was edited to reflect this point
6013	6	50	6	51	Is this statement a bit premature? Part of the point of the report is to assess how much more ambitious 1.5C would be than, for example, 2C in terms of scale, rapidity and coordination? So is it more a question at this point of the report? (to be addressed in Chapter 2). [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
1777	6	53	6	55	While economic growth has been accompanied in general by increased average life expectancy .., many regions are characterised by increased poverty gap, severe inequity in income distribution that amplifies social conflicts and also vulnerability to climate change. [Tibor Farago, Hungary]	thank you for the statement, this was considered when developing edits.
3256	6	54			p6, line 54: Identify ‘many regions’ where this economic growth has not delivered the improvements laid out in line 53. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	thank you for the statement, this was considered when developing edits.
5085	6	54	6	54	re: reference to unequal income distribution: also issue of distribution of and power? Need some reference beyond the economics -- to flag the underlying drivers of inequity in income distribution. would also be useful to reference inequity in income distribution at all levels -- HH, local, national, regional, and global. Or could reframe this that despite economic growth globally, severe inequity in income distribution as well as other markers of social, economic, and physical well-being persist. Given frame of climate justice used in this report, there's an opportunity to move past the continued focus on economic growth as the sole market of progress. This reframing would support recognition that economic growth alone is not sufficient for all to attain well-being. Economic growth will not alone enable us to achieve the SDGs. A more fundamental shift is needed that gets at the underlying causes of persistent inequality and inequity in the distribution of the benefits of economic growth. [Tonya Rawe, United States of America]	thank you for the statement, this was considered when developing edits.
13657	6	55	6	55	Check for consistency with chapters 2 and 4 eg chapter 2, page 10 ‘population growing from the current 7.5 billion to over 9 billion by mid-century (United Nations 2015)’ [Elvira Poloczanska, Germany]	the text was edited to reflect this point
9845	6	55	6	55	Why not showing the SSP range population projections here? [Christopher Reyer, Germany]	the text was edited to reflect this point
16079	6	55	6	55	Two figure precision on the population projection seems a bit overstated--how about 9.5-10 billion or something? [Michael MacCracken, United States of America]	thank you for the statement, this was considered when developing edits.
2266	6	55	6	55	The UN's latest revision increases the 2050 population projection from 9.7 billion to 9.8 billion.See: http://www.un.org/sustainabledevelopment/blog/2017/06/world-population-projected-to-reach-9-8-billion-in-2050-and-11-2-billion-in-2100-says-un/. Given the uncertainties in these projections maybe "9.7 billion" should be replaced by "around ten billion" or "almost ten billion". [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	good point. thank you for the statement, this was considered when developing edits .
2363	6	55	7	2	is this despription of population growth consitnt with the SSP that accompanies RCP2.6? [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	thank you for the statement, this was considered when developing edits .
4257	6	55	7	2	More specific information based on the United Nations Population Divison Database could be added. I suggest to include the following sentence after "The world population...": "In 2015, urban areas provided a home to 54% of the world population. This percentage was even higher for the more developed regions population (78%) and lower for the population of the less-developed regions (49%). However, the annual percentage of population residing in urban areas has increased from 1950 to 2015 by 24% and 31% in the more- and less-developed regions, respectively (Salvador, 2017)". Salvador, P., 2017: Ozone, SOx and NOx, Particulate Matter, and urban air. Reference Module in Earth Systems and Environmental Sciences, from Encyclopedia of the Anthropocene, Elsevier. Available on-line 8 April 2017. https://doi.org/10.1016/B978-0-12-409548-9.09975-9. [Pedro Salvador, Spain]	the text was edited to reflect this point
21	7		9		The chapter´s title refers to sustainable development but hardly handles [Walter Leal, Germany]	the sections were significantly edited to reflect these and other similar comments

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17376	7	1	7	2	population growth will primarily be within the coastal zones in the low and moderate-income zones. This zone is already under heavy pressure (as refered to in other areas of report). Ahmed, N. 2006, Ad Hoc Expert Meeting in preparation for the Mid-term Review of the programme of Action for the Least Developed countries for the Decade 2001-2010, Bangladesh Institute of Development Studies (BIDS), UNCTAD, Bangladesh. [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	thank you for the statement, this was considered when developing edits .
19050	7	2	7	2	Please delet space befor " The Urgencey….." [Heba Elbasiouny, Egypt]	the text was edited
16487	7	2	7	3	Go through and adress when Paris 'agreement' is used instead of 'Paris Agreement'. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	thank you for the statement, this was considered when developing edits .
1046	7	2	7	5	Suggest putting the following sentence in bold" The urgency of keeping with the Paris agreement is that the threat of 1.5c above pre-industrial levels will likely exacerbate other global scale problems such as the degradations of ecosystems, food security, increased disease outbreaks, access to fresh water in different regions" [Martini Catherine, United States of America]	thank you for the statement, this was considered when developing edits .
17819	7	2	7	5	The references listed in this paragraph focus mainly on food security but several other topics are listed (degradation of ecosystems, food security, increased disease outbreaks, access to fresh 4 water in different regions) perhaps additional references shoudl be included to cover these topics? [Wilfran Moufouma Okia, France]	thank you for the statement, this was considered when developing edits .
1778	7	3			the threat of global temperature increase by 1.5°C or more above .. [Tibor Farago, Hungary]	thank you for the statement, this was considered when developing edits .
6421	7	4	7	4	Change 'outbreaks, access' to 'outbreaks and access'. [Jonny Williams, New Zealand]	the text was edited
20350	7	4	7	4	Are disease outbreaks increasing? What kinds of disease are you talking about : vegetation, animal, human? [Olivier Boucher, France]	the text was edited to reflect this point
10407	7	4	7	4	"and" missing ''increased disease outbreaks and access to fresh…" [Jonathan Lynn, Switzerland]	the text was edited
9957	7	4	7	4	change "food security" for "ood insecurity" as you are making a list of problems [Carmenza Robledo Abad, Switzerland]	the text was edited
1047	7	4	7	5	Add an and before access to fresh water [Martini Catherine, United States of America]	thank you for the statement, this was considered when developing edits .
2910	7	4	7	5	Please rephrase to: ..... disasters, decreasing food security, ..., and missing access to fresh water. [Sabine Wurzler, Germany]	the text was edited
16488	7	7	7	13	The way of introducing 'migration' here in the report next to words such as poverty and food insecurity reinforces the negative side of environmental migration e.g. failure to adapt. Migration such as seasonal, temporary etc is also one of the oldest and most commonly used ways to deal with environmental stress/shocks and can at times be a very sucessful adaptation strategy. Maybe even include a reference to Black et al. 2011, 'Migration as adaptation' (http://www.nature.com/nature/journal/v478/n7370/full/478477a.html?foxtrotcallback=true) to difference between sucessful adaptation and erosive coping, for examaple. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	the text was edited
1702	7	7	7	16	In the context of linkages between climate change and temperature rise, there is need to focus on "long-term effects of global climate change". Research findings indicate that the net damage costs of climate change are likely to be significant and to increase over time. It has also been found that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities. Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases emitted globally, and how sensitive the Earth's climate is to those emissions. [Mishra Santosh Kumar, India]	thank you for the statement, this was considered when developing edits .
1712	7	7	7	16	In the context of linkages between climate change and temperature rise, there is need to focus on "long-term effects of global climate change". Research findings indicate that the net damage costs of climate change are likely to be significant and to increase over time. It has also been found that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities. Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases emitted globally, and how sensitive the Earth's climate is to those emissions. [Mishra Santosh Kumar, India]	thank you for the statement, this was considered when developing edits .
1717	7	7	7	16	In the context of linkages between climate change and temperature rise, there is need to focus on "long-term effects of global climate change". Research findings indicate that the net damage costs of climate change are likely to be significant and to increase over time. It has also been found that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities. Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases emitted globally, and how sensitive the Earth's climate is to those emissions. [Mishra Santosh Kumar, India]	thank you for the statement, this was considered when developing edits .
702	7	7	7	16	It does not seem clear to me that today's climate is so much worse than that in 1870. Winters were very often severe and killed many people. [Herve Nifenecker, France]	thank you for the statement, this was considered when developing edits .
2337	7	7	7	16	I would suggest to show the interaction between CCA and DRR (links/connections/disconnections), e.g. http://www.placard-network.eu/ [Thaler Thomas, Austria]	thank you for the statement, this was considered when developing edits .
1722	7	7	7	16	In the context of linkages between climate change and temperature rise, there is need to focus on "long-term effects of global climate change". Research findings indicate that the net damage costs of climate change are likely to be significant and to increase over time. It has also been found that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities. Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases emitted globally, and how sensitive the Earth's climate is to those emissions. [Mishra Santosh Kumar, India]	thank you for the statement, this was considered when developing edits .
6422	7	7	7	8	The phrase 'new shocks and new risks is imprecise'. At the least an example should be given here. [Jonny Williams, New Zealand]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
13658	7	8	7	8	Than global mean or 1.5C ? [Elvira Poloczanska, Germany]	this point was clarified
15200	7	8	7	8	The evidence for "new shocks" is very sparse in the WGII AR5 SPM (one mention) and is far outweighed by the evidence for risks. Unless there is a more convincing reference, I suggest dropping it here or at least reversing the order. [Pauline Midgley, Germany]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
20351	7	8	7	8	higher warming, higher than what ? Higher than the global mean warming? [Olivier Boucher, France]	the text was edited to reflect this point
6014	7	8	7	9	What is meant by "at different periods"? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	this point was clarified

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4258	7	9	7	10	Related to comment N°1. As it is written in the text, "extreme weather events", droughts and floods are different processes. I mean, it seems that droughts and floods are different processes than "extreme weather events". I suggest to rewrite this paragraph. [Pedro Salvador, Spain]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1151	7	9	7	11	Increases in extreme weather events, droughts, floods… - the notion that floods are increasing because of climate change, or will increase in future future, is still debatable at the global scale, and thus this statement should be tempered. Our team has done significant work on this as indicated in the two references below; and the reference lists of those papers should also be considered as they document earlier work in this space. The third reference is from another team that recently published a similar paper. [PAPER 1: Do, H., Westra, S. & Leonard, M., 2017, a global scale investigation of trends in annual maximum streamflow, Journal of Hydrology, doi: 10.1016/j.jhydrol.2017.06.015. PAPER 2: Johnson, F., White, C.J., van Dijk, A., Ekstrom, M., Evans, J.P., Jakob, D., Kiem, A.S., Leonard, M., Rouillard, A. & Westra, S., 2016, Natural hazards in Austraila: Floods, Climatic Change, 139(1), pp 21-35. PAPER 3: Hodgkins, G.A., Whitfield, P.H., Burn, D.H., Hannaford, J., Renard, B., Stahl, K., Fleig, A.K., Madsen, H,. Mediero, L., Korhonen, J., Murphy, C. & Wilson, D., 2017, Climate-driven variability in the occurrence of major floods across North America and Europe, Journal of Hydrology, 704-717] [Seth Westra, Australia]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
5086	7	9	7	12	These impacts are affecting more than economic growth. (if economic growth were sufficient to enable all to attain an acceptable level of well-being, there would not still be poverty in developed countries). This is also an opportunity to flag the cycle of poverty --> vulnerability --> impacts --> more poverty = more vulnerability. As phrased, poverty appears to be solely an effect of these impacts. It is also a cause of vulnerability to these impacts. Furthermore, there are other global policy frameworks and commitments whose realization is undermined by climate impacts (SDGS, most notably, as well as human rights obligations). [Tonya Rawe, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1779	7	11			addressing the SDGs of the 2030 Agenda for „Transforming our World" (United Nations, 2015b) and the Sendai .. [Tibor Farago, Hungary]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
15201	7	12	7	12	grammar: "decline" should be "declines" or "a decline" [Pauline Midgley, Germany]	the text was edited
4252	7	12	7	13	The following statement lacks a supporting reference, "The most affected are the low and middle income countries where this has led to decline in food security and has been linked to migration and poverty" (Chapter 1, page 1-7, lines 12-13) [Francisco Molero, Spain]	this point was clarified
2029	7	12	7	13	The most affected are the low and middle income countries where this has led to decline in food security, public health, and has been linked to migration and poverty. [Tao Yang, China]	thank you for the statement, this was considered when developing edits .
2694	7	12	7	14	Suggest you add populations residing in drylands and the Arctic to this list of most affected populations. See for example Schleussner et al (2015) on drylands emerging as critical hotspots, particularly for increasing impacts between 1.5 and 2 [Penny Urquhart, South Africa]	thank you for the statement, this was considered when developing edits .
17820	7	12	7	14	A reference is needed for this statement. [Wilfran Moufouma Okia, France]	this point was clarified
1271	7	12	7	14	These two lines should have a citation, as the factoids they point out are not self-evident. [Colin Raymond, United States of America]	this point was clarified
11669	7	12	7	16	These are important points that should be supported by references to published work. [David Schoeman, Australia]	this point was clarified
3257	7	13			p7, line 13: What proportion of the world's population is covered by small islands, megacities, coastal regions and mountain ranges? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
19051	7	13	7	13	If the words "As well," are added to the sentence " Smal islands…." I think it will be better [Heba Elbasiouny, Egypt]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
5087	7	13	7	14	Moving beyond geographic sources of vulnerability -- exposure. Opportunity to highlight vulnerability that results from social and political factors: unequal access to resources that enable a person to anticipate, prepare for, manage, and recover from impacts. People in coastal regions are not all vulnerable -- those closest to the coast in a developed country may be wealthier and able to evacuate; whereas those slightly more inland (still coastal) and at a lower income level may have less access to resources (economic or social capital) to evacuate. [Tonya Rawe, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1780	7	13	7	14	Small islands and populations residing in megacities à Populations of small islands, those residing in megacities .. [Tibor Farago, Hungary]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
12450	7	14			please add ", arid lands" after megacities. The arid lands are very vulnerable to the climate change impacts. [Mohammad Rahimi, Iran]	this point was clarified
1048	7	14	7	15	Suggest putting the following sentence in bold "Small islands and populations residing in megacities, coastal regions and in high mountain ranges are some of the most affected" [Martini Catherine, United States of America]	thank you for the statement, this was considered when developing edits .
1923	7	14	7	16	The authors might want to go into a little more detail about the characteristics of the Anthropocene to make this sentence more easily accessible. [Judith Kreuter, Germany]	the text was edited to reflect this point
12190	7	14	7	16	I think this sentence can be difficult to understand for many readers and should be reformulated. [Jan Fuglestvedt, Norway]	the text was edited
11438	7	15			The world is inter-connected regardless of whether we label it Anthropocene or not. This sentence would be clearer if it read "Efforts to curtail greenhouse gas emissions without considering the relationships between climate change and other ecosystem processes may impact negatively on the development ambitions of many nations." [Stewart Lockie, Australia]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
19659	7	15			not enough to just incorporate the anthropocene - also need to incorporate human rights [Tara Shine, Ireland]	Accepted - Now incorporated.
1051	7	15	7	15	suggest adding the word currently after most to read: "some of the most currently affected" [Martini Catherine, United States of America]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
20352	7	15	7	15	without incorporating the intrinsic interconnectivity of the Anthropocene world meaning ?? So efforts to curtail GHG emissions in a way that incorporate the intrinsic interconnectivity of the Anthropocene word would not impact negatively on the development ambitions of many nations ? [Olivier Boucher, France]	This section was extensively edited and the section structure and text has been significantly change to reflect these considerations
1781	7	18			The 1.5°C target thus .. à To limit the warming to 1.5°C thus .. ((explanation: it is NOT a target; the target is not too exceed that threshold)) [Tibor Farago, Hungary]	Accepted - text revised.
12189	7	18	7	18	I suggest changing "concerns" to "issues" or "questions" to make it more neutral [Jan Fuglestvedt, Norway]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2601	7	18	7	34	perhaps make more explicit human rights issues in relation to procedural justice/climate negotiations? What target is adhered to also represents a bias towards the certain countries at an international level [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised.
21295	7	18	7	34	the entire para should be reworked if kept to be a precis of section 1.4.1 [Jan Corfee-Morlot, France]	Accepted - text revised.
16081	7	18	7	34	Paragraph could use a bit of editorial smoothing and some simplification of some jargony phrases. [Michael MacCracken, United States of America]	Noted. The editorial work has been done.
15315	7	18	7	34	Although it is implicit in the matter in the paragraph, food security is a basic and important issue and deserves to be explicitly referred together with the important aspects in this paragraph. [Francisco Javier Hurtado Albir, Germany]	Accepted - text revised to reflect food security as an important aspect that will be affected by climate change
14971	7	18	7	34	As noted, human rights does not appear properly within the scope of this report and is a topic of legal rather than scientific inquiry. Human rights is a separate field from ethics, and this language appears to conflate the two fields, and makes conclusory statements about human rights. Therefore, the human rights discussion framing should be omitteed. Why is there no mention of the potential economic concequences of mitigation policies on communities which rely on fossil fuel production in this section? Surely, such costs should factor into a discussion on ethics. The authors should be careful to present a full, balanced, and objective framing of "ethics" as views diverge significantly. [Farhan Akhtar, United States of America]	Noted - See response 351 on Human Rights for a more precise discussion, highlighting that Human rights have recently emerged as a language relevant to the principle of equity, repeated in the UNFCCC, the Paris Agreement, and in successive IPCC reports. The question of communities reliant on fossil fuel production is raised in the context of a 'just transition of the workforce'.
13083	7	19	7	19	typo - change 'Internatonal' to 'International' [Veryan Hann, Australia]	Noted. Text adjusted.
6015	7	19	7	19	Typo - "Internatonal" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
4253	7	19	7	19	The word "internatonal", instead of "international", appears at Chapter 1, page 1-7, line 19 and Chapter 1, page 1-48, line 39 [Francisco Molero, Spain]	Noted.
10408	7	19	7	19	typo International [Jonathan Lynn, Switzerland]	Noted.
13262	7	19	7	20	An influential account of how climate change threatens human rights is Simon Caney 'Climate Change, Human Rights and Moral Thresholds' in Human Rights and Climate Change (Cambridge: Cambridge University Press, 2010), edited by S. Humphreys, 69-90. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. The reference has been reviewed and added.
1782	7	19	7	34	Ethical concerns are also mentioned in the Paris Agreement, so pls include a due reference to it. ((explanation: PA preamb.: ".. noting the importance for some of the concept of 'climate justice', when taking action to address climate change")) [Tibor Farago, Hungary]	Accepted. Text revised and added according to the reviewer's suggestion.
19660	7	20			add reference to the Office of the High Comissioner for Human rights, the Human Rights Council & the International Bar Association - see also the Journal of Human Rights and the environment special edition on climate justice, Issue 1, March 2016. https://www.elgaronline.com/view/journals/jhre/7-1/jhre.2016.7.issue-1.xml [Tara Shine, Ireland]	Accepted (partially) - OHCHR and IBA have been added.
6423	7	20	7	22	The sentence structure starting with 'For example' and ending with 'children' needs to be reworded. [Jonny Williams, New Zealand]	Accepted
21294	7	20	7	22	From an ethical perspective: isnt the issue really what happens if we miss this target? and what are the gains if we meet it eg in terms of poverty reduction and benefits to the most vulnerable populations? Suggest to move text up from section (1.4.1) below and start there... [Jan Corfee-Morlot, France]	Noted. Yes, the point of the text is to assess the literature that indicates the consequences of missing the 1.5oC target, and the benefits of meeting the target in terms of poverty alleviation and sustainability. The text in 1.4.1 stays in the section as the discussion in 1.4.1 provides an assessment of ethics and equity in the context of poverty alleviation and sustainable development.
2695	7	20	7	22	Good that children are included in the list of examples of already vulnerable people, suggest you add disabled people and the aged to this. [Penny Urquhart, South Africa]	Accepted
1272	7	21	7	21	A colon should be inserted after the word 'persons'. [Colin Raymond, United States of America]	Accepted
13589	7	21	7	22	vulnerable not just these groups - also elderly, people with mental or physical health problems [Elvira Poloczanska, Germany]	Accepted
5088	7	21	7	22	recommend using "indigenous peoples" rather than "indigenous communities" [Tonya Rawe, United States of America]	Accepted
12451	7	22			please add "old people" after women [Mohammad Rahimi, Iran]	Accepted
11439	7	22			Neither indigenous people nor women and children are inherently vulnerable. The wording should reflect this. [Stewart Lockie, Australia]	Noted - Language reflects existing definitions of vulnerability.
4413	7	22		25	Could you give more explanation for the two sentences? [Jingyong Zhang, China]	Noted - Amended for clarification
1052	7	22	7	22	Delete word "the" so line reads: "communities, women and children? As the world advances towards 1.5c, further deterioration of human" [Martini Catherine, United States of America]	Accepted
15202	7	22	7	22	grammar: "the human rights" - definite article is not needed so should be "human rights" [Pauline Midgley, Germany]	Accepted
10409	7	22	7	22	drop "the" – "further deterioration of human rights…" [Jonathan Lynn, Switzerland]	Accepted
10364	7	22	7	23	should read "further deterioration of human rights" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
6424	7	22	7	24	This sentence is unclear in its meaning. [Jonny Williams, New Zealand]	Accepted. Text has been revised for clarification.
1053	7	24	7	27	Suggest putting this sentence in bold "Failure to limit warming to 1.5c will necessarily result in further extensive human rights consequences. In human rights terms, the gap between 1.5c and 2c amounts to a greater likelihood of drought, flooding, resource depletion, conflict and forced migration in many parts of the world" [Martini Catherine, United States of America]	Accepted (partially) - text has been amended to reflect the deterioration of human rights in a 2oC world, compared to 1.5oC.
6016	7	25	7	26	Is there enough evidence to say that 2C has greater likelihood of resource depletion and conflict?? If so would like to see reference to Chapter 3 analysis of this. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Refer to (table 3.1). (section 3.3.1.2.2) (fig. 3.4), and (fig. 3.8)?
20353	7	25	7	28	Are these the best references to back this claim? I understand what "a greater likelihood of drought" means but how does "a greater likelihood of drought in human rights term" differ from that? [Olivier Boucher, France]	Noted - greater likelihood of drought in human rights terms human rights focuses on individual harms.

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1152	7	25	7	27	Increases in extreme weather events, droughts, floods… - the notion that floods are increasing because of climate change, or will increase in future future, is still debatable at the global scale, and thus this statement should be tempered. Our team has done significant work on this as indicated in the two references below; and the reference lists of those papers should also be considered as they document earlier work in this space. [PAPER 1: Do, H., Westra, S. & Leonard, M., 2017, a global scale investigation of trends in annual maximum streamflow, Journal of Hydrology, doi: 10.1016/j.jhydrol.2017.06.015. PAPER 2: Johnson, F., White, C.J., van Dijk, A., Ekstrom, M., Evans, J.P., Jakob, D., Kiem, A.S., Leonard, M., Rouillard, A. & Westra, S., 2016, Natural hazards in Austraila: Floods, Climatic Change, 139(1), pp 21-35.] [Seth Westra, Australia]	Noted - it is important to indicate that extreme weather events and droughts as a result of climate change are likely to increase in different parts of the world. We are thankful to the reviewers for the papers. We have passed them on to the authors of other chapters where the issue of extreme weather events, droughts, floods, etc are discussed in greater depth.
12452	7	26			what kind of recources? Natural, economical,etc? [Mohammad Rahimi, Iran]	Noted - but the meaning appears to be clear enough. It refers to natural resources.
15203	7	26	7	26	Are the avoidance of drought and flooding human rights? This is not the same as the right to food and shelter and other Universal Human Rights. [Pauline Midgley, Germany]	Noted - A large literature suggests these are related notions
17821	7	27	7	28	Reference: Office of the United Nations High Commossioner for Human Rights 2009. No extra information about this reference is supplied in the reference list. Please provide more information. [Wilfran Moufouma Okia, France]	Noted.
13263	7	28	7	31	For analysis of the ways in which mitigation and adaptation policies have implications for the enjoyment of human rights see 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 and Simon Caney 'Climate Change, Human Rights and Moral Thresholds' in Human Rights and Climate Change (Cambridge: Cambridge University Press, 2010), edited by S. Humphreys, 69-90. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Referenced widely elsewhere.
1646	7	30	7	30	It should be "considerations to" and not "considerations of." [Jesse Keenan, United States of America]	Noted - we have used 'attention to' instead.
4226	7	31	7	32	That sounds logical, and is not wrong, but I think the framing is a bit precarious on two issues. First, there are also many poor in developed countries who might be impacted by higher energy prices. See e.g. Bouzarovski 2014 (Bouzarovski, Stefan. "Energy poverty in the European Union: landscapes of vulnerability." Wiley Interdisciplinary Reviews: Energy and Environment 3.3 (2014): 276-289.) Second, rather than technological availability itself it might be much more about stable institutions and, specifically, access to financing and credit markets. After all low-carbon technologies must be financed front-up and if interest rates are above 10% that is not feasible. See for example the second half of the this paper: Creutzig, F., Agoston, P., Goldschmidt, J. C., Luderer, G., Nemet, G., & Pietzcker, R. C. (2017). The underestimated potential of solar energy to mitigate climate change. Nature Energy, 2, nenergy2017140. [Felix Creutzig, Germany]	Accepted (partially). We have added 'stable funding' as an important factor in rapid decarbonisation efforts. The issue around stable institutions is covered in some depth in the following paragraphs in section 1.1.
16080	7	33	7	33	Again, best to avoid word "may" as it is essentially meaningless. Drawing from the IPCC lexicon, I'd suggest "are likely to" instead. [Michael MacCracken, United States of America]	Accepted
19661	7	34			the human rights implications of climate responses also need to be referenced here. This is picked up again in chapter 5. [Tara Shine, Ireland]	Noted
1647	7	34	7	34	I get the intent of this sentence. But, there is a problem in that property rights (especially vested property rights), in particular, often manifest as a significant barrier to adaptation. I am not sure if this qualification is necessary. See, Nizalov, D., Thornsbury, S., Loveridge, S., Woods, M., & Zadorozhna, O. (2016). Security of property rights and transition in land use. Journal of Comparative Economics, 44(1), 76-91; Yegbemey, R. N., Yabi, J. A., Tovignan, S. D., Gantoli, G., & Kokoye, S. E. H. (2013). Farmers' decisions to adapt to climate change under various property rights: A case study of maize farming in northern Benin (West Africa). Land Use Policy, 34, 168-175. [Jesse Keenan, United States of America]	Rejected - Clarify it is 'human' rights.
7089	7	36		44	Some insight on gainers and loosers of global warming: LG. Giraudet, C. Guivarch (2016). Global warming as an asymmetric public bad, FAERE Working Paper, 2016.26. [Érika Mata, Sweden]	Noted. The reference was reviewed
1102	7	36	7	36	The discussion in this section refers to "political will" and "innovative governance arrangements" and doesn't say anything about the role of citizens or the private sector. On the next page fortunately it is suggested that the required mechanism would "allow for actions by non-state actors". This is really understating the importance of action by non-state actors. [Rob Swart, Netherlands]	Noted - Amended for clarification
13590	7	36	7	37	not just about political will and governance - also requires getting full support from industry, societies & communities [Elvira Poloczanska, Germany]	Noted - Amended for clarification
6425	7	36	7	39	This sentence is too long. [Jonny Williams, New Zealand]	Noted. The editorial work has been done.
1737	7	36	7	39	Too wordy. Recommend deleting 'highly supportive', 'far reaching', and 'spatial, temporal' [Levi Golston, United States of America]	Noted - Amended for clarification
5089	7	36	7	39	per the comment at the beginning of this section, it isn't clear what is meant by "innovative governance arrangement," in the absence of more discussion of what governance entails for climate change action. [Tonya Rawe, United States of America]	Noted. Text adjusted.
4350	7	36	7	39	I think more references should be included in this sentence. [Gabriel de Oliveira, Brazil]	Noted.
6266	7	36	7	43	This paragraph implies that the task is nearly impossible or disruptive. Therefore it should highlight this fact. [Milton Nogueira da Silva, Brazil]	Noted - Amended for clarification
21296	7	36	7	44	Oddly no direct mention of need for policy or policy reforms here in opening sentence and rest of para so opaque as to be distracting [Jan Corfee-Morlot, France]	Noted - Amended for clarification
11670	7	36	7	44	This final paragraph reads poorly and is filled with unnecessary adjectives and jargon. For example, what are "integrated reflexive policy institutions..."? This needs at least a bot of punctuation or, preferably, a careful edit for clarity. [David Schoeman, Australia]	Noted. Text adjusted.
2455	7	36	7	44	Top-down mitigation alone will not suffice; e.g., "When the Audubon Society killed the millinery feather trade in 1913, what was its real weapon, the prohibitory law or the refusal of intelligent women to buy wild bird plumage? The answer is plain. The law was merely the symbol of a conviction in the mind of a minority. That conviction was so strong and unequivocal that it was willing to risk direct action, danger of ridicule, and even danger of mistakes to achieve the common good" "Can society prevent by law what it condones by social usage?"(Leopold (1991[1942]:296). Leopold, Aldo 1991[1942]). Land-Use and Democracy. In The River of the Mother of God: And other Essays by Aldo Leopold, pp. 295-300. University of Wisconsin, Madison. [Lisa Lucero, United States of America]	Noted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2338	7	37	7	37	how you define/see innovative governance arrangements, please provide more in-depth information/literature on this term. In general, governance section in section 1.1.1. is a little bit thin, such as how you define institution/what is difference between institution/organization, how we change current governance arrangements etc. see also debate on political feasibility, e.g. Jordan A, Huitema D: Innovations in climate policy: the politics of invention, diffusion, and evaluation. Environ. Polit. 2014, 23:715–734. Jordan A, Huitema D: Innovations in climate policy: conclusions and new directions. Environ. Polit. 2014, 23:906–925. Jordan A, Huitema D: Policy innovation in a changing climate: Sources, patterns and effects. Glob. Environ. Change 2014, 29:387–394. [Thaler Thomas, Austria]	Noted. Editorial adjustments were made. The reference was reviewed
1738	7	40	7	40	Recommend deleting 'reflexive' for clarity [Levi Golston, United States of America]	agreed
16082	7	40	7	40	Will people really understand what "integrated reflexive policy institutions capable of operating at multiple scales" are? Given what is required, it might better be said that it would likely require a strong and possibly quite intrusive global governmental effort much stronger than the UN presently is unless there is some considerable public, governmental and business acceptance of the need for urgent action. [Michael MacCracken, United States of America]	Noted - Amended for clarification
4839	7	40	7	41	at multiple scales (from local to regional at multiple scales (from local to regional nd international) and with commitments for longer timescales [Wilfried Maas, Netherlands]	Noted - Amended for clarification
15204	7	41	7	41	grammar: "to affect the far-reaching policy change required should be "to effect the far-reaching policy change required" [Pauline Midgley, Germany]	Noted - Amended for clarification
15205	7	41	7	41	First occurrence of GHGs - define here, or earlier the first time "greenhouse gas" is used? [Pauline Midgley, Germany]	Noted - Amended for clarification
12903	7	41	7	42	There is a problem only with GHGs? Today, we have also a bad knowledge of aeroeosl radiative forcings uncertainties (direct and clouds albedo effects). It's possible to introduce mistakes in our understanding of all climate mechanisms? [Mustapha Meftah, France]	Noted
9927	7	42	7	42	I think it should say "consistent with a no more than 1.5°C warmer world" [Olga Alcaraz, Spain]	Noted. Consistent phrasing on how to describe a 1.5C warmer world was used throughout
20354	7	43	7	43	I would think of human right issues as long-standing rather than emerging? [Olivier Boucher, France]	Noted. Emerging within formal climate negotiations
9154	7	43	7	44	Citing "Paris COP21 Agreement" is a mlistake. It should read "Paris Agreement negocated during COP21" [Timothée OURBAK, France]	Noted. Consistent phrasing on how to describe a 1.5C warmer world was used throughout
9789	7	43	8	12	Please consider if the sutitle and contents should put "drought" and "flood" together, because both of them could be attributed to the imacts of extrems precipitation. [Rongshuo Cai, China]	the text was edited
9790	7	43	8	12	Please consider if the sutitle and contents should put "drought" and "flood" together, because both of them could be attributed to the imacts of extrems precipitation. [Rongshuo Cai, China]	the text was edited
1165	7	47			Section 1.1.2 and Box 1.1 should include explicit description of ALL pathways used in the SR (i.e. temperature, emission, mitigation, adaptation, transformation, transition, and climate-resilient development pathways). These should be discussed in Box 1.1, with more or less equal emphasis and references, and x-referencing of usage in the various chapters. This serves to avoid confusion later in the chapter (i.e. section 1.2.3) and throughout the report. Consider restructuring Box 1.1 in-line with Rosenbloom (2017) "Pathways: an emerging concept for the theory and governance of low-carbon transitions", Global Environmental Change, 43, 37-50: biophysical, techno-economic, socio-technical, showing an increasing order of complexity - as discussed at LAM2. Add to this climate-resilient development pathways (CRDPs) at the end, as this is a social-development pathway sensitive to issues of justice, equity, inequality etc, as explained in Ch5. Please also note that CRDPs can also be applied to sub-national scales (i.e. communities, movements, groups etc), not just national scales - again see Ch5 (5.7). I'd be happy to help with this box, based on x-chapter box discussions at LAM2. [Petra Tschakert, Australia]	the sections were significantly edited to reflect these and other similar comments
14947	7	47	7	47	Title of the section should be "1.5°C goal and pathways" [LOKESH CHANDRA DUBE, India]	the text was edited
9536	7	47	8	19	1.1.2 is better to be moved after 1.1.3. Present 1.1.1 and 1.1.3 discuss conceptual matter, 1.1.2 rather focuses on techinical and implementation matters, and be a good intriduction to 1.2 [Shuzo Nishioka, Japan]	the sections were significantly edited to reflect these and other similar comments
9562	7	47	8	19	1.1.2 is better to be moved after 1.1.3. Present 1.1.1 and 1.1.3 discuss conceptual matter, 1.1.2 rather focuses on techinical and implementation matters, and be a good intriduction to 1.2 [Shuzo Nishioka, Japan]	the sections were significantly edited to reflect these and other similar comments
20071	7	47	8	19	Here or elsewehere in the chapter: It would be useful for the authors to address possible scenarios for the case that the US government is indeed leaving the Paris agreement as stated by ist president in June 2017. What would be the possible implications, are there sufficient bottom-up mechanisms allowing for this to be e.g. compensated by city- and state-level actions in the US? [Sonia Seneviratne, Switzerland]	Noted. Yes, the point of the text is to assess the literature that indicates the consequences of missing then1.5oC target
20649	7	47	8	19	This section introduces the general idea of pathways, but could serve the reader better by previewing the four major types of pathways outlined in sections 1.2.3.1 - 1.2.3.4. That would make the issues more clear and increase not only the value to the reader early in Chapter 1, but would increase the clarity of the overall report (in additional comments, I suggest each subsequent chapter make reference to the four types of pathways presented in chapter 1 to increase clarity for decision makers about both the mitigation implications as well as the impact implications of each broad pathway choice). [Koko Warner, Germany]	the sections were significantly edited to reflect these and other similar comments
4414	7	49		50	What's the "different pathways" and what's "the others"? [Jingyong Zhang, China]	the sections were significantly edited to reflect these and other similar comments
3349	7	49	7	49	CHANGE sentence to read "Slowing the pace of current warming to prevent a rise above 1.5 can be defined.... [Paul Doyle, Canada]	Noted - Amended for clarification
13139	7	49	7	49	word "altering or" can be deleted [Iman Babaeian, Iran]	Noted - Amended for clarification
16083	7	49	7	49	The sentence seems backward, and mention needs to made to possible climate interventions. So, how about saying: "Mitigation paths will determine the temperature pathway unless unprecedented and as yet unproven steps are taken to intervene via climate geoengineering." [Michael MacCracken, United States of America]	Noted - Amended for clarification
13591	7	50	7	50	please use consistent spelling and upper/lower case letters, above p6 line 8 upper case letters are used in Sustainable Development [Elvira Poloczanska, Germany]	Accepted. Text has been revised for clarification.
12806	7	50	7	52	Financial conditions are also critical, and are missing here. Suggestion: to add it. [Kennedy Mbeva, Australia]	Accepted. Text has been revised for clarification.
13592	7	51	7	51	what about cultural and psychological dimensions of decision making? This is acknowledged in AR5, including the notion of bounded rationality [Elvira Poloczanska, Germany]	Accepted. Text has been revised for clarification.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17822	7	51	7	51	The three dimensions to be considered to reach 1.5°C are described differently later on in the chapter (geophysical & environmental, technicological & economic, social & insititutional). Please keep the descriptions consistent. [Wilfran Moufouma Okia, France]	Accepted. Text has been revised for clarification.
12191	7	51	7	51	I think "international collaboration" or "political dimensions" should be included here. [Jan Fuglestvedt, Norway]	Noted
9191	7	52			worth adding something about behaviour, or is it only technology and policy that matters? [Glen Peters, Norway]	Accepted. Text has been revised for clarification.
2069	7	52	7	52	the reader seems to search for box 1.3. There is no separate index of boxes/figures etc. Instead boxes are combined with the main text. Is this following convention? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted
3350	7	53	7	53	Change sentence to read "....levers should help decelerate the pace of global warming." [Paul Doyle, Canada]	Noted - Amended for clarification
3258	8	1			You say the NDCs are part of the global commitment to the 1.5 pathway, but then go on to say that the NDCs are not ambitious enough to secure that same pathway. However, the NDCs are the only global commitment to any change in current behaviour. So what is the purpose of the NDC? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Amended for clarification. Current commitments are sufficient to meet goals.
21297	8	1	8	2	NDCs also cover adaptation - not just ghg reduction - need to spell out somewhere what NDCs are [Jan Corfee-Morlot, France]	Noted - Amended for clarification
12192	8	1	8	2	I don't think the pathways at this stage are determined by the NDCs - but may be later. So (even if you write "in part") I think the sentence should be reformulated. [Jan Fuglestvedt, Norway]	Noted - Amended for clarification
13593	8	1	8	5	AND include mention that NDCs rely on technologies that either do not yet exist or have not been deployed at scale [Elvira Poloczanska, Germany]	Noted
13140	8	1	8	5	some parts of this phrase are duplicated [Iman Babaeian, Iran]	the sections were significantly edited to reflect these and other similar comments
703	8	1	8	5	NDCs would lead to warming of 3-4 °C. It would be interesting to explain this limit in terms of the Kaya equation. Too much increase of GDP? Or not enough progress in energy intensity, or in Carbon intensity? Here is the place to be pedagogical on the subject. It is also hard to understand why, in a dangerous situation, the objective is set much more difficult to reach, 1.5 °C rather than 2 °C. What is the rationale behind this increased difficulty? Is there a threshold between 1.5 and 2°C? If yes, it should be specified. [Herve Nifenecker, France]	Noted
1054	8	1	8	5	Effective climate communications include messages of hope and facts. It is true that current NDC commitments are on track for 3.4c warming. What is also true is that the structure of the Paris Agreement allows for an iterative process for increased ambition through successive rounds of NDCs in 5-10 year increments. This process is known as the ambition mechanism. It is rarely discussed and a critical piece of the agreement. It is often left out of media discourse. This chapter is bereft of any mention of it. This paragraph presents the perfect opportunity to provide 2-3 sentences of context and critical education about the structure of the ambition mechanism of the Paris Agreement. This would also engage in effective climate communications and adhere to scientific facts and legal structure of the agreement. To neglect to mention this aspect of the Paris Agreement would be highly remisc. 2-3 sentences could be added which say something like: Article 4 of the Paris agreement provides countries the opportunity every 5 years to increase the the pledges outlined in their NDCs. The ambition mechanism of the Agreement (Article 14) stipulates that the international community will see if it is collectively on track to meet the long term temperature goal outlined in the agreement. This ambition mechanism provides the structure for an iterative process to increase ambition over time. It is possible in future successive rounds of NDCs that the global community could be closer to reaching the 1.5c target. [Martini Catherine, United States of America]	Noted
12454	8	2			If you mean from "current NDCs", before Paris agreemet, please mention it. [Mohammad Rahimi, Iran]	Noted - Amended for clarification
5223	8	2	8	4	This sentence mentions a 3-4 degrees warming but does say when, is it 2100? Other studies suggest that the current NDCs are tracking towards a warming of 2.7 degrees, like the UNEP emissions gap report (http://www.unep.org/emissionsgap/) or the IEA WEO 2017. [Bianka SHOAi-TEHRANI, Japan]	Noted - Amended for clarification
17823	8	2	8	4	currently tracking toward a warming of 3-4°C above preindustrial.. in the two references listed here, Rogeli 2016 states a warming of 2.6-3.1°C and the UNFCCC 2016 does not mention a specific temperature rise. Please be clearer as to where the 3-4°C increase has been quoted from. [Wilfran Moufouma Okia, France]	Noted - Amended for clarification
1783	8	2	8	4	The current NDCs are not .. à The current national contributions (INDCs and NDCs) specified in relation to the Paris Agreement .. ((explanation: in many cases there are still only INDCs submitted before the adoption of the PM and which will be updated 5 years later)) [Tibor Farago, Hungary]	Noted - Amended for clarification
3259	8	2	8	5	You are mixing 'greenhouse gas' with GHG. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Amended for clarification
9192	8	3			Does Rogelj et al say 3-4C? This soft reference (covering many studies) seems to be more in the 2.5-3C range http://www.wri.org/blog/2015/11/insider-why-are-indc-studies-reaching-different-temperature-estimates [Glen Peters, Norway]	Noted - Amended for clarification
19052	8	3	8	3	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Noted - Amended for clarification
20355	8	3	8	3	3-4°C, what uncertainties does this range include? 3-4°C by when? NDCs, even if they are continued at a "similar" level of ambitious do not take us towards T stabilization anytime soon, so an indication of the time period associated with the 3-4°C is useful. [Olivier Boucher, France]	Noted - Amended for clarification
12193	8	3	8	3	Re "tracking towards a warming of 3-4…": This builds on so many assumptions. Could be removed, or one could say more about what assumptions this is building on. [Jan Fuglestvedt, Norway]	Noted - Amended for clarification
5210	8	3	8	4	There are additional papers in the literature. For example, the MIT Joint Program on the Science and Policy of Global Change has written peer-reviewed papers on this topic: Jacoby, H.D., Y.-H.H. Chen, B.P. Flannery (2017) Climate Policy, 17(7): 873–890 (doi: 10.1080/14693062.2017.1357528) [Arthur Lee, United States of America]	Noted. The reference was reviewed
1784	8	4			; UNEP 2016), i.e. the UNEP Emission Gap Report (EGR) 2016 is also a very relevant source! [Tibor Farago, Hungary]	Noted. The reference was reviewed
17814	8	4	8	4	UNFCCC 2016 - Should the corresponding bibliographic entry be for UNFCCC document FCCC/CP/2015/7 (https://unfccc.int/resource/docs/2015/cop21/eng/07.pdf) or document FCCC/CP/2016/2 (https://unfccc.int/resource/docs/2016/cop22/eng/02.pdf)? [Wilfran Moufouma Okia, France]	Noted. The reference was reviewed
12455	8	4	8	5	Need reference. [Mohammad Rahimi, Iran]	Noted. Text adjusted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3351	8	5	8	5	Eliminate last sentence entirely. It is unnecessary. [Paul Doyle, Canada]	Noted - Amended for clarification
6279	8	5	8	5	Movement toward 1.5°C will require an acceleration of this trend. [Mathis Wackernagel, United States of America]	Noted - Amended for clarification
6280	8	5	8	5	You say: Movement toward 1.5°C will require an acceleration of this trend. Make more explicit what that means in terms of carbon budget. Figueres et al paper (Nature 2017) could be used. But budget might be even tighter than that. [Mathis Wackernagel, United States of America]	Noted - Amended for clarification
12774	8	5	8	5	Does "this trend" refer to the decoupling ?This should be more explicit [Robert Vautard, France]	Noted - Amended for clarification
21298	8	7	8	10	On page 8 here and it is still not clear what this report is trying to do (if I do not read further and based on the text so far I am not very motivated!). Certainly ethics and justice issues are among the main challenges that policy makers face - but it is not the only one? is this report intending to narrowly address this ethics/justice challenge embeded in climate action? There are many other challenges that policymakers have to deal with such as keeping the costs of action low, affordable, as well as ensuring that the poorest do not suffer even more from the solutions, tackling vested interests to bring action, and managing the transition to a low carbon future (e.g. some will be losing their livelihoods and jobs, others will be gaining), etc.... Shouldn't we have a simple introduction to this report that covers some of these policy issues? [Jan Corfee-Morlot, France]	the sections were significantly edited to reflect these and other similar comments
17592	8	7	8	19	In the discussion about 1.5 pathways and the international regime (top-down vs bottom up) there is a need to situate the IPCC's role and the role of the present report vis-a-vis this regime. As noted in the FOD text, the Paris Agreement takes a bottom-up approach to climate governance. At the same time, however, it relies in part on scientific expertise (and the IPCC in particular) to guide national ambition, i.e. through the "global stocktake" process that will use IPCC reports in order to assess progress towards the Agreement's global goals. This new role of the IPCC is discussed, most recently, in Lahn, B., Int. Environ Agreements (2017), https://doi.org/10.1007/s10784-017-9375-8L , and by Beck, S. & M. Mahony, Nature Clim Change (2017), https://doi.org/10.1038/nclimate3264 . Beck & Mahony (2017) argue that there is an expectation that the IPCC will contribute a form of "regulatory science" that can guide national ambition in the form of NDCs, e.g. through the work on mitigation pathways. If this is so, it highlights the need for the IPCC process to be reflexive w.r.t. its own practice, and for IPCC reports to be explicit about the value choices and potential political conflicts inherent in model assumptions and pathway preparation (Lahn 2017). This would be good to acknowledge in the framin chapter of the report. [Bård Lahn, Norway]	the sections were significantly edited to reflect these and other similar comments
13594	8	7	8	7	in a complex system there are no 'best ways' - it is impossible to maximise in a complex system because the possibility space is too vast - can only try to optimise with incomplete information in an ever-changing context. As stated earlier (p5 lines 36-41) conventional tools are insufficient. Actually they are inappropriate - eg see Cynefin framework for explanation (Snowden & Boone 2007) [Elvira Poloczanska, Germany]	Noted
15206	8	7	8	7	copy edit: "wide reaching" should be "wide-reaching" [Pauline Midgley, Germany]	Noted
12194	8	7	8	7	I suggest changing from "challenge is" --> "challenges are" [Jan Fuglestvedt, Norway]	Noted
14972	8	7	8	8	Again, considerations of "justice" is outside the scope of this report. The authors should be careful to present a full, balanced, and objective framing of "ethics" as views diverge significantly. [Farhan Akhtar, United States of America]	the sections were significantly edited to reflect these and other similar comments
2923	8	8			TCRE is defined by AR5 (Appendix III Glossary) as "Transient Climate Response to Cumulative CO2 Emissions". Please use this definition throughout the SR. See also page 2-10 line 32. [MacDougall Andrew, Canada]	Noted
13595	8	8	8	8	most effective' - same point as for 'best ways' above (in a complex system there are no 'best ways' - it is impossible to maximise in a complex system because the possibility space is too vast - can only try to optimise with incomplete information in an ever-changing context. As stated earlier (p5 lines 36-41) conventional tools are insufficient. Actually they are inappropriate - eg see Cynefin framework for explanation (Snowden & Boone 2007)) [Elvira Poloczanska, Germany]	Noted
7715	8	10	8	10	Put “and” between strong and effective [Hilary Inyang, Nigeria]	Noted - Amended for clarification
16084	8	10	8	10	Change "earth-system" to "Earth-system"--"Earth" is a planet and not dirt--it should be capitalized. [Michael MacCracken, United States of America]	Noted
520	8	10	8	11	An additional option exists to get down to 1.5 C, as specifically detailed for 139 countries in the peer-reviewed paper, Jacobson, M.Z., M.A. Delucchi, Z.A.F. Bauer, S.C. Goodman, W.E. Chapman, M.A. Cameron, Alphabetical: C. Bozonnat, L. Chobadi, H.A. Clonts, P. Enevoldsen, J.R. Erwin, S.N. Fobi, O.K. Goldstrom, E.M. Hennessy, J. Liu, J. Lo, C.B. Meyer, S.B. Morris, K.R. Moy, P.L. O'Neill, I. Petkov, S. Redfern, R. Schucker, M.A. Sontag, J. Wang, E. Weiner, A.S. Yachanin, 100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for 139 countries of the world, Joule, 1, doi:10.1016/j.joule.2017.07.005, 2017, http://web.stanford.edu/group/efmh/jacobson/Articles/I/WWS-50-USState-plans.html. [Mark Jacobson, United States of America]	Noted. The reference was reviewed
9111	8	10	8	12	An option exists… is a poorly consturcted sentence and leaves the reader wondering where the text is headed. The entire paragraph seem to meander too close to making a judgment about what is an appropriate form of an IEA. [Michael Oppenheimer, United States of America]	Noted - Amended for clarification
6017	8	10	8	14	A bit of a strange sentence structure "An option…." Would it be clearer to say something like "The Paris Agreement marked a move away from "top down" approaches…" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Amended for clarification
9958	8	10	8	19	You need to discuss the feasibility of using top-down, treaty based govenrnance approaches vs. using non-binding "pledges of intent" ones. Otherwise the introduction of these approaches is meaningless. What is feasible and why? What are the trade-offs of each approach? What is needed to achieve a governance towards decarbonisation? [Carmenza Robledo Abad, Switzerland]	Noted - Amended for clarification. Space limitations constrained a full discussion in spots

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16086	8	10	8	12	This option of a top-down approach has been tried and failed--it leads to countries choosing goals so weak that there is a very low likelihood of a country ever being penalized, and the arguments after the initial Kyoto conceptual agreement took years to try to get into place with countries withdrawing even though a number allowed for emissions increases. The Paris accord with its bottom up approach led to much more ambitious goals in that no penalties would be imposed (other than embarrassment for not reaching the aspirational goals) and to an agreement by countries to work to ratchet their efforts up. Sugggesting that the top-down option is at all practical in our complex world really requires an elaboration of its practical weakness in getting large cuts in world emissions. This tatement and the next should be presented in a balanced way, elaborating the limits and advantages of each approach. Suggesting a preference, as is implied here, seems to me to not be facing the political situation that exists and is very unlikely to be changed by wishful thinking. [Michael MacCracken, United States of America]	Noted
3352	8	11	8	11	CHANGE "and" to "to use" [Paul Doyle, Canada]	Noted
12904	8	11	8	11	Could you develop and explain the 'top-down, treaty baseds' approaches? [Mustapha Meftah, France]	Noted - Amended for clarification
5688	8	11	8	12	greenhouse gases' should be GHG. [Hong Yang, Switzerland]	Noted
6477	8	12	8	12	later' > 'latter' [Roger Bodman, Australia]	Noted. Text adjusted.
15207	8	12	8	12	copy edit: "The later approach" should be "The latter approach" [Pauline Midgley, Germany]	Noted. Text adjusted.
10365	8	12	8	12	should say “latter” not “later” [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text adjusted.
11671	8	12	8	12	“Latter" misspelled... [David Schoeman, Australia]	Noted. Text adjusted.
16085	8	12	8	12	Change "later" to "latter" [Michael MacCracken, United States of America]	Noted. Text adjusted.
16087	8	12	8	19	These two sentences seem to disagree on what is in the Paris agreement and is the bottom-up approach. [Michael MacCracken, United States of America]	Noted. Text adjusted.
7716	8	14	8	14	Add “by each country” at the end [Hilary Inyang, Nigeria]	Noted - Amended for clarification
2456	8	16	8	16	Since this is the first mention of 'bottom-up', provide definition and/or an example for policy makers and general public [Lisa Lucero, United States of America]	Noted. Text adjusted.
6426	8	16	8	17	Both or neither of 'top down' and 'bottom up' should have a dash between the words. [Jonny Williams, New Zealand]	Noted. Text adjusted.
10410	8	16	8	17	bottom-up / top down – should be top-down with hyphen [Jonathan Lynn, Switzerland]	Noted. Text adjusted.
1785	8	16	8	17	The new approach .. entirely to bottom-up efforts or top down directives à The approach .. entirely to bottom-up efforts. ((explanation: it is not new and it is basically a bottom-up approach.)) [Tibor Farago, Hungary]	Noted - Amended for clarification
12333	8	16	8	19	The text here does not properly describe the Paris Agreement legal architecture: "The new approach signalled by the Paris Agreement does not leave mitigation entirely to bottom-up efforts or top down directives. Instead, voluntary country pledges are embedded in an international system of climate accountability and a “ratchet” mechanism’ (Falkner 2016) and allows for actions by non-state actors(Morgan and Northrop 2017)". Whilst the INDCs were in a sense voluntary every next step is subject to a top down asssessment as to how the aggregated effects of NDCs contribute towards the LTTG. Hence to imply the entire system is voluntary is to in effect argue that the entire corpus of internationl law is voluntary which is not only incorrect but misses the main operative effect of international climate law. [Bill Hare, Germany]	Accepted. Text has been revised for clarification.
21299	8	16	8	19	Yes - could move this up and use it as a way to introduce the breadth of NDCs and some of the other initiatives emerging from UNFCCC process e.g. Nazca started at COP 20 and continuing as far as I know... http://climateaction.unfccc.int [Jan Corfee-Morlot, France]	Noted - Amended for clarification
4351	8	16	8	19	I recommend to the authors to improve this paragraph, giving more details to the reader. [Gabriel de Oliveira, Brazil]	Noted - Amended for clarification
15208	8	17	8	17	copy edit: "top down" shoud be "top-down" [Pauline Midgley, Germany]	Noted. Text adjusted.
15209	8	17	8	18	copy edit: no end quotation mark after ‘an international system … ; decide whether to use single or double ones as in "a ratchet" [Pauline Midgley, Germany]	Noted. Text adjusted.
2070	8	18	8	18	Too many “ands”! [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text adjusted.
1273	8	18	8	18	As a policy term, this "ratchet mechanism" should be explained in an additional clause or short sentence. [Colin Raymond, United States of America]	the sections were significantly edited to reflect these and other similar comments
3353	8	19	8	19	ADD this sentence "Such an approach is insufficient to keep warming under 1.5." [Paul Doyle, Canada]	Noted
11878	8	22	9	21	The "Anthropocene narrative" refered to in multiple places in this section is not well defined or explained. I also think that the term "Anthropocene" is potentially more problematic than "pre-industrial" has proven to be, as there is still no common agreement on what period of time consitutes the Anthropocene. [Abram Nerilie, Australia]	the sections were significantly edited to reflect these and other similar comments
11440	8	22	9	21	This section should focus less on definitions (leave those for the relevant chapters) and identify instead the key opportunities and threats for sustainable development inherent in 1.5 degrees of climate change and the strategies that might be pursued to limit warming to 1.5 degrees. [Stewart Lockie, Australia]	the sections were significantly edited to reflect these and other similar comments
9962	8	22	9	21	Section 1.1.3 Sustainable development and 1.5°: This section is very poorly elaborated. It gives some key definitions (which is good) but it doesn't provide any framework for the assessment. The last paragraph (lines 49-55) is especially poor. It only states the obvious, that there is a relationship between SDG 13 and other SDGs but it doesnt provide any aditional thought. Even worst the relationship with other SDGs lacks to mention key relations to other SDGS. Either you elaborate on these interlinkages or you simply mention that the SDGs are interlinkaged. But a little bit of text saying nothing new is not helpful and it doesn't provide an analytical frameowrk for the rest of the report. The section looks especially poor if you compare with section 1.1.4 where the key conceptual elements are clearly stated and well structured [Carmenza Robledo Abad, Switzerland]	the sections were significantly edited to reflect these and other similar comments
21300	8	24		25	there are different kinds of poverty and energy poverty (e.g. numbers without electricity, without clean cooking access) is one that should be raised in this report as how we solve that problem will affect the low C, resilient development pathways. IEA is releasing new report on this - Oct 2017 - could be a useful new reference re SDG7 [Jan Corfee-Morlot, France]	Noted
15210	8	24	8	24	copy edit: "remain" should be "remains" [Pauline Midgley, Germany]	Noted. Text adjusted.
10411	8	24	8	24	remains not remain [Jonathan Lynn, Switzerland]	Noted. Text adjusted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16088	8	24	8	24	remain to "remains" [Michael MacCracken, United States of America]	Noted. Text adjusted.
16489	8	24	8	26	There must be more recent UNDP reports on extreme povery and hunger? [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Noted. References were reviewed
14337	8	24	8	55	An interesting reference may be the very recent "The state of food security and nutrition in the world" published by IFAD, UNICEF, WFP, WHO in 2017. According to the study, global hunger is on the rise again,driven by conflicts and climate change) [Alessio Giardino, Netherlands]	Noted
3326	8	24	9	21	I believe that the AR.6 report should include in the IPCC web or an independent web how the SDGs are connected with the IPCC reports eg with indicators such as https://environmentlive.unep.org/ but we have indicators that measure the relationship between the two will only be a parameter for scientists and not for decision makers. The relationship is still not seen and the population does not buy the impact, for example, from SDG No. 14 with landslides in the terriory. [Fátima Castaneda, Guatemala]	Noted
16089	8	25	8	25	close to or around--would not either descriptor be adequate--why both? [Michael MacCracken, United States of America]	this section was heavily edited
17813	8	26	8	28	Not clear what the following sentence referes to? "The AR5 provided insight into the geographic distribution and trends of poverty patterns and addressed poverty dynamics…..". Is this referring to IPCC 2014b indicated in the subsequent section? Reader would gained in clarify if the authors could provide further reference [Wilfran Moufouma Okia, France]	Accepted. Text has been revised for clarification.
10534	8	26	8	33	IR5 is mentioned. But only in line 33 it was stated IR5 (year). Why is the different ways in mentioning IR5? Need consistency when mentioning IR5. [Linda Yanti Sulistiawati, Indonesia]	Accepted. Text has been revised for clarification.
10412	8	26	8	33	lines 26/28/33 etc we can say AR5 rather than The AR5 [Jonathan Lynn, Switzerland]	Accepted. Text has been revised.
3354	8	27	8	27	CHANGE "for example" to "such as" [Paul Doyle, Canada]	Accepted. Text has been revised.
15211	8	29	8	30	The quoted text is not to be found as given in the cited Chapter of WGII AR5 and the confidence statements on related text is other than high; please revise [Pauline Midgley, Germany]	Noted
15224	8	29	8	30	This is the first occurrence of IPCC confidence language and there should be at least a footnote referencing section 1.6 [Pauline Midgley, Germany]	Noted
10413	8	29	8	31	should (high confidence) be inside the quoted inverted commas? [Jonathan Lynn, Switzerland]	Noted
15212	8	31	8	31	As far as I can see in the cited Chapter of WGII AR, the quoted text is not given a confidence statement or at most medium confidence [Pauline Midgley, Germany]	Noted - Amended for clarification
19076	8	33	8	35	There is no need to repeat the word that after comma, [Fathy Elbehiry, Egypt]	Noted
21301	8	33	8	39	para starts off in an understandable way but the close is incomprehensible - what does it mean to be "attentive to the Anthropocene narrative.....framework?" And the para does not do justice to the Olsson et al piece where the focus is much more on the question of what is transformative change looking across different social, natural and technical/economic systems... [Jan Corfee-Morlot, France]	Accepted. Text has been revised for clarification.
10565	8	33	8	39	Empirtical evidence of this could be appreciatted with the passing od the recent huricanes through the Caribbean and south USA. The responses by countries were obvious, and teh extent of damage could be associated to the development pathways of each. The extent of damege is directly related to the infraestructure affected; recovery could be easier for less developed societies, in nthe technical sense only. [Elemer Briceño-Elizondo, Costa Rica]	Noted
6267	8	33	8	39	There is a kind of circularity in the statement, mixing too many factors and causes. [Milton Nogueira da Silva, Brazil]	Accepted. Text has been revised for clarification.
19662	8	36		39	Point being made is not clear. Add a reference to human rights - human rights also provide the context and framing for Agenda 2030 and the SDGs. [Tara Shine, Ireland]	Accepted. Text has been revised for clarification.
6018	8	36	8	39	What does it mean for a policy response to be attentive to a narrative? Will policy-makers understand that? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text has been revised for clarification.
20356	8	36	8	39	This is a nice example of parlance for which IPCC has been rightly criticized in the past by various stakeholders and observers. Generally speaking this chapter is in the purest IPCC tradition of using complicated language. [Olivier Boucher, France]	Accepted. Text has been revised for clarification.
11672	8	36	8	39	What does this sentence mean in the real world? This seems too much like discourse and too little like plain English. And what is the "past-present"? [David Schoeman, Australia]	Accepted. Text has been revised for clarification.
2497	8	36	8	39	What is the "Anthropocene narrative"? This concept needs to be defined [Robert Koppu, United States of America]	Noted - Amended for clarification. Space limitations constrained a full discussion in spots
12775	8	36	8	39	The sentence is hard to understand [Robert Vautard, France]	Accepted. Text has been revised for clarification.
12195	8	37	8	39	I find the sentence including "…benefit from attentiveness…" unclear. [Jan Fuglestvedt, Norway]	Accepted. Text has been revised for clarification.
15215	8	38	8	38	past-present and future seems an odd way of putting it. I suggest either "past-present-future" as on p.6 or "past, present and future" [Pauline Midgley, Germany]	Accepted. Text has been revised for clarification.
2498	8	39	8	39	the need for a sustainable development framework sounds policy prescriptive [Robert Koppu, United States of America]	Noted. Text adjusted.
1166	8	41	9	14	Refer to Box 5.1. in Ch5; no need to repeat details from the box here. Consider deleting last paragraph as this is only supported by one reference and includes the Anthropocene framing (see above). [Petra Tschakert, Australia]	Noted. Text adjusted.
20936	8	42		47	It would be advisable for this chapter (and throughout the Special Report Report on 1.5 Degrees) to specify the conceptual scope of future generations. [Erick Pajares, Peru]	Noted - Amended for clarification
13084	8	42	8	42	is there a missing in-text quotation here? "Future: '(…) development" [Veryan Hann, Australia]	Noted - Amended for clarification
1648	8	42	8	42	There is a missing citation. [Jesse Keenan, United States of America]	Noted. Text adjusted.
17824	8	43	8	43	Reference: The World Commission on Envrironment and Development 1987 is not listed in the reference list. [Wilfran Moufouma Okia, France]	Noted. Text adjusted.
1786	8	44			Goals (SDGs) are an interlinked network of targets à Goals (SDGs) include an interlinked network of targets [Tibor Farago, Hungary]	Noted
12950	8	45			systematic wellbeing is there an easier way to explain this? E.g. increased/holistic wellbeing? [Johanna Nalau, Australia]	Noted. Text adjusted.
1787	8	45			addressing the interconnected challenges of the Anthropocene for systematic wellbeing and to avoiding the problems expressed by the Planetary Boundaries. [Tibor Farago, Hungary]	Noted. Text adjusted.
13596	8	45	8	45	systematic ? it is not 'systemic' wellbeing that is meant here given references to interlinked networks [Elvira Poloczanska, Germany]	Noted. Text adjusted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3355	8	47	8	47	CHANGE "systems and lend themselves" to "systems are needed and these lend themselves" [Paul Doyle, Canada]	Noted. Text adjusted.
1788	8	49			SDG13 specifically requires 'urgent action to address climate change and its impacts' à SDG13 specifically requires 'urgent action to combat climate ((explanation: this is the exact quotation ..)) [Tibor Farago, Hungary]	the sections were significantly edited to reflect these and other similar comments
10566	8	49	8	55	This is paramount. The concept of sustaintability should gear towards promoting the 17 SDGs, Climate action from my perspective is a transversal objective. [Elemer Briceño-Elizondo, Costa Rica]	the sections were significantly edited to reflect these and other similar comments
14973	8	49	9	14	While the SDGs may be relevant to conceptualizing 'sustainable development' within the discussion of global warming of 1.5 degrees, the SDGs are not the focus of this exercise. Authors should stick closely to the mandate given to them from the Panel and not incorporate other goals which broaden the analysis of this report beyond the mandate of the IPCC and issues specifically relevant to global warming of 1.5 degrees. In stating in line 49 that SDG13 "specifically requires" urgent action to address climate change and its impacts, the language could be seen to suggest that the SDG imposes binding obligations, which is not the case. [Farhan Akhtar, United States of America]	the sections were significantly edited to reflect these and other similar comments
12951	8	53			Might be worth considering adding something here for adaptation e.g., SDG indicators and targets, which could provide examples how the global adaptation goal could be measured [Johanna Nalau, Australia]	the sections were significantly edited to reflect these and other similar comments
1789	8	53			The SDGs provide targets and indicators to be .. à The SDGs provide targets to be .. ((explanation: the SDGs or the provisions of the 2030 Agenda do not include indicators; such indicators were adopted later; see: para 75 of the Agenda: "The global indicator framework, to be developed by the Inter Agency and Expert Group on SDG Indicators .. ")) [Tibor Farago, Hungary]	the sections were significantly edited to reflect these and other similar comments
21302	8	53		55	This is mistated - SDGs do not provide specific targets (ie those that are measurable) and indicators or metrics for measuring progress - these are being set out after Agenda 2030/SDGs - eg on indicators the exercise has only just begun, and methods are work in progress. See for example: https://unstats.un.org/sdgs/ [Jan Corfee-Morlot, France]	the sections were significantly edited to reflect these and other similar comments
1790	8	54	8	55	"promote efforts to manage climate change sustainably." ??? misunderstandable [Tibor Farago, Hungary]	Noted - Amended for clarification
7570	9				In Section 1.2, I miss a discussion on how the report deals with probability of achieving 1.5 and 2 degrees in mitigation effort on the one hand and impacts on the other. In mitigation literature, a 2 degree sceanrio often refers to a scenario with >66% probability of staying below 2 degrees. Such a scenario, however, would lead to a most likely level of warming of less than 2 degrees and would therefore not be the correct scenario to study impacts of 2 degrees. This non-trivial point seems to be raised at the end of Box 1.1, last paragraph, but this is still a bit hidden and I would like to see a clearer explanation how the rpeort dealt with this. [Andries Hof, Netherlands]	the sections were significantly edited to reflect these and other similar comments
21303	9	1		6	This para is an example of one that does not do justice to a large literature and prior treatment by IPCC of this topic -- see section noted in back (1.4.1) and also prior treatment by IPCC eg SAR [Jan Corfee-Morlot, France]	Noted - Amended for clarification
19663	9	1		6	Add references to Shue, Henry; Caney, Simon; and Weiss Brown, Edith on intergenerational equity. [Tara Shine, Ireland]	the sections were significantly edited to reflect these and other similar comments
1056	9	1	9	1	Caution against language that contradicts other UN efforts. Question: does saying that "SDG 5 and 10 are fraught with definitional problems" challenge the tireless work done by leaders in the SDG community? Could this be phrased in another way? [Martini Catherine, United States of America]	Noted - Amended for clarification
1791	9	1	9	6	No reason here to provide some interpretation of the terms "equality" and "equity"; moreover, many experts deny the concept of 'growth sustainability' while you offer here only this to explain the equality in context of global warming (by Llavador et al.). So, I propose to delete this para. [Tibor Farago, Hungary]	the sections were significantly edited to reflect these and other similar comments
5090	9	1	9	1	Why? Equity in responses and processes is a necessary prerequisite for achieving equality. While SDGs 5 & 10 (in the goal & targets) are silent on equity, a discussion of what it takes to reach equality will naturally uncover the need for equitable approaches. What could be disccussed here is the challenge of achieving equality when equity is required, when a change in the balance of power (between men and women, between developed and developing, between elites and marginalized) is needed. That will be uncomfortable for many but is part of the discussion and action needed to achieve the SDGs and to tackle climate change (and achieve the 1.5o goal) in the context of human rights, ethics, and good governance. [Tonya Rawe, United States of America]	the sections were significantly edited to reflect these and other similar comments
4825	9	1	9	6	Much work has been done in the climate ethics literature on the meaning and demands of intergenerational fairness, justice and equity. See: McKinnon, C., Climate Change and Future Justice (Routledge 2012); Gardiner, S.M., 'A Perfect Moral Storm' (Oxford: Oxford University Press, 2011); Shue, H., 'Deadly delays, saving opportunities: creating a more dangerous world?' in 'Climate Ethics' ed. S.M. Gardiner, S. Caney, D. Jamieson and H. Shue (New York: Oxford University Press, 2010), 146-62; Nolt, J., 'Greenhouse gas emissions and the dominaiton of posterity' in 'The Ethics of Global Climate Change' ed. D.G. Arnold (Cambridge: Cambridge University Press, 2011, 60-76; Caney, S., Climate Change, Intergenerational Equity, and the Social Discount Rate', Philoosphy, Politics and Economics, 13/4 2014, 320-42; de Shalit, A., 'Why Posterity Matters: Environmental Policies and Future Generations' (Routledge, 1995);, [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	the sections were significantly edited to reflect these and other similar comments
2071	9	2	9	3	"yet people embark from different starting points and this doesn't benefit the same way" is approximate, woolly language. Its not scientific. Be clear what is meant here! Is it talking of comparative socio-economic trajectories? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Amended for clarification
13264	9	2	9	3	Note the fact that "people embark from different starting points and thus don't benefit the same way" does not call into question the value of equality as a goal. In fact it might make the importance of realizing equality even more urgent. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Amended for clarification
6427	9	3	9	3	Informal abbreviations such as 'don't' should not be used in this type of document. [Jonny Williams, New Zealand]	Accepted. Text has been revised.
3356	9	3	9	3	CHANGE "don't benefit" to "don't all benefit in" [Paul Doyle, Canada]	Noted
13085	9	3	9	3	change "don't" to "do not" [Veryan Hann, Australia]	Noted
15216	9	3	9	3	copy edit: please write "do not" instead of "don´t" [Pauline Midgley, Germany]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13265	9	3	9	4	Llavador et al (2015) are not defending equality over time. Rather they argue for the principle that current generations should leave future generations better off. The view that equality applies over time is defended by Caney 'Climate Change, Intergenerational Equity, and the Social Discount Rate', Politics, Philosophy & Economics, vol.13 no.4 (2014), 320-342. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Amended for clarification. Space limitations constrained a full discussion in spots
13597	9	4	9	6	and inter-species equity - see AR5 WGII Part A p926 [Elvira Poloczanska, Germany]	the sections were significantly edited to reflect these and other similar comments
6428	9	5	9	5	The words 'seen synonymous' should be replaced with 'seen as being synonymous with'. [Jonny Williams, New Zealand]	Accepted. Text has been revised for clarification.
3357	9	5	9	5	CHANGE 'seen" to "seen as being" [Paul Doyle, Canada]	Accepted. Text has been revised for clarification.
13598	9	5	9	5	typo: 'as' synonymous, or 'synonymously' [Elvira Poloczanska, Germany]	Accepted. Text has been revised for clarification.
15221	9	5	9	5	copy edit: "seen synonymous" should be "seen as synonymous" or "seen as being synonymous" [Pauline Midgley, Germany]	Accepted. Text has been revised for clarification.
2075	9	11	10	13	There is mention of "mandate" and "scope" of the report yet no explicit reference (citation) to a mandate or scope e.g. could the report benefit from a definitively clear, separate 'scope' section? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	the sections were significantly edited to reflect these and other similar comments
3358	9	13	9	13	CHANGE "how to achieve" to "achieving" [Paul Doyle, Canada]	Noted
2602	9	13	9	14	but how to achieve these aspirations WITHOUT securing 1.5 deg is also a challenge? It could be argued that the only way to achieve equity and justice goals is through limiting warming, so 1.5 deg can actually be seen as an opportunity for transformational change that will enable a more equitable society [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Noted
9960	9	13	9	14	Please state which elements need to be considered in such a planning and clarify what is meant with "careful". Otherwise the sentense is nothing else than stating the obvious [Carmenza Robledo Abad, Switzerland]	Noted - Amended for clarification. Space limitations constrained a full discussion in spots
3359	9	14	9	14	CHANGE "will need" to "will require" [Paul Doyle, Canada]	Noted. Text adjusted.
2072	9	14	9	16	"careful planning" is underrated e.g. try 'will require assiduous planning'? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted
13086	9	16	9	16	delete line 16 - there are 2 lines where there only needs to be one. [additional space] [Veryan Hann, Australia]	Noted. Text adjusted.
21304	9	17		21	what about understanding of social innovation and transformative change for sustainability - which is what this Olsson paper is really about? Use of term Anthropocene to capture all of this is jargonistic and does not help reader understand what you mean here. One option would be to do a box on transformation for sustainability and what this implies in terms of thinking across system boundaries, path dependence and different dimensions of scale as laid out in Olsson et al piece [Jan Corfee-Morlot, France]	the sections were significantly edited to reflect these and other similar comments
2696	9	17	9	17	An understanding of 1.5 - this phrase is unclear - what aspect of 1.5? [Penny Urquhart, South Africa]	Noted - we have tried to reduce complexity
1924	9	17	9	18	Again, the authors might want to elaborate on what they mean by the term 'Anthropocene', as it is a little puzzling to see it presented here as a knowledge base. [Judith Kreuter, Germany]	the sections were significantly edited to reflect these and other similar comments
12953	9	17	9	18	It would be useful here to identify what these "established and emerging knowledge bases" are. For example knowledge bases that will also be helpful will be those of advanced technology. [Johanna Nalau, Australia]	the sections were significantly edited to reflect these and other similar comments
12196	9	17	9	18	Again, I think the reference to "anthropocene" is not needed. I think many readers will not understand what is meant here. [Jan Fuglestvedt, Norway]	the sections were significantly edited to reflect these and other similar comments
2499	9	17	9	18	The Anthropocene, as I am familiar with it, is a proposed geological period, not a "knowledge base." [Robert Koppu, United States of America]	the sections were significantly edited to reflect these and other similar comments
2267	9	17	9	18	I find this sentence hard to understand. I thought the Anthropocene was a label for the latest epoch in the history of the Earth, so in what sense is it a "knowledge base"? [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	the sections were significantly edited to reflect these and other similar comments
9961	9	17	9	22	Repetition: The concept of anthropocene was introduced before. Thus either delete this paragraph or use parts of it to complete the definition given previously [Carmenza Robledo Abad, Switzerland]	the sections were significantly edited to reflect these and other similar comments
1792	9	18			Anthropocene (Olsson et al. 2017) and Planetary Boundaries (Rockström, 2009; Steffen, 2015) [Tibor Farago, Hungary]	the sections were significantly edited to reflect these and other similar comments
12952	9	18			For someone outside of academia, the concept of Anthropogene might be difficult to grasp unless it is clearly explained e.g. in a glossary or in the text. [Johanna Nalau, Australia]	the sections were significantly edited to reflect these and other similar comments
14915	9	18	9	18	delete 'more'. …be critical to fully realise…. [Ambarish Karmalkar, United States of America]	Noted - Amended for clarification
1793	9	19			realise the texture and conditions of impact, vulnerability, resilience, mitigation [Tibor Farago, Hungary]	the sections were significantly edited to reflect these and other similar comments
14916	9	20	9	21	Saying 'this apprach' at the end of the sentence is awkward. Suggestion: This framework is required to propose meaningful solutions to limit global warming to 1.5 C.. [Ambarish Karmalkar, United States of America]	Accepted. Text has been revised.
1794	9	24			1.2 Understanding 1.5°C warming: reference .. [Tibor Farago, Hungary]	Unclear what revision is required.
3260	9	24			Worth defining extreme poverty and hunger, perhaps in a footnote. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text adjusted.
646	9	24	12	14	Is an 1.5C global warming for ten year mean? [Zong-Ci Zhao, China]	Warming refers to the average over 30 years centred on the time in question
686	9	24	12	14	Is an 1.5C global warming for ten year mean? [Zong-Ci Zhao, China]	Warming refers to the average over 30 years centred on the time in question
2911	9	24	12	23	I think it would be very helpful if you would change the order. I suggest to put what you write on page 12 lines 17 to 23 at the beginning and to give it the titel: "methods employed here" or something similar. [Sabine Wurzler, Germany]	good point, the text was revised to clarify
1795	9	26			1.2.1 Working definitions of 1.5°C and 2°C warming for use in this report [Tibor Farago, Hungary]	Rejected: needs to mention pre-industrial
3261	9	26			Quantify how much more unequal income distribution is now than before. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Rejected: out of scope.
14948	9	26	9	26	Title of the section should be "Working definitions of 1.5°C and 2°C goals for use in this report" [LOKESH CHANDRA DUBE, India]	Rejected: these are temperatures, not goals.
9193	9	28			I would delete "the overal interntion is clear" as I don't think that is really obvious? Do the authors know what the intention of negotiations are, maybe it has to do with diplomacy more than climate? Or provide a reference to back your claim. [Glen Peters, Norway]	Discussion of the PA has been removed.
12905	9	28	8	35	Which definition you will use in your studies (next chapters)? [Mustapha Meftah, France]	As stated here (as far as consistent with the available literature)
11673	9	28	9	28	The writing improves markedly here. Much better: clear and direct. [David Schoeman, Australia]	Noted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1796	9	28	9	33	.. Whether or when global temperature increase reaches 1.5°C depends .. .. The UNFCCC provides further guidance in this context: it makes clear that those changes should be considered which are 'attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. In .. ((explanation: The Paris Agreement is also 'under' the UNFCCC; the PA explicitly refers e.g. to the objective, principles, definitions ..)) [Tibor Farago, Hungary]	Noted, but at the Scoping Meeting it was agreed that 1.5°C should refer to total, not just anthropogenic, warming.
3360	9	29	9	29	CHANGE "Whether or" to "The year" [Paul Doyle, Canada]	Sentence has been edited.
16090	9	29	9	29	Why is "global temperatures" plural here? What is meant by this--varying year to year temperatures when the sim it to stabilize the average value? My understanding is the goal is to stabilize the multi-decadal average, global average temperature (really, one is dealing with the anomaly--the change, and not the temperature at all). [Michael MacCracken, United States of America]	Editorial.
3262	9	30			Should remove 'to some extent' - you cannot measure progress without having a clear definition of the baseline. The 1961-1990 global mean surface temperature used for temperature anomalies is a sensible baseline for assessing our position relative to the 1.5 upper limit. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text has been revised.
15222	9	30	9	30	I would have thought that this depends to a large extent not "to some extent" so I suggest deleting the qualifier [Pauline Midgley, Germany]	Accepted. Text has been revised.
11879	9	33	9	33	Does "coverage" refer to temporal coverage, averaging intervals or spatial coverage, or all of the above? [Abram Nerilie, Australia]	Accepted: all of the above.
11441	9	34			various potential alternatives should simply be "potential alternatives" [Stewart Lockie, Australia]	Sentence deleted.
13087	9	37	9	37	the same as for comment above - delete line 37 [additional space]. [Veryan Hann, Australia]	Accepted.
5211	9	38			Section 1.2.1.1 does not make clear the proposed definition of temperature rise. There is a lot of discussion about data sets used, but the text does not give a clear indication about what combined, average temperature data are being used in the definition. [Arthur Lee, United States of America]	Accepted. Text has been revised.
3263	9	38			Section 1.2.1.1 seems unnecessary - you discuss the challenges of surface temperature measurements (no doubt repeated in AR5) to conclude that the IPCC approach is best, albeit with a shifted baseline. What is the material difference between the current baseline (1961-1990) and your new shifted one? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text has been revised.
18841	9	38	12	23	The choice of reference period and measurements used for the report are crucial for the calculations of the remaining carbon budget. However, this is not discussed here. Nor are the implications of uncertainties in the reference period, or in the measurement data, discussed further in Chapter 2 (section 2.2.2). This topic needs to be covered in one of the sections. (Comment repeated for Chapter 2.) (I wrote this before the publication of Millar et al. 2017, NGeo. After that, it has become clear that the interpretation of differences between realized and modeled temperature change also needs to be discussed in one of the sections.) [Bjørn Samset, Norway]	Accepted. Text has been revised. Discussion of carbon budgets is in Ch 2.
3121	9	38	13	18	Most of the material in these pages is too technical to be included in the report at all. A simple summary in clear and common sense language can be included here instead, and this will also help to shorten the chapter. [Richard Rosen, Germany]	Accepted. Text has been revised.
2364	9	38	9	51	This needs to be consistent with Chapter 3 pg 125-42 to 125- 45 [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text has been revised.
704	9	38	11	4	This part defines the GMST and shows that it is difficult to measure. Furthermore GMST is not directly related to the GHG content of the atmosphere. AR5 has shown that GHG concentration was directly related to the earth radiation energy imbalance or Radiative Forcing. Only 1% of this energy imbalance is used for direct heating of the atmosphere, 93% is absorbed by the oceans, 3% by the earth crust, 3% by the cryosphere. The concept of Radiative Concentration Pathways has a much clearer physical meaning than that of GMST. The GMST is more a concept used by politicians and medias. One should come back to the RCP concept. GMST has shown a pause between 1998 and 2014 which was used by climato-skeptics to argue that Global warming had stopped. At the same time arctic sea ice surface decreased more rapidly as well as that the polar icecaps masses. The connection between ice mass decrease and GMST has been thoroughly studied in the recent paper: Berger, A., Yin, Q., Nifenecker, H. and Poitou, J. (2017), Slowdown of global surface air temperature increase and acceleration of ice melting. Earth's Future. doi:10.1002/2017EF000554. This paper should be cited. It is a clear illustration of the ambiguities of the GMST as compared to the RCP. Please come back to RCPs. [Herve Nifenecker, France]	Concept of attributable warming addresses this point.
12906	9	39	9	41	GMT, SAT and SST are the good proxies for global warming? Why? [Mustapha Meftah, France]	They are the only data we have.
12456	9	40			Please add "air" after "sea surface". [Mohammad Rahimi, Iran]	Rejected - SST observations are of water temperature
19079	9	41	9	51	The speaking in the present tense and the paper was published in 2016 [Fathy Elbehiry, Egypt]	Editorial, but use of present tense is conventional.
6429	9	43	9	43	It is not clear here what the term 'difference' is referring to. [Jonny Williams, New Zealand]	Accepted. Text has been revised.
19077	9	43	9	43	Cowetan et al. (2015) show, why the speaking in the present tense and the paper was published in 2015 [Fathy Elbehiry, Egypt]	Accepted. Text has been revised.
12907	9	43	9	47	SAT/SST data gives approximately 0.1°C less warming … Could you provide uncertainty of this study? This is significant? [Mustapha Meftah, France]	Difficult at this precision, but the sign of the effect is not in doubt.
2268	9	43	9	47	The differences between using SST and marine SAT have also been explored by Simmons et al.(2017, doi 10.1002/qj.2949). They were looked at it in the context of atmospheric reanalysis, and the work thus complements that of Cowtan et al. (2015) for the CMIP5 models. The paper shows (in its Figure 1) that differences are small, but they have a systematic component such that global-mean temperature trends from 1979 to 2016 are slightly higher using marine SAT than SST, implying a small trend in air-sea temperature differences (such as might occur, for example, from a trend in marine wind speeds). This was shown for both the ERA-Interim and the JRA-55 datasets. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted, and accepted.
9762	9	44	9	46	Replace imprecise 'to-date' with the date being referrred to. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text has been revised.
19078	9	45	9	45	The speaking in the present tense and the paper was published in 2016 [Fathy Elbehiry, Egypt]	Editorial, but use of present tense is conventional.
3361	9	46	9	46	CHANGE "to-date" to "to date" [Paul Doyle, Canada]	Accepted. Text has been revised.
17825	9	46	9	47	Please rephrase the bracketed text to 'see Figure TFE8.1 in the insert panel of Stocker 2013 and Figure 1.1' or similar, so it is clearer figure 1.1 is not also in the Stocker reference. [Wilfran Moufouma Okia, France]	Accepted. Text has been revised.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1057	9	51	10	2	Could this sentence be rephrased or broken up? It is long and confusing. Would a 5th grader understand it? No a 5th grader is not the target audience for this report but communicating simply and effectivley is, especially if the goal is retention. Could a sentence be added which says "if you blend SAT & SST different results are yielded" Then explain the technical details. This makes the point clear for a non-technical reader and still keeps it scientifically accurate. [Martini Catherine, United States of America]	Accepted. Text has been revised.
7188	10				Fig 1.1: Interesting. Please make the different lines more readable. Consider to add an additional panel for the shorter term development (e.g. 1990 - 2030). [Nico Bauer, Germany]	We have revised the figure in an attempt to respond
3726	10				Reagrding Figure 1.1: I would strongly advise to also include borehole estimates of the range of Holocene temperature variability. The multi-proxy reconstruction of Marcott et al. (2013) – with which I am very familiar – is based on a limited number of sparsely distributed records with often a low signal-to-noise ratio. When making a composite of such proxy data, and calibrating or scaling the composite to instrumental temperature data, it is well known that the amplitude of the low-frequency variability will be underestimated (for theoretical discussion, see for example von Storch et al. 2004; Bürger et al. 2006; Christiansen 2011; Tingley et al. 2012; Christiansen and Ljungqvist 2017). Thus, the multi-proxy reconstruction of Marcott et al. (2013) should rather be considered as a lower bound of Holocene temperature variability. As an upper bound I would recommend to include the borehole reconstruction composite by Huang et al. (2008). Unlike the other proxy data (as used in Marcott et al. 2013), the temperature estimates from boreholes are based on physical modelling, instead of statistical calibration against time-series of instrumental temperature measurements and may be more reliable on millennial time-scales. To include such an upper bound of Holocene temperature variability is important given that the borehole data indicate global mean temperatures close to the 1.5°C “target” relative to the reference period 1850–1879 during the mid-Holocene (due to seasonal orbital forcing conditions at that time reinforced by feedback mechanisms still poorly understood). New reference: Bürger, G., I. Fast, and U. Cubasch, 2006: Climate reconstruction by regression—32 variations on a theme. Tellus, 58A, 227–235, doi: 10.1111/j.1600-0870.2006.00164.x. Christiansen, B., 2011: Reconstructing the NH mean temperature: Can underestimation of trends and variability be avoided?, J. Climate, 24, 674–692, doi:10.1175/2010JCLI3646.1. Christiansen, and F. C. Ljungqvist, 2017: Challenges and perspectives for large-scale temperature reconstructions of the past two millennia. Rev. Geophys., 55, 40–96, doi:10.1002/2016RG000521. Huang, S. P., H. N. Pollack, and P. Y. Shen, 2008: A late Quaternary climate reconstruction based on borehole heat flux data, borehole temperature data, and the instrumental record. Geophys. Res. Lett., 35, L13703, doi:10.1029/2008GL034187. Tingley, M. P., P. Craigmile, M. Haran, B. Li, E. Mannshardt, and B. Rajaratnam, 2012: Piecing together the past: Statistical insights into paleoclimatic reconstructions. Quat. Sci. Rev., 35, 1–22, doi: 10.1016/j.quascirev.2012.01.012. von Storch, H., E. Zorita, J. M. Jones, Y. Dimitriev, F. González-Rouco, and S. F. B. Tett, 2004: Reconstructing past climate from noisy data. Science, 306, 679–682. [Fredrik Charpentier Ljungqvist, Sweden]	Because we are showing global mean temperatures, not just regional land temperatures, we think the Marcott et al. is a better global synthesis. It is ocean-focused, but tries to correct for this, as well as 70% of a the planet is ocean, it is more representative. Figure S26 of Marcott et al., suggests that actually the Marcott et al. is potentially biased warm because of a few points in the North Atlantic.
10414	10		10		figure 1.1 Why does present day come before past decade? [Jonathan Lynn, Switzerland]	We have revised the figure in an attempt to respond
3948	10	4	10	17	Reanalysis products aren't mentioned here which could be useful to add to Figure 1.1 [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Reanalysis is now included in the table, but figure 1.1 is full.
2697	10	4	10	17	Consider moving to technical annex. [Penny Urquhart, South Africa]	Accepted. Text has been revised.
2269	10	4	10	4	GFDL is the wrong institution. It should be NOAA/NCEI (formerly NCDC). Maybe it would be better, however, to refer to the datasets consistently, either by their names (NOAAGlobalTemp, GISTEMP and HadCRUT4) or by their producing institutions (replacing HadCRUT by the names of the Hadley Centre and the Climatic Research Unit). [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text has been revised.
13008	10	4	10	5	I suggest using NOAA-GFDL instead of GFDL (In figure 1 is used NOAA: change to NOAA-GFDL) [Caserini Stefano, Italy]	Accepted. Text has been revised.
11880	10	4	10	9	It isn't clear to non-experts what temperature datasets are being refered to when using the terms GFDL and GISS. Suggest to stick with consistent terminology [Abram Nerilie, Australia]	Accepted. Text has been revised.
17826	10	4	10	9	GFDL, GISS, HadCRUT in the text are referred to as HadCRUT4, NOAA and GISTEMP in Figure 1.1. Please edit to be consistent. [Wilfran Moufouma Okia, France]	Accepted. Text has been revised.
2270	10	4	10	17	The absence of any reference in this paragraph to the temperature estimates provided by atmospheric reanalysis is surprising. The globally complete fields produced by reanalysis have been used to estimate global-mean surface temperature in a number of peer-reviewed publications, starting in 2004, and have been referenced in both AR4 and AR5. It is thus not just "Since AR5" that more sophisticated methods have been used to estimate global-mean surface temperature in a way that reduces the impact of gaps in conventional climatic temperature records in key regions, notably parts of the Arctic.The uncited paper by Simmons et al.(2017, doi 10.1002/qj.2949) is the latest in a sequence of peer-reviewed articles on this topic. It compares the results of GISTEMP, HadCRUT4, NOAAGlobalTemp, the extensions of HadCRUT4 developed by Cowtan and Way (2014) and three recent reanalyses, and discusses the results in the context of the Paris Agreement. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Reanalysis is now included in the table, but figure 1.1 is full.
19080	10	5	10	5	The speaking in the present tense and the paper was published in 2012 [Fathy Elbehiry, Egypt]	Editorial, but use of present tense is conventional.
13009	10	7	10	8	I suggest using NASA-GISS instead of GISS (In figure 1 is used GISSTEMP: change to NASA-GISS) [Caserini Stefano, Italy]	thank you, the recommendation was considered
9194	10	10			After Millar et al and the following discussion on attributed warming, on the method (Otto et al 2015), etc, then just be sure that this figure and its content has consensus… [Glen Peters, Norway]	thank you, the recommendation was considered
943	10	11	10	11	The report cites work by Cowtan & Way (2014) as “sophisticated statistical modelling to infill missing data”. It is suggested to remove this citation because later work by Gleisner et al. (2015; DOI: 10.1002/2014GL062596) revealed that the Arctic data infill method used by Cowtan & Way (2014) is not robust. i.e. not very “sophisticated”. [Sebastian Luening, Portugal]	Noted: Revised wording states that the C&W approach is "more sophisticated" than the datasets cited in AR5, which is correct. Our statement here is about the method, not the results. Sophisticated does not necessarily imply robust.
4415	10	14		15	It is not very clearly that for readers what definition of global average temperature used in this assessment. [Jingyong Zhang, China]	copyedited and text was altered to make this more clear

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9763	10	14	10	14	using blended versions of the GMST datasets'. This is unclear, please clarify what is meant by ‚blended'. Does it refer to some average of the three datasets referred to? Or is it simply that data from each is going to be shown individally, and that each dataset is a blend of SST and air temp? [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Noted: Blended is used throughout to refer to blending surface water temperatures over oceans and surface air temperature over land and ice. We believe this is clear, and consistent with the wording in the literature
11881	10	14	10	15	It was unclear to me exactly what the second half of this sentence was trying to say. [Abram Nerilie, Australia]	copyedited and text was altered
13599	10	15	10	16	The temperatures as used in Paris agreement and their physical basis need to be clearly identified as early as possible. SST is the water temperature close to the ocean's surface. This mix of definitions needs to considered in light of the oceans lagging behind in the warming trend. [Elvira Poloczanska, Germany]	Rejected: Unfortunately, the "temperatures as used in the Paris Agreement" is not clear, because AR5 used both GMST and GSAT. We have attempted to disambiguate, but emphasise these are working definitions. It would be policy prescriptive to state which temperature definition was used in the Paris Agreement. The figures for the current level of warming given in the Structured Expert Dialogue unambiguously referred to (blended) GMST.
11882	10	16	10	16	Does "extended in time" refer to extended forwards or backwards or both? [Abram Nerilie, Australia]	Accepted: Wording has been removed as ambiguous
13010	10	16	10	17	I suggest mentioning that other dataset of GMST exist (i.e. JMA, Cowtan&way, Berleley Earth) [Caserini Stefano, Italy]	Accepted: These are mentioned in table 1.1
20072	10	17	10	28	Fig. 1.1: The observations are difficult to see on this graph. Most readers will be primarily interested in knowing where we stand at present. The observations (HadCRUT4, GISS, NOAA) should be drawn with solid lines, and in colors clearly distinguishable from the model simulations (e.g. in green given the present color scheme). Alternatively, two graphs can be provided, one using observations and the other one using climate simulations. [Sonia Seneviratne, Switzerland]	Accepted: The graph has been clarified, and the observations range given as a variable-width grey line. Providing individual datasets corresponds to excessive information that is beyond the scope of this report.
20073	10	17	10	28	Fig. 1.1.: The "CMIP5" lines seem to be for the multi-model mean (only one line each for "CMIP5 - Surface air temperature" and "CMIP5 - Blended and masked"). Indicate "multi-model mean" in the respective labels. [Sonia Seneviratne, Switzerland]	Noted: We believe "model average", clarified as ensemble average in the caption, is clear enough
648	10	18	10	18	Is it posible to show the human-induced warmng (orange) to year 2050? It is better to see more information than now. [Zong-Ci Zhao, China]	Human-induced warming is calculated from observed warming and best-estimate historical forcing. As it doesn't depend on a scenario it isn't possible to project it out into the future
688	10	18	10	18	Is it posible to show the human-induced warmng (orange) to year 2050? It is better to see more information than now. [Zong-Ci Zhao, China]	Human-induced warming is calculated from observed warming and best-estimate historical forcing. As it doesn't depend on a scenario it isn't possible to project it out into the future
13141	10	18	10	19	mean temperature in pre-industerial period must be shown over the figure 1.1 to have general view of mean temperature [Iman Babaeian, Iran]	Noted: The figure provides the Holocene temperature range, which addresses this point.
20823	10	18	10	19	The coloured lines on Figure 1.1 are hard to distinguish (GISS and NOAA are hard to see; use of pink for both GISS and initialised predictions is confusing; representation of near term predictions on the graph does not look the same as in the key; the light green shading is very similar to the light blue) [Alison Smith, United Kingdom (of Great Britain and Northern Ireland)]	We now only use a shaded bar for all AR5 observational datasets to aid readability
11883	10	18	10	19	Figure 1.1: Legends and captions do not define what type/width of smoothing has been applied to yellow and dark blue curves, and to CMIP5 curves. [Abram Nerilie, Australia]	No smoothing has been applied to these lines.
1938	10	18	10	19	Light blue line and dotted line is not clear against grey HadCRUT4 time series [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	We have tried to improve readability in the revised version of the figure
10183	10	18	10	19	Figure 1 is an important one. It is very good for the expert except obs temp lines are not that clear. I wonder if another figure is needed at the eventual SPM level which would be much simpler to understand. Maybe a bar chart version of para 1.2.1.4 [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	A similar and simplified version may be included in the SPM
12908	10	18	10	28	In Figure 1.1, why there is no effects of the Sun in Solar and volcanic temperature change (blue curve)? We would expect the Earth's global temperature to vary by a 0.1 K during a solar cycle (or a decade) in relation with solar radiative forcing. [Mustapha Meftah, France]	Noted: there is a solar cycle contribution but it is obscured by much larger fluctuations due to volcanos in this presentation. The amplitude depends primarily on the shorter response-timescale of the climate system, details of which are given in the Supplementary Information.
944	10	18	10	18	The chart contains the observed (measured) temperature curve since 1850. Notably, the start date represents the end of the Little Ice Age which is known to represent the coldest phase of the entire past 10,000 years. It does not represent a suitable base line to compare the warming of the last 150 years. In order to provide the reader with a more balanced and less biased view of the historical temperature development, it is suggested to add an additional figure with two subfigures a & b that shows the reconstructed temperature evolution of the past 2000 years (e.g. based on PAGES 2k 2013; DOI: 10.1038/NGEO1797) and the last 10,000 years (e.g. based on Marcott et al. 2013; DOI: 10.1126/science.1228026). Such a comparison is much more transparent than just the green shading of the Marcott et al. extremes which does not even contain information on the Holocene temperature average. Furthermore it needs to be stated that the Marcott et al. 2013 curve is based on SST only. In light of the detailed SAT/SST discussion in the report on page 9 (lines 38-48), it is important to qualify the Marcott et al. data as SST. It is clear that SAT temperatures of the Holocene Thermal Maximum must have been significantly higher than the SST temperatures illustrated here, therefore the upper limit of the green shading would have to be shifted upwards to achieve a like-to-like comparison, something that the report itself favours (page 9, line 48). [Sebastian Luening, Portugal]	We do not have the space to include so much detail on the paleoclimate, which it is unclear how vital this is. We think the Marcott et al. is sufficient information from the paleoclimate.

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945	10	18	10	18	It is suggested to remove the blue and orange curves from the graph which are meant to illustrate the natural and anthropogenic components of the warming of the past 150 years. At current, the figure suggests that the entire warming is anthropogenic and none due to natural forcings. This statement contradicts the finding of the IPCC's AR5 report, namely the conclusion from the AR5 Synthesis Report for Policymakers (p. 5): "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together." Consequently "up to half" of the observed warming could be natural. This important AR5 implication is not included in Fig. 1.1 of the SR1.5 report. In order to avoid confusion and misinterpretation, the blue and orange curves should be removed. This would be in line with the cautious AR5 finding that anthropogenic forcings have most probably only become important since the mid-20th century. In the AR5 Synthesis Report for Policymakers (p. 5) this reads: "Anthropogenic forcings have likely made a substantial contribution to surface temperature increases since the mid-20th century over every continental region except Antarctica". The cautious approach in AR5 is also reflected by the fact that the AR5 report did not state a "best estimate" for the CO2 climate sensitivity, which consequently precludes a best estimate of the anthropogenic vs. natural contributions to the warming of the past 150 years. Footnote 16 on page 16 of the AR5 Summary for Policymakers (SPM) reads: "No best estimate for equilibrium climate sensitivity can now be given because of a lack of agreement on values across assessed lines of evidence and studies." It is very likely that the warming of the past 150 years includes a significant natural rebound effect, in which the climate was naturally re-adjusting after one of the most severe cold phases of the past 10,000 years. [Sebastian Luening, Portugal]	Rejected: This is a statement of the views of the ER, not consistent with AR5. In fact, AR5 stated "The best estimate of the human-induced contribution to warming is similar to the observed warming over this period" referring to 1951-2010, and see figure SPM.3 of the Synthesis Report. This figure simply extends that analysis to the 19th century, using identical approaches and methods as used in AR5.
645	10	18	10	28	Figure 1.1 should indicates the years for IPCC-AR5 present day ad Past decade. [Zong-Ci Zhao, China]	This has been implemented in the revised figure
647	10	18	10	28	Figure 1.1 should add the curves to 2050 as projected by CMIP5. Therefore, the readers can see when will reach 1.5C global warming as projected by multi-CMIP5 with RCP2.6, RCP4.5, RCP6.0 and RCP8.5. [Zong-Ci Zhao, China]	This has been implemented in the revised figure for RCP8.5
12197	10	18	10	28	Figure 1: I suggest moving the horisontal time period bars down to the time axis, or alternatively, moving to top and adding time axis here as well. [Jan Fuglestvedt, Norway]	The period bars have been updated in the new figure to lie behind the observed data
685	10	18	10	28	Figure 1.1 should indicates the years for IPCC-AR5 present day ad Past decade. [Zong-Ci Zhao, China]	This has been implemented in the revised figure
687	10	18	10	28	Figure 1.1 should add the curves to 2050 as projected by CMIP5. Therefore, the readers can see when will reach 1.5C global warming as projected by multi-CMIP5 with RCP2.6, RCP4.5, RCP6.0 and RCP8.5. [Zong-Ci Zhao, China]	This has been implemented in the revised figure for RCP8.5
6430	10	18	11	4	Regarding figure 1.1: The colour scheme in this figure is unsuitable for readers with colour deficiency and must [Jonny Williams, New Zealand]	We will try to provide colour-blind friendly versions of this figure in the next order draft
6431	10	18	11	4	be changed to better reflect the needs of these readers. I am completely unable to tell the difference between [Jonny Williams, New Zealand]	See above
6432	10	18	11	4	the blue and pink lines hence rendering this crucial figure, at best, very hard to interpret. [Jonny Williams, New Zealand]	The pink line has now been removed
5689	10	18	11	4	Figure 1.1 needs to improve the clarity. The lines for Initialised predictions and IPCC-AR5 near-term projections are not visible in the Figure. [Hong Yang, Switzerland]	Initialised predictions have been removed from the revised figure and the IPCC-AR5 near-term projections represented as a single vertical bar
13270	10	18	11	4	Figure 1.1: This figure packs a lot of information in which is difficult to un-pack in relation to text in the main document. For example, matching the difference between SAT/SST to area-average SAT data (described on Page 9, from line 43 to line 47) to the data in the Figure is not immediately clear (reader has to match up different terminology, pick out relevant lines, etc.). Recommend reducing complexity or building up information across a set of sub-figures, integrating text, e.g. clear heading and sub-heading with main message. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted - we have tried to reduce complexity
13271	10	18	11	4	Figure 1.1: Pink colour for initialised predictions looks very similar to colour used for GISS observations - so could be confused. Suggest change colour. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Initialised predictions have been removed from the revised figure
13659	10	19	10	19	The temperatures as defined in the Paris agreement and their physical basis need to be clearly identified. As written this leaves the question open and some confusion. [Elvira Poloczanska, Germany]	Wording has been clarified as far as possible.
3949	10	19	10	28	Figure 1.1: The time series could be extended to show when the lower bound of the predicted global mean warming exceeds 1.5C [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	CMIP5 multi-model mean lines have now been extended until 2050
3860	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits is recommended in this and following comments (1) Clearly distinguish between historical and future temperatures by making the CRU, NASA, and NOAA increasing temperature time series warm colors: black, red, and orange, and the future values another color that is not blue, which implies cooling (CMIP5 projections are light blue in the draft). The human-induced line is very important in this graph and making it red would make it stand out. The solar and volcanic line is generally cooling, so it could be blue, but a less bright shade so that it is not disproportionately prominent. [Patrick Gonzalez, United States of America]	All grey observational datasets are now shown as a grey shaded range in the revised version of the figure
3861	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (2) To be consistent with the observational time series and to simplify, the CMIP5 land temperature-only line could be deleted. [Patrick Gonzalez, United States of America]	We do not show a CMIP5 land-only temperature line
3862	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (3) For the CMIP5 time series, it would be clearer to say "land and sea" rather than "blended." [Patrick Gonzalez, United States of America]	Rejected - "Blended" and global surface air temperature doesn't refer to land vs land and sea combined
3863	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (4) It would be clearer to say "past 11 300 years" rather than "Holocene." [Patrick Gonzalez, United States of America]	We have revised the figure in an attempt to respond
3864	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (5) The pink line "initialized predictions" does not seem to be essential. To simplify the graph, omit. [Patrick Gonzalez, United States of America]	These lines have been removed from the revised figure

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3865	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (6) Instead of horizontal lines for the reference period, present day, and past decade, use vertical shaded sections the height of the graph to identify these time periods. [Patrick Gonzalez, United States of America]	We have revised the representation of the periods in the new version of the figure
3866	10	19	11	4	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (7) Place all symbols in one legend. [Patrick Gonzalez, United States of America]	Implemented
17450	10	20			B [Tom Gabriel Johansen, Norway]	Noted: figures have been heavily simplified.
17490	10	20			B [Angela Morelli, Norway]	Noted: figures have been heavily simplified.
4259	10	20			The Figure 1.1 is somewhat confusing. The line colours are very similar (too many light blues) and the colour lines inside the boxes are very thin with the exception of the "Human-induced temperature change" (orange line) and the "Solar & volcanic temperature change" (blue line). Besides, the order of the colour lines in the boxes is not followed in the figure caption where their meaning is defined. [Pedro Salvador, Spain]	We have tried to improve readability in the revised version of the figure
9764	10	20	10	20	Figure 1.1. is difficult to read because of the large amount of information contained. I would suggest having an extra panel first which shows the three observation based datasets with distinct colours (at present they're hard to separate on colour) and then include the mean of the three (perhaps with the spread shaded) on the main panel. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	We now show a grey range to denote the AR5 assessed observational datasets
20358	10	20	10	28	There is far too much information on this chart. One can't even see all the lines. [Olivier Boucher, France]	We have tried to improve readability in the revised version of the figure
11888	10	20	11	18	Figure 1.1 caption says that all observational datasets are shown relative to 1950-1879 base period, but HADCRUT4 is the only observational dataset covering this period, so how is this anomaly calculation done for the other observational datasets that don't cover the reference period? [Abram Nerilie, Australia]	Revised information on this has been provided in the Ch1 technical annex
13011	10	23	10	24	fig. 1.1: please add explanations or more detailed references on how human induced warming and naturally-forced warming are calculated [Caserini Stefano, Italy]	We provide a recently accepted reference in the updated draft
14931	10	27			While I respect that the authors have done their best to describe the different types of carbon budgets, the recent media response to the Millar et al. Nature Geo paper (which I assume will be included in the next draft) show the difficulty in understanding the concept of carbon budgets in the public. Given that this concept has now gained significant popular attention in industry and finance, it is crucial that carbon budgets are communicated well. I would suggest the authors drop all references to budget types other than TEB and TAB, consistent with AR5, and develop an easy to understand graphic that shows the difference between the concepts over time (a SIMPLE, perhaps area-style, visual representation of key scenario groups from Table 2.X). The key concepts to convey are how the budgets are different from each other and over time in the case of WB1.5, 1.5, and WB2 scenarios. [Christopher Weber, United States of America]	We don't see how this comment refers to Figure 1.1
7017	11				1.2.1.3 Total versus human-induced warming: It seems strange that no references at all are given in this section [Érika Mata, Sweden]	References have been added.
4163	11	1		31	It should also be noted that meteorological information, knowledge and tools used to collect data on climate have changed dramatically since 1850 further complicating earlier reference periods. Data collection methods, the available data and how we use it has also changed dramatically since record keeping began. As an ever evolving science, we have seen advancements made within the last decades that make long range acurate comparisons difficult. [Michelle Leslie, Canada]	thank you, the comments were considered when redrafting this section
6478	11	1	11	1	green shading' in Figure 1.1 not visible. Also missing lines in legend for observations? [Roger Bodman, Australia]	We have changed the green shading to pink in the revised version of the figure
4905	11	1	11	2	In the Figure caption 1.1, there is the following text: "The green shading indicates a maximum and minimum temperature range from the Holocene (Marcott et al. 2013).". But there is no green color shading in the Figure. Please, introduce it. [Rubén Piacentini, Argentina]	We have changed the green shading to pink in the revised version of the figure
3867	11	2	11	2	To enable Figure 1.1 to more clearly and accurately communicate its complex body of information, a series of edits in this series of comments is recommended (8) Replace “predictions” with “projections”. Add a phrase like “under all four RCPs”. [Patrick Gonzalez, United States of America]	Figure has been streamlined as far as possible.
1274	11	2	11	2	The temperature range for the Holocene is computed using sets of how many years? (2, 5, 10, 100...?) [Colin Raymond, United States of America]	The holocene temperature range corresponds to decadal ranges, with shading indicating internal variability, detailed in the Annex
7717	11	4	11	5	Given the statement in lines 4-5, why is the reference period of 1850-1879 used as the compromise period. It may be justified but the choice need to be explained not just as a description of the features of the period [Hilary Inyang, Nigeria]	We now use the 1850-1900 period.
644	11	7	11	31	Suggection is to provide a Table. This Table should show the global annual averaged surface air temperature of several observed data such as HadCRU, GISS, NOAA, BEST for several reference periods such as 1850-1900, 1850-1879, 1861-1880. [Zong-Ci Zhao, China]	Accepted: table is now provided.
684	11	7	11	31	Suggection is to provide a Table. This Table should show the global annual averaged surface air temperature of several observed data such as HadCRU, GISS, NOAA, BEST for several reference periods such as 1850-1900, 1850-1879, 1861-1880. [Zong-Ci Zhao, China]	Accepted: table is now provided.
946	11	7	11	15	It is important to select a stable reference period against which to define the climate targets. Nevertheless, it is equally important to define a meaningful baseline which provides crucial context for the warming of the last 150 years. Such a baseline is to represent an average of the pre-industrial temperature development over the past 10.000 or at least 2000 years. The end of the Little Ice Age at 1850 AD does not fulfil this criterion. Rather, it forms part of a globally unusually cold phase, during which the coldest temperatures of the past 10,000 years have been recorded (e.g. Chambers et al. 2014; DOI 10.1177/0959683614551232). Considering widely used and respected temperature reconstructions for the last 2000 years (PAGES 2k 2013; DOI: 10.1038/NGEO1797) and the last 10,000 years (Marcott et al. 2013; DOI: 10.1126/science.1228026), the Holocene temperature baseline may be closer to the interval 1940-1970. Even more unsuitable is the 1720-1800 AD period proposed by Hawkins et al. (2017) which coincides with the central and coldest part of the Little Ice Age. It is important to place the warming of the past 150 years into an extended historical temperature context, otherwise readers are insufficiently informed and could feel they are being misled. [Sebastian Luening, Portugal]	Noted: the pink holocene range is provided to convey precisely this information.

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2271	11	7	11	31	Please see comment 5 on this topic.This FOD is economical with the truth in quoting two reference periods from AR5 that are more-or-less consistent with its proposal of 1850-1879 as a reference period, while at the same time neglecting to mention the "1750" definition of pre-industrial given in the glossary of AR5 WG1, which it has to be assumed applies to the many references to the pre-industrial in AR5 that do not quote a date. I again urge the authors to adopt the AR5-consistent definition given by Hawkins et al. (2017). The argument that the anthropogenic contribution to warming from 1750 to 1850 is uncertain (Schurer et al., 2017) is irrelevant when it comes to the target of the Paris Agreement, as that target is couched in terms of the net temperature rise over the industrial era, not the anthropogenic contribution to the rise. It is the net rise in temperature that has to be limited if damaging climate change is to be avoided. The anthropogenic contribution needs to be known for the purpose of attributing responsibilities for past warming (in particular in the UNFCCC loss and damage mechanism) and to estimate what actions are now required to limit future change, but this is not a good reason for defining a "pre-industrial level" that begins about one hundred years after the industrial revolution began. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Rejected: it is not feasible to use a reference period that predates anything approximating global observations.
5922	11	8	11	15	I would like to have a sentence on what 'pre-industrial' is, linking this to the Industrial Revolution, the start of massive emissions, and when this Industrial Revolution occurred. While using 1850-1900 as a reference is understandable due to data coverage, this paragraph should also mention that earlier periods could be more relevant from an emission and human activity standpoint. [Borgar Aamaas, Norway]	Accepted: these points are noted.
2457	11	8	11	15	Here and throughout, need to consider Ruddiman's claim/data that increasing CO2 emissions began with the advent of agriculture--thus, the Anthropocene did as well; e.g., Ruddiman, William F. 2013 The Anthropocene. Annual Reviews Earth and Planetary Sciences 41:45-68. [Lisa Lucero, United States of America]	Out of scope: a discussion of the timing of the onset of industrialisation is out of scope.
3950	11	8	11	31	The description of the definition of 1.5C warming is rather confusing. I appreciate that the detail is needed for those steeped in IPCC, but difficult to follow for someone less familiar with previous IPCC reports. This paragraph could perhaps be rearranged or trimmed to allow easier reading. [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Wording has been clarified as far as possible.
13091	11	8	11	32	This sub-section on the "choice of reference period" and as an explanation of CALIBRATION is important. Suggestion: This could be expanded just a little to more fully address critics; by adding detail and justification of the choice of reference period. [Veryan Hann, Australia]	Unfortunately we are constrained for length.
1797	11	8	11	9	The historical and political context of the "pre-industrial" is essential: the UNFCCC and the negotiators clearly refer in that sense to it. It is what precedes "Ind. Revolution" (before 2nd half of 18th c.) and the industrial period: when anthropogenic interference with climate system and increasing differences in 'historical emissions' were already happening. So, pls, add a new opening sentence: Pre-industrial period is usually identified with a period before the rapid industrialization and increasing interference with the climate system that started in the 2nd half of the 18th century. Yet, any choice of reference period used in this report .. [Tibor Farago, Hungary]	Out of scope: a discussion of the timing of the onset of industrialisation is out of scope.
12199	11	9	11	11	The authors may also mention that Radiative Forcing was given relative to 1750. [Jan Fuglestvedt, Norway]	We do not focus on RF in this chapter.
12198	11	9	11	9	Carbon budget may have several meanings - "fluxes&resevoirs" or "remaining budget". I think authors should explain what they mean. "Remaining budget" may work as a minimum, but some more explanaition would be useful for many readers. [Jan Fuglestvedt, Norway]	Discussion of the carbon budget has been moved to chapter 2
15223	11	11	11	11	copy edit: delete unnecessary parentheses around Field et al 2014 [Pauline Midgley, Germany]	Noted.
1939	11	11	11	11	Remove bracket preceding Field; move to preceding 2014 [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
4416	11	17			The authors use 1850-1879 as the reference period, but do you consider the natural variability, such as PDO and AMO? [Jingyong Zhang, China]	Role of variability, esp. in modern reference period, is now discussed.
9195	11	17			Page 4, line 11 says "consistent with IPCC", while here it says "compromise"? Which is corrrect? [Glen Peters, Norway]	We now use the 1850-1900 period.
11887	11	17	11	18	This working definition of a "pre-industiral" reference period is reasonable, but if only one observational dataaset ocvers this period, should there also be a recommendation that this is the primary dataset used? [Abram Nerilie, Australia]	We now use multiple datasets, although they are not independent.
12201	11	17	11	31	This is an important paragraph. Could this be also shown in a figure for better overview? [Jan Fuglestvedt, Norway]	Unfortunately we are constrained for length.
9932	11	17	11	31	The adoption of a reference period that is different of those used in the AR5 makes difficult the comparison with the AR5. I think that, at least, it's necessary to maintain in parallel or in a special annex, the new scientific knowledge using the same references of AR5 in order to facilitate the comprenhension of this new report. [Olga Alcaraz, Spain]	We now use the 1850-1900 period.
9196	11	17	11	31	As the Millar et al 2017 paper shows, every 0.1C matters, particularly for 1.5C. Can you incldue a table that shows how each reference period matches. You have it in text here, but a table would be great. [Glen Peters, Norway]	Table has been added.
4742	11	19	11	19	rewrite "1861-80" to "1861-1880" so as to consist with the other expression. [Ma Lijuan, China]	Accepted.
12200	11	25	11	26	strongly recommended sounds strange. The report can adopt what the authors agree on. I simply suggest changing to "important". [Jan Fuglestvedt, Norway]	Wording has been deleted.
2272	11	26	11	27	For the record, 1850-1879 is not quite consistent with WMO definitions. 1851-1880 would be. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We now use 1850-1900, which isn't consistent either.
20359	11	27	11	27	So how should I interpret the "last decade" of figure 1.1 ? [Olivier Boucher, France]	Unclear what revision is required but text has been clarified.
1058	11	27	11	29	Suggest bold this sentence: THus far, average temperatures of the past decade (i.e., that beginning on 1st January 2010 are 0.89c warmer than in 1850-1879). [Martini Catherine, United States of America]	Sentence has been deleted.
1798	11	28			Thus far, average temperatures of the present decade (i.e., à Thus far, average temperatures of the already elapsed period of the present decade (i.e., [Tibor Farago, Hungary]	Sentence has been deleted.
9765	11	28	11	28	How far is 'thus far'? Need to be specific here. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Sentence has been deleted.
11891	11	28	11	29	The present decade' is a bit vague because beginning on 1st January 2010 does not make a period of ten years currently. [Junichi Tsutsui, Japan]	Sentence has been deleted.
6021	11	29	11	29	Is it worth stating where the 1C comes from in the executive summary? I think 2010-2017 is 0.89C warmer but 2016 is 1C warmer? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Point has been clarified.

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16091	11	29	11	29	rose by gives the impression of quite low uncertainties; What about saying "are estimated to have risen by"? [Michael MacCracken, United States of America]	A large range including zero conveys considerable uncertainty.
6511	11	29	11	31	This sentence is unclear. Which time period does the warming of 0.0-0.2 °C refer to and what is the baseline for that rise in temperature? [Heike Hebbinghaus, Germany]	Sentence has been deleted.
11886	11	30	11	31	This section could also cite Abram et al., 2016, Nature, doi: 10.1038/nature19082, which suggested that at least part of the early warming signal is consistent with early GHG emissions. [Abram Nerilie, Australia]	Good suggestion, thank you.
947	11	31	11	31	The text says that anthropogenic vs. natural contributions to warming before the reference period is uncertain. This is true. However, it also needs to be said, that the same is true for the modern warming which occurred since the reference period and lasts until now. The quantification of anthropogenic vs. natural contributions depends very much on the CO2 climate sensitivity which the AR5 states as a wide range of 1.5-4.5°C per CO2 doubling. In case the true value was at the lower end of this uncertainty distribution, the natural contribution to the warming since the reference period would be significant. This needs to be stated here, otherwise the text suggests a degree of certainty that in reality does not exist, as contained in the AR5 report. Please add a reference to one of the latest key papers on this issue, e.g. Mauritsen & Pincus (2017; doi:10.1038/nclimate3357), or in case this postdates the literature cut-off date you may cite e.g. Lewis & Curry (2014; DOI: 10.1007/s00382-014-2342-y). [Sebastian Luening, Portugal]	References to the attribution literature have been added, although note that attribution does not depend on the CO2 climate sensitivity.
2273	11	32	11	32	Simmons et al.(2017, doi 10.1002/qj.2949) and Hawkins et al.(2017) both make the point that the estimation/monitoring of temperature rise may best be divided into two parts. The first is critical to monitoring future climate change. It is the rise that occurs following the latest 30-year period for which climate norms can be calculated. This is 1981-2010 according to the WMO definition, and is in the modern era for which fairly reliable temperature estimates can be made. Damaging climate change will occur as absolute thresholds are reached. These imply a change since 1981-2010 that can be estimated reasonably well. The second part of the calculation is the estimation of how much warmer 1981-2010 is than the pre-industrial level, whatever that may be. This is not needed for monitoring how close we are getting to damging climate change. It is needed to apportion responsibilities for past change in a loss and damage mechanism, and is needed to evaluate the capabilities of climate models. It is much more uncertain than estimated recent change and the monitoring yet to be undertaken of future climate change. Following this two-stage approach de-emphasizes the choice of pre-industrial level. This point could be considered for inclusion in the report. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted, and the opening paragraph stresses this point about definitional ambiguities.
13088	11	33	11	33	the same as for comment above - delete line 33 [additional space]. [Veryan Hann, Australia]	Accepted. "only" is deleted. "emissions reduction alone" means without special technologies such as CCS and SRM.
2274	11	34	12	13	It could be pointed out in this section that temperature variations due to natural processes change to a certain extent as a consequence of human-induced warming. For example, some of the variability in global-mean temperature is due to variations in snow and ice cover, and the latter will change as the cryosphere shrinks under human-induced warming. Thinner sea-ice over the Arctic Ocean is more easily perturbed by natural variations in atmospheric circulation.Some of the damaging impacts of human-indiced warming occur first when they are superimposed on short-term climatic fluctuations, so if the latter change in amplitude as a consequence of the slower component of human-induced warming, then the human-induced warming and consequent impacts are more than a question of long-term averaging. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted, but a full discussion of mechanisms is out of scope.
2912	11	34	12	14	Which are the reference periods here? What do you mean with "multi-decade timescale"? Is it always the same number of decades? If so, how many? Which time span? Or is it something arbitrary? [Sabine Wurzler, Germany]	Section has been clarified.
14974	11	34	12	14	Attention should be given to the AR5 finding: "Robustness of detection and attribution of global-scale warming is subject to models correctly simulating internal variability." And in particular, the ability of models to correctly simulate differences in regional and global climate impacts between a difference of 0.5 degrees and the corresponding role of internal variability within this range. A more robust discussion of climate models and internal variability is warranted. In addition, the authors should consider the paleo record of global temperatures, and the internal variability found within these records. [Farhan Akhtar, United States of America]	Our focus here is on the central estimates, which do not depend on the magnitude of simulated variability.
4727	11	35	11	38	It would be better if some references were presented to further support this statement. [Spyros Schismenos, China]	Accepted.
4352	11	35	11	41	It is necessary to include references in this paragraph. [Gabriel de Oliveira, Brazil]	Accepted.
886	11	35	11	52	The discussion of global-scale warming is interesting, but would there be value in pointing out the regional variations? I know that they will be discussed later, but it felt like an omission not to mention this earlier. [Sarah Gille, United States of America]	Out of scope here.
948	11	43	11	43	The report says “In the absence of strong natural forcing due to changes in solar or volcanic activity,…“. This statement is problematic because solar activity has in fact changed greatly over the past 150 years and reached one of the highest activity levels during the second half of the 20th century (e.g. Solanki et al. 2014; doi:10.1038/nature02995), interestingly coinciding with a major warming phase. Besides sun spots and total solar irradiance, amplifications mechanisms are currently being studied including for example UV and magnetic field effects. Our understanding of solar effect on climatic change is still poor, therefore the radiative forcing attributed to solar changes needs to be revisited at some point in the future. Palaeoclimate reconstructions have made major progress over the past 15 years and have empirically identified a clear and strong link between solar and climate variability, which cannot be explained by the low radiative forcing value initially interpreted by the IPCC. An overview of papers can be found here: http://chrono.qub.ac.uk/blaauw/cds.html. Climate models need to first achieve a successful hindcast performance of these solar-climate links before the solar radiative forcing value can be confidently determined. [Sebastian Luening, Portugal]	Noted, and further references have been added to this paragraph.
16092	11	43	11	44	Might it be relevant to be mentioining that the changing orbital configuration has likely been inducing a slow cooling over the preceding few thousand years that would likely have been continuing, so that assuming a steady baseline may well be leading to an underestimate of human-induced warming? [Michael MacCracken, United States of America]	Noted, but this is too small an effect to merit discussion here (and opens potential controversies).
3868	11	44	11	44	Cite and summarize briefly here Myhre et al. (2013). [Patrick Gonzalez, United States of America]	Rejected: we are building on AR5 throughout.
4260	11	44	11	45	It is stated that Figure 1.1 shows that "human-induced warming" since the 1850-1879 reference period is close to "total observed warming". "Human-induced warming" is represented in Figure 1.1 by the orange line. What does represent the "total observed warming" in this figure?. [Pedro Salvador, Spain]	Clarified to 'total forced temperature change'

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13012	11	44	11	45	please add explanations or more detailed references on how human induced warming and naturally-forced warming are calculated [Caserini Stefano, Italy]	Additional references to attribution step have been added.
12909	11	45	11	45	Why you use the 1850-1879 reference? The 1850-1925 reference period is also possible? [Mustapha Meftah, France]	Reference period is now 1850-1900 following AR5
949	11	46	11	47	The quantitative contribution of natural vs. anthropogenic warming of the past 150 years is still unclear and requires further work. Therefore the statement in lines 46-47 is misleading. This statement also contradicts the findings of the IPCC's AR5 report, namely the conclusion from the AR5 Synthesis Report for Policymakers (p. 5): "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together." Consequently "up to half" of the observed warming could be natural. This AR5 implication is not included in Fig. 1.1 of the SR1.5 report. The AR5 argues much more cautiously, that anthropogenic forcings have most probably only become important since the mid-20th century. In the AR5 Synthesis Report for Policymakers (p. 5) this reads: "Anthropogenic forcings have likely made a substantial contribution to surface temperature increases since the mid-20th century over every continental region except Antarctica". The cautious approach in AR5 is also reflected by the fact that the report did not state a "best estimate" for the CO2 climate sensitivity, which consequently precludes a best estimate of the anthropogenic vs. natural contributions to the warming of the past 150 years. The real natural vs. anthropogenic contribution depends very much on the CO2 climate sensitivity which the AR5 states as a wide range of 1.5-4.5°C per CO2 doubling. In case the true value was at the lower end of this uncertainty distribution, the natural contribution to the warming since the reference period would be significant. This needs to be stated here, otherwise the text suggests a degree of certainty that in reality does not exist, according to the AR5. Please add a reference to one of the latest key papers on this issue, e.g. Mauritsen & Pincus (2017; doi:10.1038/nclimate3357), or in case this postdates the literature cut-off date you may cite Lewis & Curry (2014; DOI: 10.1007/s00382-014-2342-y). [Sebastian Luening, Portugal]	Additional attribution references have been added to support this point. There is no contradiction with AR5 statements, which focus on different periods.
2076	11	49	11	50	The separation of "human induced warming" and "natural fluctuations" (especially with regard to mitigation) seems academic rather than based in reality and potentially erroneous. That is, systems are so complex and interlinked that it is extremely unlikely that such clear separation could ever be achieved. This is a fundamental assumption that needs to be explicitly stated and likelihoods/uncertainties expressed as to the degree (or not) of (un)coupling between systems! [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Rejected: there is no evidence that human influence is changing the climate response to solar and volcanic activity.
3951	11	49	11	50	Are future natural fluctuations really unpredictable? Studies looking at how ENSO or NAO changes with future warming give suggestions at least (e.g. Cai, W., et al. (2015), ENSO and greenhouse warming, Nature Clim. Change, 5(9), 849-859; [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	On decadal timescales, yes.
19085	11	51	11	52	Is there a specific reason why the number of decades is left open here? For the reference period this number is set to 3, but for the 1.5 world this seems to be undefined. Note that this leaves some ambiguity in the working definition of a '1.5°C world'. [Wim Thiery, Switzerland]	Formal definition of a 1.5°C world has been deleted.
9833	11	51	12	2	The definition of "1.5 C world" can confuse the readers about the achieving probability. Chapter 2 defines the achieving probability. Please describe the relationship between "1.5 C world" and the 1.5 C with different achieving probabilities descussed in Chapter 2. [Keigo Akimoto, Japan]	Definition of 1.5C-consistent pathways and 1.5C worlds are now clarified.
12776	11	51	11	52	The sentence is extremely important and not understandable, as the first part mentions "are expected to be 1.5°C…" without mentioning assumption and is followed by "or" mentioning only volcanic eruption. It is essential that this definition is stated clearly as policies my rely upon it. At the moment it is not. A clear sentence with one option only should be there. My suggestion: "Hence, for the purposes of this report, a '1.5°C world' is defined as one in which temperatures averaged over 52 a multi-decade timescale are expected to have warmed by 1.5°C above the pre-industrial reference period as a result from human activities only." The rest of the sentence should be omitted. The "multi-decade" should be more precise. 30 years? [Robert Vautard, France]	Formal definition of a 1.5°C world has been deleted.
13013	12	1	12	2	add a reference to the statement that there is no evidence of secular trend of natural forcing [Caserini Stefano, Italy]	References have been added.
1799	12	2			a world in which human-induced warming has reached 1.5°C. This is also fully in line with the Paris Agreement and the UNFCCC as the latter clearly refers to the warming attributable to human activities. [Tibor Farago, Hungary]	Unfortunately, it does not appear to be universally accepted that the 1.5°C in the Paris Agreement refers unambiguously to human-induced warming.
5923	12	4	12	14	Can this paragraph be clearer on a suggestive definition of crossing the 1.5° C threshold, as policymakers will need help on this issue? For instance, that the global temperature have to be above this limit on average for three decades? Or shouldn't this report give any clear recommendations here? Any changes should reflect what is written in Ch. 3, page 12, lines 9-20. [Borgar Aamaas, Norway]	We must avoid being policy prescriptive here.
887	12	4	12	4	Perhaps "would fluctuate equally on either side of 1.5°C" --> "would fluctuate equally in time on either side of 1.5°C". This point is subtle and could be explained more clearly. [Sarah Gille, United States of America]	Point has been amplified with reference to Rogelj paper.
16093	12	4	12	4	I'd suggest changing "On this definition" to "Using this definition". Also on line 11, change to "using our working definition". [Michael MacCracken, United States of America]	Wording revised.
4261	12	8			What are "the decadal predictions" in Figure 1.1?. Are "the initialised predictions"?. How do the authors interpret that "the initialised predictions" are substantially different than the observations?. [Pedro Salvador, Spain]	Predictions have been removed.
6433	12	9	12	9	Make sure the sentence in brackets here is updated before publication. [Jonny Williams, New Zealand]	Noted. Paper did not make the cutoff.
12910	12	10	12	11	1.5°C on our working definition? You use a running mean of 20 years? [Mustapha Meftah, France]	As explained, unless otherwise specified, warming refers to a 30-year centred running mean, correcting for short-term variability such as volcanoes.
4262	12	11			What are "the natural fluctuations" in Figure 1.1?. I suggest that the Figure 1.1 boxes and captions and the manuscript should use the same expressions with the aim to avoid misinterpretation when reading the inform. [Pedro Salvador, Spain]	Language has been harmonised as far as possible.
13272	12	11	12	13	Figure 1.1.It would be useful to indicate to the reader here which part of the figure shows the range of natural fluctuations (presumably solar and volcanic, i.e. the blue line). Different terminology between main text and text in figure labels makes it more difficult to match the up, so suggest consistency where possible. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Figure has been clarified.
11884	12	12	12	12	Why is a 20-year average used here, rather than a 30-year climatology? [Abram Nerilie, Australia]	20 years is used for traceability to AR5

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12911	12	13	12	13	Warming trend over the period 1850-2017 is consistent with your studies. Why you use the period 1861-2017? [Mustapha Meftah, France]	Trend now refers to 1880-2012 for consistency with AR5
12457	12	13	12	14	Regional fluctuations would be larger still. need to explain more. [Mohammad Rahimi, Iran]	Sentence has been deleted.
12912	12	14	12	14	Impact of stratospheric ozone, albedo and aerosol on Regional Climate? Links with observed global warming and regional temperatures? [Mustapha Meftah, France]	Sentence has been deleted.
12334	12	17			Is this correct? My understanding is that Ch 02 and 03 use mean TAS for future warming. Which means that HadCrut blended-masked is used for the observations and non-blended - non-masked for the projections. Please clarify. [Bill Hare, Germany]	Importantly, the TAS/blend distinction matters less for future warming (Richardson et al, 2017)
9112	12	17	12	23	This paragraph provides a very tidy summary of a complex issue. [Michael Oppenheimer, United States of America]	Summary has been moved earlier.
10956	12	17	12	23	This summary would be better placed at the beginning of the section. Bureau also needs to consider this for all the products in the AR6 cycle. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	section has been reorganised.
6434	12	18	12	21	Sentence too long. [Jonny Williams, New Zealand]	Noted.
2275	12	18	12	21	If "full spatial coverage" is achieved in the future, it could be either through adoption of reanalysis or through adoption of an approach such as that of Cowtan and Way (2014). But these methods also give complete global coverage into the past, albeit with diminishing reliability the further back one goes, as is the case also for spatially incomplete datasets such as GISTEMP, HadCRUT4 and NOAAGlobalTemp. This sentence could be amended to acknowledge this point. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted, although the importance of future coverage is now downplayed.
1800	12	18	12	23	As this is of fundamental importance for the understanding of the whole SR15: pls, make both sentences much more understandable for 'non climate scientists' [Tibor Farago, Hungary]	Summary has been clarified and moved earlier.
12863	12	18	12	23	I suppose that this relative warming is human induced that is beyond the natural variability. Maybe some words in this regards is needed. [Jorge Carrasco, Chile]	Noted.
3952	12	18	12	23	This summary of how 1.5C is defined is very helpful. For me, the structure would be better with this paragraph first in the section, followed by the detailed reasoning and justification behind that choice [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
3362	12	20	12	20	CHANGE "under" to "insufficiently" [Paul Doyle, Canada]	Sentence deleted.
14949	12	20	12	20	'undersampled' is one word. [LOKESH CHANDRA DUBE, India]	Deleted.
15225	12	20	12	20	for clarity, I suggest hyphenating "under sampled" [Pauline Midgley, Germany]	Deleted.
1275	12	20	12	20	Undersampled should be a single word. [Colin Raymond, United States of America]	Deleted.
14338	12	21	12	23	At the level of precision…... I am not sure I understand the sentence and the periods to which the two levels of warming (0.9 ° and 0.6 °) refer to [Alessio Giardino, Netherlands]	Sentence has been clarified.
3363	12	23	12	23	ADD "based on present data through 2017" at end of sentence [Paul Doyle, Canada]	Sentence has been deleted.
9766	12	23	12	23	0.6 deg C warmer than the present decade 2010-2019'. The present decade is incomplete so this statement is incomplete. Need to replace 2019 with whatever end date is used for the partial-decade calculation in the final version of the report. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Sentence has been deleted.
11885	12	23	12	23	How is it possible to have an estimate for the 2010-2019 decade when we are currently only in 2017? [Abram Nerilie, Australia]	Sentence has been deleted.
9846	12	23	12	23	Sounds weird to privide numbers for 2010-2019 while we are still in 2017 [Christopher Reyer, Germany]	Sentence has been deleted.
898	12	23	12	23	how can one in 2017 say that the decade 2010-2019 is 0.5°C below 1.5°C ? What about 2017, 2018 and 2019 ? [Jean Poitou, France]	Sentence has been deleted.
6020	12	23	12	23	present decade 2010-2019 - better to use the date this is measured up to so far - 2016/2017? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Sentence has been deleted.
20360	12	23	12	23	You anticipate years 2017-2018-2019 not to increase the current 2010-2017 decade average ? [Olivier Boucher, France]	No. Definition assumes that any trend can be extrapolated.
2276	12	23	12	23	0.9 deg C would be reduced to 0.8 deg C by using a more appropriate 18th Century level for the pre-industrial temperature, such as proposed by Hawkins et al., (2017). [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Use of 1850-1900 as an approximation of pre-industrial is required for consistency with AR5.
2277	12	23	12	23	1986-2005 should be changed to 1981-2010, as the latter is the standard WMO 30-year averaging period. In practice the difference is negligible, as according to ERA-Interim's estimate of global-mean temperature, the difference between the 1981-2010 and 1986-2005 averages happens to be well under 0.01 deg C. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	We quote 1986-2005 for traceability to AR5. Table now includes WMO 30-year period, as suggested.
21332	12	23	12	33	Are we at + 0.9 (line 23 and others) or at + 1 (line 33 and others). Please clarify [alessandra conversi, Italy]	Sentence has been clarified. Warming by 0.1 degrees every 5 years, it all depends on when.
2278	12	23	12	23	The temperature rise relative to the present decade should not be quoted. We do not know what the temperature will be in 2018 and 2019. Forecasts can be made, but a big volcanic eruption could scupper the forecasts. And for the record, to be consistent with WMO definitions of 30-year climatic periods, the present decade should be referred to as 2011-2020, not 2010-2019. To be current, one could refer to the past ten years (2007-2016, or perhaps 2008-2017 by the time the report is finalised), but if one of these periods is choosen, it should be pointed out that the 2015 to 2017 period is exceptionally warm, so that the mean temperature of any ten-year period that incorporates it probably includes some effect of natural variability. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Sentence has been deleted.
12458	12	26	12	26	You are comparing spatial resolution with temporal resolution! But they are different. I think it is better to devide the discussion to spatial(global&regional) and temporal(seasonal) warming. [Mohammad Rahimi, Iran]	We decided to keep the discussion in one subsection as it is relatively short.
17316	12	26	13	18	This report focuses on the impact of 1.5? rise in global temperatures relative to the pre-industrial reference period. However, Figure 1.2 shows the observed regional changes in seasonal average temperatures associated with the observed 1? rise in global temperature. For the consistency, it would be better to show the regional changes in temperatures associated with 1.5? rise. [Young-Hwan Ahn, Republic of Korea]	The intent of Fig. 1.2 is to show regional warming over the past decade relative to pre-industrial. Chapter 3 includes a figure showing regional warming at 1.5 C rise in global mean surface temperature
13527	12	26	13	18	I wish seasonal warming is put in different subsection and put "Global versus regional and Polar versus Equator warming", then move temporal-related disussion such as seasonal warming in the next subsection. [Aditya Kartadikaria, Indonesia]	We decided to keep the discussion in one subsection as it is relatively short.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4353	12	28	12	29	Here it is necessary to explain more in detail why the temperature increase is expected to be greater over land than over the oceans. [Gabriel de Oliveira, Brazil]	This was discussed extensively in the AR5, and a reference to the report is provided.
17827	12	29	12	29	Reference: IPCC 2013a is not listed in the references (it is IPCC 2013). [Wilfran Moufouma Okia, France]	Has been corrected
20074	12	29	12	31	The authors could also cite Seneviratne et al. (2016, Nature) and Chapter 3 of the SR15 on this point, and highlight the fact that the differences may be also much stronger when considering regional temperature extremes than regional means. [Sonia Seneviratne, Switzerland]	References will be included in the next draft
14917	12	30	12	30	Joshi et al., 2011 and Karmalkar and Bradley, 2017 (both already cited in the chapater) can be cited for 'substantially greater than 1.5C in many land regions'. Joshi et al., 2011 shows greater warming over land for 2C, whereas Karmalkar and Bradley, 2017 show regional warming for several regions in the US for global 1.5C and 2C targets. [Ambarish Karmalkar, United States of America]	Noted
6435	12	30	12	31	Use of the terms 'many' and 'most' is not good practise because they are imprecise. [Jonny Williams, New Zealand]	Agreed. More precise language will be used in the next draft
7018	12	31			a best-estimate: In which respect? Could it be clarified? [Érika Mata, Sweden]	best-estimate has been replaced with "estimate".
6022	12	31	12	31	Is it really "less than 1.5C in most ocean regions"? Would be interesting to see evidence of that. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	There are only very few grid boxes in Fig. 1.2 with annual mean warming in excess of 1.5 C
12459	12	31	12	31	in "…most ocean regions…", I suggest change"ocean" to " water" or "Sea". [Mohammad Rahimi, Iran]	Ocean' is preferred over sea" or "water"
4263	12	31	12	32	Replace "which shows a best-estimate of the observed change…" by "which shows a best-estimate of the human induced observed change…". Otherwise, it could be misinterpreted as the total observed change in seasonal average temperatures. [Pedro Salvador, Spain]	Sentence has been reworded
6023	12	31	12	34	If figure is to illustrate that land regions show more than global average warming, and ocean regions show less than average warming, it would be good to be able to distinguish that from the colour bar. I think the figure shows change associated with 1C global warming, but the colour scale shows the same colour for regions with 0.75-1.5C warming, so it is not possible to assess the difference between above and below global average temperature. Suggest changing colour bar or rephrasing text. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	thank you, the comments were considered when redrafting this section
6436	12	34	12	34	Again the term 'many' is used without quantification, examples or references given. [Jonny Williams, New Zealand]	More precise language will be used in the next draft
950	12	38	12	40	Please also cite Marcott et al. (2013; 10.1126/science.1228026) who found “Current global temperatures of the past decade have not yet exceeded peak interglacial values but are warmer than during ~75% of the Holocene temperature history.“ [Sebastian Luening, Portugal]	Marcott et al. (2013) is cited in section 1.2.1
20361	12	38	12	45	I'm not a big fan of the "time of emergence" concept. First variability is less in some regions than others, so the climate change signal may be easier to detect there despite being smaller. Second, natural systems respond both to extremes and to average climate perturbations. The average climate change signal may remain the most important quantity, irrespective of the variability of the underlying climate. I would recommend that you highlight the limitations of the concept. [Olivier Boucher, France]	Paragraph assessing "time of emergence" literature has been deleted.
2279	12	38	12	45	After temperature, there are other climate variables that are better candidates for change detection than precipitation. This includes some impact-relevant climate variables such as soil moisture and surface air humidity. This paragraph would benefit from being a bit more general. As it stands, the reader is left hanging between temperature and precipitation, and may wonder about other variables. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been deleted
12864	12	39			Maybe It would be good to mention what are the "internal climate variability" for not specialist readers [Jorge Carrasco, Chile]	Paragraph has been deleted
5212	12	40	12	45	Buried in section 1.2.2 Global versus regional and seasonal warming aret two sentences that discuss the fact that the signal-t-noise for precipitation is much lower. These two sentences need to be highlighted in its own sub-section, perhaps a new section 1.2.3. [Arthur Lee, United States of America]	Paragraph has been deleted
6627	12	40	12	45	A realistic discrimination of the signal-to-noise for precipitation at regional scale may be really complex. Among other things it probably needs a data network denser than the used for temperature. For example some local (intra-regional) precipitation records may be driven by factors like the orography, altitude, distance to sea, SST oscillations depending on the intensity of the coastal upwelling, etc. Therefore, in large abrupt regions the spatial scale of study may be crutial in order to identified some divergent extreme responses: e.g. floods windward but droughts afecting leeward areas. Otherwise these real risks could become masked if only average regional information is considered. [Castor Muñoz Sobrino, Spain]	Paragraph has been deleted
10184	12	42	12	43	Is emerged above the noise etc. precise enough here - do all studies use the same definition of emergence? I think we need to point to the fact that there are different ways of defining this [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been deleted
2280	12	43	12	43	The cited paper by Mahlstein et al.(2012) refers to GMST warming of 1.4 deg C relative to 1900-1929, not a pre-industrial level. This may not be quantitatively significant as the first decade of the 20th century was a relatively cold one, but this should be clarified. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been deleted
6024	12	43	12	44	Does Mahlstein et al. 2012 estimate refer to seasonal mean precipitation change? Would be clearer to specify. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been deleted
11674	12	44	12	44	Changes in what? Precipitation? Clarify? [David Schoeman, Australia]	Paragraph has been deleted
13014	12	44	12	44	add "in precipitation intensity" after "significant changes" to clarify [Caserini Stefano, Italy]	Paragraph has been deleted
16094	12	44	12	44	has reached 1.4 C seems very precise--how about saying "has exceeded about 1.4 C" or something similar. [Michael MacCracken, United States of America]	Paragraph has been deleted
9467	12	44	12	44	Can you please be more clear about what rainfall statistic you are referring to in this statement about " not reaching statistically significant changes …". E.g. Should this sentence be phrased " … statistically significant changes IN SEASONAL MEAN RAIFALL ..." ? [David Wratt, New Zealand]	Paragraph has been deleted
12202	12	45	11	45	much earlier could be changed to "at lower levels" [Jan Fuglestvedt, Norway]	Paragraph has been deleted

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16095	12	45	12	45	may is not an appropriate likilihood indicator in the IPCC lexicon. I'd suggest "are likely to"--and indeed one might add that the observations are indicating changes in extreme precipitation now when we are only about 1 C above preindustrial. [Michael MacCracken, United States of America]	Paragraph has been deleted
4511	13				Fig 1.2 - add explanation of "green lines" (see Fig 3.16) [Radim Tolasz, Czech Republic]	Unclear which figure comment refers to
3364	13		13		Fig. 1.2. Hatch marks are impossilbe to discern on darker colours. [Paul Doyle, Canada]	Figure panels have been enlarged
6479	13		13		Figure 1.2 is too small [Roger Bodman, Australia]	Figure panels have been enlarged
12937	13		15		CO2 -fe is new unit and it is replacing CO2 -eq as was in AR5? An explanation comes later in page 18 but the unit is used earlier. Resequencing might be necessary so the explnanation comes before the use of the unit CO2 -fe. [Joyashree Roy, India]	The concept of CO2-forcing equivalent emissions is used in this section for illustrative purposes only. It is not suggested as a replacement for CO2-eq
19664	13		18		Can this section include an asssessment of the impacts of the different pathways and timescales on human rights and an assessment of the human rights impacts of an overshoot? [Tara Shine, Ireland]	Suggested detail beyond scope of section
951	13	1	13	1	The map shows the warming since the reference period and claims the entirety is of anthropogenic origin. This is misleading and conflicts with the AR5 which sees potential for a substantial natural component for up to half of the warming. See my previous comments on this subject. [Sebastian Luening, Portugal]	Plot now shows total warming.
4906	13	1	13	2	In the Figure 1.2 at the 100% zoom, it is almost impossible to read the abrevations in the rectangular regions. It was needed to expand up to 200% zoom, in order to read AMZ for Amazonia in South America. Please, amplify these abreviations. [Rubén Piacentini, Argentina]	We have increased the size of the region labels in the revised figure
13660	13	1	13	2	Ensure these figures are taken up consistently in other chapters, eg chp 3 refers to a further warming of 0.5C not 0.6C [Elvira Poloczanska, Germany]	Consistency has been improved.
12777	13	1	13	6	I do not think "Regional human attributable warming" is correct, given the methodology used for building Figure 1.2; Warming regional values are explained as being regression of observed temperatures to the human induced global temperature. However if in one region a large (or small) warming is induced by natural variability in the region, it will still give large regressed (or small values), regardless of its human attributable nature. There is no attribution in the figure 1.2. I would remove "human-attributable". [Robert Vautard, France]	We have updated the methodology to show observations regressed against total attributed externally-forced warming
6437	13	1	13	7	Regarding figure 1.2: This colour bar is unsuitable for some colour deficient readers. For example the colour representing -3 -> -2.25 appears very similar to the colour for values greater than +3. [Jonny Williams, New Zealand]	Noted: we have endeavoured to use a colour-blind-friendly scale.
6964	13	1	13	7	To the general public, the procedures to plot Figure 1.2 may be too complicated to understand. It is suggested to simply plot the actual difference between DJF/JJA/Annual temperature in the two periods of 2007-2016 and 1850-1879. [Sai Ming Lee, China]	Rejected - We do believe that there is added value of showing the externally forced warming over the period as it enables a much larger amount of the globe to have displayed trends
10567	13	1	13	7	what is the mitigation method to deal withmissing data in South America? [Elemer Briceño-Elizondo, Costa Rica]	More data is now available for the previously sparse regions of data with the new update to the HadCRUT4 dataset
2913	13	1	13	7	Figure caption and header of figure 1-2: please exchange "warming" by "temperature change". [Sabine Wurzler, Germany]	Rejected: reason for change is unclear, and title is already long.
13016	13	1	13	7	fig. 1.2: I understand the reasons that lead to the choice of using HADCrut dataset; anyway, warming in the polar region is so important that in the figure 1.2 I suggest using BerkeleyEarth data or NASA-GISStemp data (managing in some way the data missing for the period, and stating clearly the uncertainty for the assessment of the GMST in this area in this period) [Caserini Stefano, Italy]	We provide the GISTEMP and HadCRUT4- Cowtan and Way versions of the figure in the technical annex but choose to display HadCRUT4 in the main chapter to keep consistency with Figure 1.1
13273	13	1	13	7	Figure 1.2: For increased accessibility and to reduce unceessary text in caption, suggest spelling out DJF and JJA in the figure, rather than having to describe in caption. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Implemented
13274	13	1	13	7	Figure 1.2: It would be useful to visually indicate the annual plot separate from the DJF and JJA plots, for example using a vertical line as a divider. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	We have had the annual plot much bigger than the seasonal ones and on a separate vertical line
13275	13	1	13	7	Figure 1.2: As annual data is referred to first in the main text, suggest placing the annual plot to the left-hand side of the figure so it can be more easily identified. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	We have had the annual plot much bigger than the seasonal ones and on a separate vertical line
13276	13	1	13	7	Figure 1.2: Suggest removing the green region outlines and labels to reduce visual clutter. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Regions are now only defined on the large annual plot
13277	13	1	13	7	Figure 1.2: Suggest rotating legend colour scale to run top-bottom rather than left-right, as then maps with spatial metaphor of more-up, less-down. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Good suggestion.
13278	13	1	13	7	Figure 1.2: Areas missing data (in white) look like no warming and so may be misinterpreted as such. Suggest indicating missing data differently, e.g. grey perhaps and include missing data colour in legend. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Figure revised.
13279	13	1	13	7	Figure 1.2: Hatching is difficult to see in the plots - if this is important information, an alternative may be to produce separate sets of plots, one showing data meeting significance at 10% confidence level, and another plot showing all data. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Hatching was not essential to this figure - deleted.
3953	13	1	13	8	Figure 1.2: The green boxes aren't defined in the caption. The labels on the boxes are impossible to read. [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Boxes are added for reference: font should be legible in final print version.
17451	13	2			C [Tom Gabriel Johansen, Norway]	Noted.
17491	13	2			C [Angela Morelli, Norway]	Noted.
9767	13	2	13	2	Fig 1.2 panels are too small to be useful. Suggest replacing with a column of 3 panels rather than a row and increasing size of each panel. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Figure panels have been enlarged
6512	13	2	13	2	It is suggested to change the caption to "Regional human-attributable temperature change …" as that is what is shown in the figures. [Heike Hebbinghaus, Germany]	Map is now used to show total warming.
15230	13	2	13	2	Figure 1.2 needs to be reproduced on a much larger scale to be useful [Pauline Midgley, Germany]	Figure panels have been enlarged
19086	13	2	13	2	Figure 1.2: several SREX region acronyms are difficult to read on this figure, e.g. SEA, CAM, CAR, NEU, CEU, MED, SAS and ALA (non-exhaustive list). To further enhance figure's readability, perhaps these acronyms could be shown only in panel a? [Wim Thiery, Switzerland]	Accepted. Good suggestion.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20362	13	2	13	8	By definition I would expect human-attributable warming to be smooth in space. I see no reason for two contiguous gridboxes in Siberia to differ by 2°C. You need to project HadCRUT4 onto a CMIP5 warming map, not regress individual grid-boxes from HadCRUT4 onto a global mean time series. [Olivier Boucher, France]	Map is now used to show total warming.
4264	13	4			Figure 1.2 caption uses the term "trend" but it is not clear what does it mean. It appears that "trend" refers to human induced warming in ºC as showed in Figure 1.2 but the current use of trend in science usualy refers to the change of a magnitude per time unit, such as x ºC/year. More information should be included in the manuscript to ellucidate the meaning of "trend" in the framework of the climate change analysis. [Pedro Salvador, Spain]	Map is now used to show total warming.
6438	13	5	13	5	The colur orange referred to here may change in light of my ealier comment on the colours used in figure 1.1. [Jonny Williams, New Zealand]	Noted.
16096	13	5	13	6	data is plural--two adjustments are needed [Michael MacCracken, United States of America]	Noted.
4265	13	6			The term "hatching" has been used in Figure 1.2 caption to remark areas with significant values at a 10% confidence level. In the technical note for Figure 1.2 (page 57, line 11) the term "stippling" was used instead of "hatching". It would be desirable to use the same nomeclature. It should also be noted that Figure 1.2 and Figures 1 and 2 in the Technical Annex 1.A are too small to identify the stippling areas from the non-stippling ones. [Pedro Salvador, Spain]	Hatching no longer used.
1940	13	6	13	6	Hatched areas not clear on Figure 1.2 - try '+' marks as in figure 3.1 in Ch 3 [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	Hatching no longer used.
2500	13	6	13	6	Is the phrase "10% confidence level" consistent with the IPCC guidance on confidence and likelihood language? [Robert Koppu, United States of America]	Phrase no longer used.
5690	13	10	13	18	The 33 regions should be indicated in a map. It seems that the divisions of areas in Figure 1.2 are based on the 33 regions. If so, need to specify. [Hong Yang, Switzerland]	The 33 regions are indicated on the annual mean regional warming map, which has been enlarged
12204	13	10	13	18	May be useful to mention that these regions will not be used in discussions of mitigataion, only for impacts. [Jan Fuglestvedt, Norway]	Rejected: this seems too restrictive.
4417	13	11		18	Could you give a table or a figure for temperature change relative to reference period over 33 regions in supplementary materials? [Jingyong Zhang, China]	space permits.
15231	13	11	13	11	Shouldn´t "the AR5 definition of regions" be "the definition of regions used in the Working Group I contribution to AR5"? [Pauline Midgley, Germany]	Agreed. Clarification will be included in the next draft.
10957	13	11	13	11	Should specify which WG reports this refers to - WG III did not use these 33 regions [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Will clarify that 33 regions were used by WG I.
2914	13	11	13	12	Can this list of 33 regions be found somewhere in the report? If not, please add. [Sabine Wurzler, Germany]	It is provided in AR5.
20075	13	11	13	12	There was not yet a discussion within the SR15 author team of the regions to consider. For instance, within Chapter 3, the IPCC SREX regions (IPCC 2012; see chapter 3 of that report, Seneviratne et al. 2012) were used in several analyses. After checking Christensen et al. (2013) it seems that the land regions are the same, but this should be checked. Having a map with the considered regions would be useful. A cross-chapter discussion on this topic might be helpful. [Sonia Seneviratne, Switzerland]	Noted.
3954	13	11	13	12	It may be worth including a map and list of the regions used, particularly if they reoccur throughout the report. [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	The 33 regions are indicated on the annual mean regional warming map, which has been enlarged
12335	13	12			I strongly disagree with the statement on CBA and the 'relatively easy to calculate costs' as it also relates to future costs of climate change. It might be true insofar as that scholars have come up with various numbers, creating headlines, but the scientific credibility of those is often questionable. Most importantly, such methods disguise the amount of value judgement that underlies there analysis (e.g. by the choice of the discount rate or the choice of which impacts are actually costed in). Authors should revisit the discussion in the AR5 on tools such as CBA. [Bill Hare, Germany]	Comment does not appear to refer to indicated section
13089	13	12	13	12	request a link to the research The report adopts the AR5 definition of regions that included 33 regions of land and sea areas and each of 12 the 33 regions was provided with a name and a label (Christensen et al. 2013). [Veryan Hann, Australia]	Comment unclear
6025	13	12	13	14	Unclear sentence. Reconsider commas/use of plural. Does it mean northern mid-latitude winters have already experienced regional warming in excess of 1.5 or 2C? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Sentence has been deleted.
10415	13	12	13	14	Projections of change… even 2ºC" does not read [Jonathan Lynn, Switzerland]	Sentence has been deleted.
897	13	13	13	13	Run-on sentence: Change to "regional variations. For example, …." [Sarah Gille, United States of America]	Sentence has been deleted.
13015	13	13	13	13	add ";" after "variations" [Caserini Stefano, Italy]	Sentence has been deleted.
15232	13	13	13	14	copy edit: correct punctuation for clarity to "large regional variations, for example northern mid-latitudes in winter have already experienced" [Pauline Midgley, Germany]	Sentence has been deleted.
16097	13	14	13	16	It is not just the albedo effect that leads to greater warming in cold regions. At such cold temperatures less of the trapped energy goes into evaporation and so a greater share is available to contribute to warming. In addition, the warming in high latitudes is generally of a thin layer below an overlying inversion. Conversely, a greater share of the trapped heat goes into evaporation over warm ocean areas, keeping the temperature change small, but adding water vapor to the atmosphere that contributes to greater precipitation extremes. I think it would be useful to explain this--high latitudes do have more of a temperature increase, but low latitudes get more of a change in precipitation; both have their particular ways of making impacts worse. [Michael MacCracken, United States of America]	Sentence has been deleted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2281	13	14	13	18	These two sentences, taken together, are misleading. There are several reasons why the Arctic warms more than elsewhere. As discussed by Simmons et al.(2017, doi 10.1002/qj.2949) and earlier by Simmons and Poli (2014; doi: 10.1002/qj.2422, also uncited in the report), much of the recent Arctic warming has ocuured in the colder seasons of the year, especially at oceanic locations that are free of sea-ice in recent years but ice-covered in the climatological average. Under appropriate meteorological conditions Arctic temperatures can fall to values much below the freezing point over sea-ice but not over unfrozen sea. Winter temperature anomalies over areas where sea-ice is anomalously absent can be 10 deg C or higher. The area may be relatively small, but the anomaly is relatively large. One reason sea-ice cover may be low is that an unusual amount of heat was absorbed by the ocean the preceding summer, by the albedo mechanism the FOD authors discuss, but anomalies in atmospheric circulation also play a role in individual years such as 2016. It is bemusing to see the FOD refer to a web article by the GISTEMP team, but not to the above peer-reviewed publications, which are backed up by more recent data published on the web at climate.copernicus.eu. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Sentences have been deleted.
9768	13	17	13	17	warmest year ever recorded'. What period does 'ever' refer to? [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Sentence has been deleted.
13017	13	17	13	18	move the reference GISTEMP team 2017 after "in 2016" in line 17, and add at the end a reference for the statement on the record low sea ice for most of the year 2017 (please check it is still true) [Caserini Stefano, Italy]	Sentence has been deleted.
1801	13	21			1.2.3 Definition of 1.5°C consistent pathways and associated emissions à 1.2.3 Definition of pathways and associated emissions consistent with 1.5°C warming [Tibor Farago, Hungary]	Taken into account. Text is revised.
12336	13	21			I do not agree with the way TCR is presented here. It gives the false impression as if we are able to classify 1.5°C pathways ex ante in a deterministic way, which is obviously not the case. We can only assess probabilities of pathways and therefore also just classify them according to probabilities. Assessing impacts at 1.5°C most often cannot rely on pathways anyway (see e.g. James et al. 2017). So I think this section should (re-)introduce the concept of TCR and why it matters for 1.5°C. Then it should comment on the difference between the taks of Ch 02, which is limiting warming to a certain level with a certain probability, and the task of Ch 02 which is about assessing warming at a level. And introduce some of the key challenges of the report as they are e.g. related to questions of scenario dependency of impacts. [Bill Hare, Germany]	Noted: Figure 1.4 (in the final numbering) is the only point in chapter 1 in which TCR is mentioned, and is used simply to demonstrate the functional relationship between emissions, concentrations, temperature and sea-level in ambitious mitigation scenarios. These relationships hold whatever the climate response. The classification of pathways is made clear in the text: "This report defines a '1.5°C pathway' as a pathway of emissions and associated possible temperature responses in which the majority of approaches using presently available information assign a probability of approximately one-in-two to two-in-three to warming remaining below 1.5°C or, in the case of an overshoot pathway, to warming returning to 1.5°C by around 2100 or earlier"
20076	13	21	14	10	This section could refer to the cross-chapter box on "1.5° warmer worlds". [Sonia Seneviratne, Switzerland]	Accepted
649	13	21	18	2	It should provide the years of the various 1.5C global warming. Figure 1.3 calculated from the simple model. This result should be compared with the CMIP5 results. [Zong-Ci Zhao, China]	Noted. Figure 1.3 is revised. Detailed results are presented in the following chapters.
689	13	21	18	2	It should provide the years of the various 1.5C global warming. Figure 1.3 calculated from the simple model. This result should be compared with the CMIP5 results. [Zong-Ci Zhao, China]	Noted. Figure 1.3 is revised. Detailed results are presented in the following chapters.
12209	13	21	18	27	This is a very important and useful section. [Jan Fuglestvedt, Norway]	Thanks.
20650	13	21	16	2	This section goes further introduces the four main pathways that (should be consistently referred to throughout the rest of the chapters). It would be very beneficial to the story line for Chapter 1 and the subsequent chapters to consistently refer to these pathways (whether through characterising them with a name or otherwise). Consider adding "impacts" to the subtitle of section 1.2.3 so it reads "Definition of 1.5C consistent pathways and associated emissions and impacts". In this way, decision makers and other audiences can get a more full sense of the choice "clusters" associated with each pathway. This would create a more solid basis for decision making, I think, than presenting slivers of information in separate sections or chapters (which makes it more challenging to get a holistic picture of what each pathway could generally entail). [Koko Warner, Germany]	Accepted. The title is changed.
1802	13	23	13	26	'The Paris Agreement (PA) does not associate a timescale or pathway .. .. associated with very different impacts and emissions ..' This argument is not fully valid for 2 reasons: (i) PA itself has one element of the pathway (4.1. .. achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century ..) plus the "Paris Decision" (1/CP.21) for the emissions pathways refers to 2030 (para 17); (ii) the objective for UNFCCC and PA has a ghg-concentration and adaptation related component (Art.2). These indications should not be overlooked for the SR15. [Tibor Farago, Hungary]	Noted. We revised the sentence of the first paragraph in Section 1.2.4 (old 1.2.3).
11018	13	23	13	26	If the Paris Agreement does not associate a timescale with 1.5C, but 2100 is chosen throughout the report (explicitly via IAMs in chapter 2) then this requires an explicit explanation here: why not earlier and why not later? This explanation needs to go beyond IAM pragmatics. One day, the 2100 limit might come under political pressure, and climate science should establish safeguards early on [Oliver Geden, Germany]	Noted. We revised the sentence of the first paragraph in Section 1.2.4 (old 1.2.3) and put the sentence to explain the pathways which temporarily exceeding 1.5°C (where "temporary" here is with reference to the timescale to 2100, allowing an exceedance duration of at most a few decades).
20855	13	23	13	26	This paragraph seems to suggest that a continued warming pathway is consistent with 1.5C: "temperature pathways [] consistent with 1.5C []…: temperature stabilization, continued warming and temperature overshoot" [Heleen de Coninck, Netherlands]	Noted. Three pathways: "Pathways remaining below 1.5°C", "Pathways temporarily exceeding 1.5°C" and "Pathways permanently exceeding 1.5°C" are considered.
14926	13	23	16	2	While I find this discussion helpful, and Figure 1.3 is mostly helpful, there are some key concepts that must be further brought out for decision-makers. First is the reason why Temp stabilization pathways (green) monotonically go down while overshoot (blue/purple) scenarios allow emissions growth initiatlly. The authors are likely aware that the near term slope of these curves have been used extensively by government and non-state actors to help define the needed mitigation ambition in the near term (e.g. inititives such as Science-based Targets, Climate Action Tracker, FSB Task Force on Climate-related Financial Disclosures). I believe the reason stabilization scenarios immediately decrease is simply definitional, but this is a critical point for non-scientists making use of this information. Second, I think frame (f)'s y axis (emissions as % of baseline) is very helpful but PLEASE change the x axis to year rather than temperature. The graphic with temperature as x axis is highly confusing without spending a lot of thinking time. [Christopher Weber, United States of America]	Noted. Figure 1.3 (f) is deleted.
3264	13	25			How do these pathways compare with the RCP used in 5AR? Worth saying something about similarities, differences and justifications for the new choice. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted. RCPs are referred in Box 1.1. The difference is that the pathways in SR1.5 focus on temperature and RCPs focus on concentration/radiative forcing.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12460	13	26	13	26	What do you mean by “temperature stabilization”? You mean temperature increasing rate? Or keeping temperature at a specific amount? I think we don’t have such a term in climate change literature. So I suggest these pathways: Current rate warming, higher rate warming, temperature overshoot. [Mohammad Rahimi, Iran]	Noted. We consider pathways: remaining below 1.5 oC, temporality exceeding 1.5oC, and permanently exceeding 1.5oC.
16098	13	26	13	26	Actually, the desired path is likely peaking at 1.5 C and then going down in that quite adverse impacts (e.g., ice sheet deterioration) started at a lower increase in global average temperature than 1.5 C. It would seem to me that rather than a "temperature stabilization" pathway, it would be more appropriate to be talking about a pathway peaking at 1.5 C and then headed down--indeed, if enough emissions reduction were done to achieve this, it would be likely where this pathway would in any case go. Also such a pathway might be the goal set for a climate intervention (geoengineering) pathway, and so again this makes more sense to have than a stabilization pathway. [Michael MacCracken, United States of America]	Accepted. We consider pathways reaming below 1.5 °C.
7019	13	28			Is the qualification OFTEN accurate? I do not think "scenario" and "pathway" have storically been used as equal. [Érika Mata, Sweden]	Accepted. The text is revised. "often" -> "sometimes"
12203	13	28	13	31	Very useful para. [Jan Fuglestvedt, Norway]	Thanks.
12066	13	29		31	This definition is essential as there have been multiple interpretations and uses of the word scenario which generates significant confusion, especially for practitioners. [Silvia Serrao-Neumann, Australia]	Noted.
20184	13	30			...climate variables in the future, such as... [Ton Wildenborg, Netherlands]	Noted. "evolution" implies future, so we do not insert "in future".
6439	13	33	13	33	References to specific figures, tables and sections should be hyperlinked in the PDF, this is just one example. [Jonny Williams, New Zealand]	Noted.
6026	13	33	13	43	I think this para might need more explanation, if its intended for an interdisciplinary audience. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been rewritten; technical language has been deleted.
3122	13	33	14	10	This material is unclear and too technical to include. If any of this is included terms like TCR and TCRE would have to be defined and it would have to be made clear why they are important to this discussion to non-technical readers and policy makers. What are the policy implications of this material, if any??? [Richard Rosen, Germany]	Technical material has been deleted.
9834	13	33	14	2	The literature (K. Akimoto, F. Sano, T. Tomoda, GHG emission pathways until 2300 for the 1.5 C temperature rise target and the mitigation costs achieving the pathways, Mitigation and Adaptation Strategies for Global Change, Published online Sep. 5, 2017) focuses on several kinds of emission pathways for 1.5 C. This should also be referred. [Keigo Akimoto, Japan]	Noted
4743	13	33	14	2	It would be better to combine this paragraph with the caption of Figure 1.3 since they are both the description of Figure 1.3. A more detailed interpretation from behind this figure is expected here. [Ma Lijuan, China]	Paragraph has been rewritten; detailed information on figure panels has been oved to figure caption
16099	13	33	14	2	As context for this paragraph, it seems to me there needs to be a preceding discussion of the radiative forcing implications of long and short lived forcing agents. Converting everything to a CO2-forcing equivalent would seem to imply to me that one is assuming a lifetime of the agent that is equivalent to CO2, so creates a tail effect that is very long, whereas methane, tropospheric ozone, black carbon, sulfates all have much shorter tails. If one instead were to just be talking about the time histories of radiative forcing, then one could imagine a quite wide range of possibilities for reducing the forcings by going after emissions of different types. I just don't see the need here to be using CO2 as a baseline quantity here for the forcing--this seems a bit confusing to me and would also seem to have the disadvantage of essentially hiding what can be accomplished by reducing the loadings of short-lived warming agents (gases and aerosols). The following paragraph does raise some of these points and then suggests that the use of "Effective Radiative Forcing" can overcome the problems--so why not use this instead of using CO2-forcing-equivalent? [Michael MacCracken, United States of America]	The concept of CO2-forcing equivalent emissions is used in this section for illustrative purposes only. Its use avoids presenting scenarios in Fig. 1.5 as CO2-only scenarios, or making assumptions about future non-CO2 forcings.
9468	13	34	13	34	I suggest it would be useful to add a simple-language definition or explanation of the term "Transient Climate Response" here for the non-expert reader [David Wratt, New Zealand]	Mention of "Transient Climate Response" has been deleted from paragraph.
18844	13	37			The term CO2-fe is not widely used. It is discussed further in Box 2, so I suggest pointing the reader there. [Bjørn Samset, Norway]	A definition of "forcing equivalent emissions" has been included with the first mention of the concept.
6331	13	37			The concept for CO2-fe will be very confusing for policymakers, as some will see it as a way to replace GWP - but a metric built on delta concentration is a very different concept to any metric that compares pulse emissions, which is what you need for any application in emissions trading schemes or even just formulation of economy-wide emission targets. CO2-fe is introduced and used here without further explanation. Authors should consider a box that explains the concept (even Box 1.2 is too complex - I'm asking for a specific explanation of CO2-fe on its own). But authors also need to be careful not to place too much emphasis on this since at present, the rest of the report especially chapters 2 or 4 make no use of it - hence no point in raising interest or introducing a new metric that is then not used to translate findings into policy relevant results. It is a useful diagnostic but I question its utility beyond being used as an internal diagnostic. It could be used differently but right now the report doesn't achieve that and hence is more confusing than useful in my view. Be clear about its use and its limits. [Andy Reisinger, New Zealand]	It has been clarified that the concept of CO2-forcing equivalent emissions is used in this section for illustrative purposes only.
1060	13	37	13	37	“CO2-forcing” referenced a number of times but not fully described until page 18. Would it be possible to include a footnote citation with a definition? Or a footnote pointing a reader to a full explanation of the term on page 19? Or possibly list the definition of the term once the first time it appears on page 13? [Martini Catherine, United States of America]	A definition of "CO2-forcing equivalent" emissions has been included with the first mention of the concept.
19382	13	37	13	37	CO2-forcing equivalent needs to be explained here as it is a new and important concept. I suggest either bringing section 1.2.3.6 or Box 1.2 forward to here, or at least pointing the reader to the later definitions here. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	A definition of "forcing equivalent emissions" has been included with the first mention of the concept.
11892	13	37	13	39	The concept of cumulative diagnosed CO2-forcing-equivalent (CO2-fe) emissions is hard to understand in general although it is described in 1.2.3.6 and 1.2.4. I think that the authors should be more conservative regarding new concepts like CO2-fe emissions, in particular, in case of SR1.5. [Junichi Tsutsui, Japan]	The concept of CO2-forcing equivalent emissions is used in this section for illustrative purposes only. Its use avoids presenting scenarios in Fig. 1.5 as CO2-only scenarios, or having to make assumptions about the future trajectory of non-CO2 forcings.
13501	13	37	13	39	The relationship between the panel (c) and the Figure SPM.10 of WG I of AR5(RCP 2.6) should be inserted as a footnote, even though there is an explanation on the AR5 on page 18. [Dong-Woon Noh, Republic of Korea]	The scope of the cumulative emissions panel of Fig. 1.5 is to illustrate the cumulative CO2 emissions over time consistent with different temperature pathways, rather than the GMST change/cumulative emissions relationship (TCRE) shown in Fig. SPM.10

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7393	13	37	14	2	This is the first time that CO2-fe is explicitly mentioned in the text of the report, and further explained in Box 1.2 page 16-17. Please consider to add information to why it gives added value to include this information in this special report. We believe that such a dedicated special report like this one might not be the most apropriate IPCC product to introduce a new additonal concept/metric that are not currently very well known or used amongs user of this report. These kind of terms need also to be discussed between the different WGs for consistency. Infact, this might cause more confusion than added value in the context of this special report. In our view it might be more apropriate to consider possible possible new terms in AR6. [Øyvind Christophersen, Norway]	The concept of CO2-forcing equivalent emissions is used in this section for illustrative purposes. Its use avoids presenting pathways in Fig. 1.5 as CO2-only scenarios, or having to make assumptions about the future trajectory of non-CO2 forcings.
1276	13	40	13	42	Isn't it rather that warming = emissions * TCRE, as is written on p 18, lines 16-17? [Colin Raymond, United States of America]	Multiplied should have read "divided"
12206	13	40	13	43	The authors may use an appendix or Supplemantery Ifnformation to explain more about how CO2-fe is calculated [Jan Fuglestvedt, Norway]	Accepted: The text is revised to reduce the dependence on the concept of CO2-fe emissions by focussing instead on the fraction of forcing or warming contributed by non-CO2 forcing, which is a more accessible concept (and identical in meaning).
20363	13	41	13	41	multiplied => divided ? [Olivier Boucher, France]	Divided is correct.
12205	13	43	13	43	time rate change of (c) may be difficult to understand. I suggest saying "of cumulative….". [Jan Fuglestvedt, Norway]	Figure caption has been rewritten
1006	14				The overshoot section (1.2.3.2) likewise does not discuss the timescale over which recovery of some aspects of the climate system might occur. Nusbaumer and Matsumoto (2008 in Global and Planetary Change 62, 164–172) present model simulations of overshoot scenarios and note that the time scale is ~200 years. But as mentioned already sea level may be irreversible as are species extictions. [Katsumi Matsumoto, United States of America]	Noted.
12212	14	4	14	10	you may mention for which species the introduction of efficacies will have largest effect [Jan Fuglestvedt, Norway]	Mention of efficacies has been deleted from section
6440	14	5	14	5	Briefly explain this in more detail; 'efficacy consideration' is not enough information here. [Jonny Williams, New Zealand]	Paragraph has been deleted
521	14	5	14	7	The same global mean radiative forcing from different mechanisms can have different transient and equilibirum GMST impacts… This was first shown in Paragraph 63 of Jacobson, M. Z., Control of fossil-fuel particulate black carbon plus organic matter, possibly the most effective method of slowing global warming, J. Geophys. Res., 107 (D19), 4410, doi:10.1029/ 2001JD001376, 2002. Please include this citation. [Mark Jacobson, United States of America]	Paragraph has been deleted
17828	14	7	14	7	Reference: Marvel 2016, is listed as 2015 in the list of references. [Wilfran Moufouma Okia, France]	Paragraph has been deleted; Marvel et al. is no longer cited
18843	14	9			ERF calculations reduce differences between forcers, but in particular black carbon will still be different, due to its strong rapid adjustment term. (See e.g. Samset et al., GRL, 2016, doi:10.1002/2016GL068064.) This rapid adjustment term, and the difference in regional patterns between GHG and aerosol forcing, may lead to response patterns that depend on the relative mitigation of GHG and aerosol emissions. A paper discussing this will shortly be submitted for publication. This difference between GHG and SLCF should be noted already here. [Bjørn Samset, Norway]	ERF no longer mentioned in section
3265	14	9			Is it worth defining 'effective radiative forcing?' You have taken time to highlight the difference between scenario and pathway, so not unreasonable to expect a more technical term to have a bit of explanation. Likewise with transient climate response. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been deleted
13502	14	12	14	12	Definition of "baseline pathway(scenario)" should be inserted as "1.2.3.1. Baseline pathways" instead of "1.2.3.3. Continued warming pathways" since mitigation pathways are compared with reference cases in page 7 in chapter 2 [Dong-Woon Noh, Republic of Korea]	Noted. Sometimes mitigation pathways are not compared with reference cases. The definitions of pathways are revised.
12337	14	12	14	32	The temperature stabilization framing is policy prescriptive (1.2.3.1 Temperature stabilization pathways ….This report will focus on temperature rather than concentration stabilization pathways.) The Paris Agreement LTTG in Article 2.1 does nowhere refer to this, nor does it directly imply this. The term stabilization was specifically rejected by a large number of vulnerable countries. This section needs to be reframed. 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 1.5oC 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 stabilizatio framing of this section cuts across this interpretation and is hence policy prescriptive. [Bill Hare, Germany]	Taken into account. Text is revised.
11893	14	13			Matsuno et al. (2012a, b) have discussed the zero-emissions stabilization in comparison with the traditional constant composition stabilization that is termed "emissions-keeping stabilization". Although their zero-emissions pathway is different from recent ones regarding the long-term temperature evolution, which depends on the treatment of carbon cycle-climate feedback, their pioneering work is worth being referred to here. Matsuno, T., K. Maruyama, and J. Tsutsui (2012a), Stabilization of atmospheric carbon dioxide via zero emissions: An alternative way to a stable global environment. Part 1: Examination of the traditional stabilization concept. Proc. Jpn. Acad., Ser. B, 88, 368-384. Matsuno, T., K. Maruyama, and J. Tsutsui (2012b), Stabilization of atmospheric carbon dioxide via zero emissions: An alternative way to a stable global environment. Part 2: A practical zero-emissions scenario. Proc. Jpn. Acad., Ser. B, 88, 385-395. [Junichi Tsutsui, Japan]	Noted
12208	14	13	14	20	It would help the reader if you insert reference to figure 1a and refer to color of the curve [Jan Fuglestvedt, Norway]	Noted. Figure 1.3 is changed.
10416	14	14	14	14	"monotonically" – guess what it means but it's a very obscure word. "steadily"? [Jonathan Lynn, Switzerland]	Accepted. The text is changed.
3123	14	14	14	15	This first pathway should be clearly labeled as a non-overshoot scenario to contrast it with the overshoot pathways defined in section 1.2.3.2. [Richard Rosen, Germany]	Noted. The text is change.
3266	14	15			Yes, the simplest pathway - but is it realistic to expect that? Even RCP2.6 does not show such a trajectory. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2282	14	15	14	16	As stated here, "the rate of human-induced warming varies slowly over decades". Surely, then, this rules out that the human-induced warming can be as large as the 0.25 deg C per decade rate quouted in several places in this FOD, given the amount of warming indicated by observations. See also comment 3. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The text is revised.
10417	14	15	14	19	cannot understand this sentence which seems ambiguous with only and alone [Jonathan Lynn, Switzerland]	Accepted. "only" is deleted. "emissions reduction alone" means without special technologies such as CCS and SRM.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3124	14	15	14	32	This section should note that even if emissions stopped tomorrow, that further warming is built into the earth-climate system. It should then describe what that fact implies for being able to stabilize the increase at only 1.5 degrees. [Richard Rosen, Germany]	Section 1.2.6 clarifies that if all emissions stopped tomorrow, no substantial long-term warming is to be expected, only temporary warming lasting a few decades from elimination of aerosol radiative forcing
16100	14	15	14	17	While I understand the first phrase of the sentence, the second phrase seems backwards to me. I would think it should be saying that the indicated characteristics of the system will also mean the emissions reductions (mitigation) would be likely to lead to a smooth trajectory going forward. More important, however, is whether the system is really so stable, smoothly changing, and reversible? I don't think the research suggests being all that confident about this. First, thresholds could be passed (methane clathrates destabilized, etc.), and second is the question of hysteresis, especially because the threshhold for initiating significant deterioration of the ice sheets has arguably been passed. Consider also the ocean overturning circulation--are we really sure it is so reversible, etc.? I guess my concern is that the phrasing here seems overly sanguine. [Michael MacCracken, United States of America]	Noted. Here we define pathways. These pathways are achieved or not will be discussed in the following chapters.
15233	14	16	14	16	In order to make sense of the second half of this sentence, I think "allowing only smooth temperature pathways" should be "only allowing smooth temperature pathways" [Pauline Midgley, Germany]	Noted. "only" is deleted.
6027	14	16	14	17	Unclear sentence. Does it mean a stablisation pathway will only occur if emissions reductions are the only control on global temperature? (might be clearer to the reader if the alternative is specified - a stablisation pathway would not be achieved through CO2 removal?Is that right?) [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. "only" is deleted to the make the discussion of rate of increase more clear
12722	14	17	14	17	The sentence states that only smooth temperature pathways arise if goals are achieved through emission reductions alone. It should be made clear what other "non-emission reduction" options the authors are thinking of (geoengineering? Sequestration?) [Vassilis Daioglou, Netherlands]	Noted. "only" is deleted.
15237	14	18	14	19	copy edit: "two thirds chance" should be "two-thirds chance" [Pauline Midgley, Germany]	Editorial. Accepted. The text is revised. The paragraph is moved to Box 1.1.
3267	14	19			Agreed that RCP is concentration-based, rather than temperature-based. However, the RCP2.6 achieves temperature stabilisation by design. Moreover, GHG are the main drivers of climate change which you have referred to already. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The text is revised.
16101	14	19	14	20	While the Paris Accord set temperature as the metric, it might well be that the stability of existing storm tracks and water resources generally might be a more appropriate metric. Or, given the 1.5 C upper limit was pushed for by island nations, it may be that a more appropriate metric would be sea level rise. Might it be worth a discussion of whether the intent was to take the 1.5 C literally, or to take it as wanting to have climate change generally be less than the types of changes projected to occur when global warming reasches 1.5 C. At least somewhere, some discussion is needed of how a 1.5 C change translates into the types of changes in other factors that models show (and I appreciate that the next paragraph starts this discussion, but I think a fuller discussion is needed). Indeed, it seems to me there needs to be clear mention that a 1.5 C warming is not going to save the low-lying island nations that were the loudest constituency for the 1.5 C ceiling. [Michael MacCracken, United States of America]	Noted. This is a framing chapter and this section focuses on the definition of 1.5C consistent pathways. The impacts other than temperature increase are dealt with in Chapter 3 in detail.
3268	14	20			Ok, this is why you are not using the RCP from 5AR. Perhaps a slight re-ordering of this section to pre-empt the questions which I have raised already. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
1803	14	22	14	24	.. net annual CO2-fe emissions (Figure 1.3, panel d) to decline to near zero .. other aspects of climate. The Paris Agreement requires to reach this target before the end of this century. If other .. [Tibor Farago, Hungary]	Noted.
20077	14	24	14	25	Some authors may want to argue that stabilizing of the GMST could be achieved with global SRM. It might be useful to mention here that stabilization of climate means more than only stabilizing the GMST, namely one could stabilize GMST but have major modifications of regional climate as well as continued ocean acidification if global SRM were chosen as a "solution". [Sonia Seneviratne, Switzerland]	Noted
7931	14	24	14	25	This implies that if we stabilise GMST that CO2 levels will automatically decline, this would only be the case if CO2 emissions were 0 or less - is it possible to clarify this sentence? (if all other forcings are positive?) [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. The text is revised.
12207	14	25	14	25	I suggest adding "and radiative forcing" after "concentration" [Jan Fuglestvedt, Norway]	Accepted. The text is revised.
1005	14	25	14	27	Seems to assume that sea level is reversible and linear. Melting of continental ice can be catastrophic, nonlinear, and irreversible on human timescale. [Katsumi Matsumoto, United States of America]	Rejected. No assumption is written that the sea level is reversible and linear.
13018	14	26	14	27	Please specify that since in this very simple model no ice sheet dynamics are considered, this approach could underestimate sea level rise in the continued warming /baseline scenario (i.e, see: DeConto1 & Pollard (2016) Contribution of Antarctica to past and future sea-level rise. Nature, 531) [Caserini Stefano, Italy]	Noted The figure is revised.
3269	14	28			You are back to talking about CO2_fe emissions (which must impact concentration) as the driver for temperature changes. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The text is revised.
5152	14	28	14	32	1.5 mitigation pathways on the basis of 100% renewable energy and energy efficiency which remain in the required carbon budget are not considered neither in chapter 1 (as the framing document) nor in chapter 2, which accesses different pathways. This is fundamentally biased and does not reflect the scientific debate (see Beyer e.t al. 2016, Jacobsen 2017, and Teske et. al. 2015). To exclude specific mitigation pathways on political grounds is irresponsible. I therefore urge the IPCC authors to include 100% renewable energy pathways in the AR6. [Sven Teske, Australia]	Noted. Here we only talk about the definition of pathways remaining below 1.5oC.
14950	14	29	14	29	It may not be appropriate to call "no policy" scenario as baseline. [LOKESH CHANDRA DUBE, India]	Accepted. The text is revised.
15234	14	35	14	35	copy edit: italicise the subheading [Pauline Midgley, Germany]	Editorial
6965	14	35	14	43	References to relevant sub-sections of Section 4.3, which assessed the current status and development of the carbon dioxide removal (CDR) technology, should be added here. The readers, especially the policymakers, should be alerted at the forefront that there is huge uncertainty about large scale deployment of the CDR technology as the assesment in Sub-sections 4.3.2.3, 4.3.6.1 - 4.3.6.3 have shown. The CDR technology is still immature as this stage, and the life cycle of power stations should also be taken into account when considering mitigation pathways. [Sai Ming Lee, China]	Noted. As Chapter 1 is a framing chapter, we do not go into detail.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21134	14	35	14	43	discussion of the implications of overshoot scenarios should mention additional feedbacks and tipping poinys within the climate syste, particularly Arctic sea ice, permafrost thaw, and glacial melt (cite to Drijfhout el at. 2015, Catalogue of abrupt shifts in Intergovernmental Panel on Climate Change climate models, PNAS, doi/10/1073/pnas.1511451112). [Nathan Borgford-Parnell, Switzerland]	Noted.
10651	14	35	14	43	In discussion of amount and duration of overshoot, include additional climate feedbacks and tipping points within the climate system, particularly Arctic sea ice, permafrost thaw, and glacial melt (cite to Drijfhout et al. 2015, Catalogue of abrupt shifts in Intergovernmental Panel on Climate Change climate models, PNAS, doi/10.1073/pnas.1511451112). [Kristin Campbell, United States of America]	Noted. Same with comment 1345.
12210	14	35	14	43	Refer to figure and color of the curve [Jan Fuglestvedt, Norway]	Accepted. The figure and the text are revised.
1277	14	36	14	37	This is unclear -- a suggested rewording would be "before peaking and declining, converging on 1.5 C or a value below it". [Colin Raymond, United States of America]	Noted. The text is revised.
6332	14	37	14	38	Given the definition of CO2-fe, the parenthesis should say "(corresponding to anthropogenic removals of CO2 or rapid reductions of emissions of short-lived climate forcers)" since the latter also corresponds to negative CO2-fe. [Andy Reisinger, New Zealand]	Noted. The text is revised.
21331	14	37	15	37	Will most readers know what CO2-fe emissions are? Consider defining [alessandra conversi, Italy]	Accepted. The definition is given in Section 1.2.4.5.
12338	14	39	14	41	Language in these sentences is interpretative and hence policy prescriptive ("In this report, consistency with the Paris Agreement temperature goal is interpreted ... Overshoot pathways are referred to in this report as 1.5°C-consistent ") Overshoot pathways clearly exist in the literature but this does not mean they are consistent with the PA LTTG..Peaking 'well below 2°C' is not defined in the PA. And the IPCC should not implicitly adopt an assumption about what this means, but rather present a range of possible interpretations, including quantitative assessments of peak levels etc. [Bill Hare, Germany]	Accepted. The text is revised.
15236	14	42	14	42	(e) should be panel (e) [Pauline Midgley, Germany]	Accepted. The figure and texts are revised.
15235	14	46	14	46	copy edit: italicise the subheading [Pauline Midgley, Germany]	Editorial
12211	14	46	14	54	Refer to figure and color of the curve [Jan Fuglestvedt, Norway]	Accepted. The figure and texts are revised.
4418	14	50		51	What's the difference between CO2-fe concentrations and sea level? [Jingyong Zhang, China]	Noted The text is revised.
4266	14	50	14	52	Triangles in Figure 1.3 have only been added to panels a,b and e. Since the panels c and d have not triangles, it is not possible to estimate the CO2-fe concentrations when temperatures reach 1.5 ºC under the different scenarios, as suggested in this sentence. [Pedro Salvador, Spain]	Accepted. Figure is changed.
13019	14	50	14	54	the meaning of the triangle is not clear, and thus all the sentence until the end of line 54 [Caserini Stefano, Italy]	Accepted. Figure is changed.
17317	14	53			Missing parentheses [Young-Hwan Ahn, Republic of Korea]	I cannot understand "missing parentheses". Anyway, the text is revised.
20856	15				Figure 1.3: Why does the green line indicating the 1.5C stabilization pathway have upward and downward pointing triangles indicating years in which 1.5C is reached from below or above following an overshoot? [Heleen de Coninck, Netherlands]	Triangles removed.
17736	15		15		Fig 1.3. Frames a) to e) are good and intuitively understandable. Frame f) is much more difficult and need more explanation, or perhaps it should be replaced by something else. [Göran Finnveden, Sweden]	Frame removed.
13503	15		15		The current year(starting point, ex 2015) should be inserted in Fifure 1.3 since other years are showned [Dong-Woon Noh, Republic of Korea]	Figure is too busy already.
12339	15	1			GMT pathways should be introduced in a probabilistic fashion as in AR5 (e.g. with the MAGICC6 model). No SLR projections should be included here. [Bill Hare, Germany]	Figure is a schematic, to show different timescales: hence the SLR illustration. Adding plumes of uncertainty is not relevant to the message of the figure. It is not a projection.
6441	15	1	15	1	Regarding Figure 1.3: The 2 degree line and its label are very hard to see. [Jonny Williams, New Zealand]	Figure has been simplified.
12913	15	1	15	1	In Figure 1.3, this is a simulation without aerosol impact analysis. Could you introduce limitations of this shematic analysis. [Mustapha Meftah, France]	Figure has been revised to focus on CO2 for simplicity, assuming fractional contribution of other drivers is constant at current level. Figure does not exclude aerosols, simply assumes net fractional impact of non-CO2 drivers is unchanged.
12914	15	1	15	1	Most climate models employed aerosol forcings and achieved good agreement with observed global warming over the past century, suggesting that the aerosol forcing is only moderate. However, there is an ambiguity in the climate models. Most of the models used in IPCC mix heat efficiently into the intermediate and deep ocean, resulting in the need for a large climate forcing (~2 W/m2) to warm Earth's surface by the observed ~0.8°C over the past century. But if the ocean mixes heat into the deeper ocean less efficiently, the net climate forcing needed to match observed global warming is smaller. There is an ambiguity. [Mustapha Meftah, France]	The figure accounts for these multiple timescales of response.
4728	15	1	15	1	The vertical description of all the 6 legends should be enlarged as it it not showned clearly [Spyros Schismenos, China]	Figure has been simplified.
4744	15	1	15	1	Why choose 1865, but not 1850-1879 as reference period in this figure? [Ma Lijuan, China]	Reference period is now 1850-1900 following AR5
4745	15	1	15	1	Panel c, abbreviate "CO2-forcing-equiv." to "CO2-fe" since this abbreviation has been explained in P13L38. [Ma Lijuan, China]	Reference to CO2-fe now removed.
20244	15	1	15	10	In Figure 1.3, the baseline case of continued warming is given along with several cases at 2 degrees C and 1.5 degress C. There are several issues with this. First, these charts should be given with appropriate uncertainty levels (or some discussion of the modeling approaches that arrive at these results). Second, perhaps in this chart or someplace else, a sensitivity analysis should be conducted (probably the sources of these charts have done this already). This would help to weigh the results. Third, this data also looks very smooth which matches the language of 'overshoot', 'balance', and other dynamics-oriented words. This smoothness should be addressed and the discussion of how singular events, tipping points, phase changes, and other non-linearities are dealt with. [Joshua Loughman, United States of America]	Figure is a schematic, to show different timescales: hence the SLR illustration. Adding plumes of uncertainty is not relevant to the message of the figure. It is not a projection.
2603	15	1	15	10	how do these relate to the RCPs or the SSPs? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	These are schematic pathways only.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3125	15	1	15	10	Figure 1.3 seems highly problematic. First of all, the labels are too small to read when printed. Second of all, the descriptions of each of the six sub-figures are not easy to understand, and must be explained to a non-technical reader. Thirdly, the implied carbon budgets do not seem to be consistent with either the carbon budgets discussed in chapter 2, nor with the implied years in which emissions must go to zero from earlier in chapter 1. For example, in my comment #16 above, the mid-range is 2050, and from figure 1.1 it is about 2040 when 1.5 degrees C would first be reached. Yet, the green line in figure 1.3, which represents a hypothetical non-overshoot scenario, does not reach zero emissions in figure 1.3.d until about 2080. And the area under this green curve, which would be its carbon emissions budget, is far higher than the numbers for a non-overshoot carbon budget in chapter 2. Thus, I think that a lot of work will have to go into making figures 1.3 consistent with chapter 2, and a lot of explaining of 1.3 will be needed for non-technical readers.Another symptom of the consistency problem is that the abatement rate for the green line is about 50% by 2040, or about 2% per year. This is on the very lowest end of the 2-5% range cited in the executive summary to chapter 1. The green line here should not represent the low end of the range, but perhaps the middle. [Richard Rosen, Germany]	Figure has been simplified.
5691	15	1	15	10	The colores of the lines for Continued warming pathway and 1.5C overshoot+cooling are too close and hard to distinguish. Need to change one color for clearity. [Hong Yang, Switzerland]	Figure has been simplified.
3955	15	1	15	10	Figure 1.3: The triangles need to be bigger on the subplots. The triangles are not defined in the figure caption. All the axes labels need to be bigger. [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Triangles removed.
19383	15	1	15	10	The caption should explain the triangles in figure 1.3. Why are there no triangles for panels (c), (d) and (e)? [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Triangles removed.
705	15	1	15	10	Figure 1.3 is a way to represent pathways leading to 1.5 °C increase by 2100. It should include the evolution of the cryosphere. It shows also the lack of physical meaning of the concept of GMST limit as compared with RCP. Conditions to be fulfilled by scenarios should go back to RCP, or CO2 budget. Influence of phenomena like El Nino are further difficulties found with the GMST. It is not discussed. [Herve Nifenecker, France]	Comment is unclear: RCP is not an alternative to GMST.
13020	15	1	15	10	Fig. 1.3: the meaning of the triangle is not explained in the caption [Caserini Stefano, Italy]	Triangles removed.
13280	15	1	15	10	Figure 1.3: Panels a-f: recommend giving each panel a heading/sub-heading to highlight the main message for each. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
13281	15	1	15	10	Figure 1.3: Panels a, b, e: the meaning of the triangles in the plots is not explained; nor their association between plots. (Acknowledge that meaning is explained later on in main text, but not on first reference of Fig1.3 - figure may be looked at before that text being read). Include meaning of triangles in legend/caption. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure has been simplified.
13282	15	1	15	10	Figure 1.3: Panel a) Recommend re-ordering the legend labels to match the order in which the lines appear top-bottom, i.e. Continued warming / baseline; 2.0 temperature stabilisation; 1.5 overshoot+cooling; 1.5 overshoot+stabilisation; 1.5 temperature stabilisation. Should then be a little easier for readers to match-up line to labels when first orientating themselves with this data. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure has been simplified.
14355	15	1	15	12	Figures a to e are a funtion of time and f a function of warming but this is not directy clear from the wording. Possibly include figure f description in a different sentence [Ioannis Daliakopoulos, Greece]	Figure has been simplified.
9934	15	1	15	3	Figure 1.3 d): Taking into account that the mitigation pathways that appear in AR5 (for example figure 3.2-a page 82, AR5_SYR- are) are expressed as CO2eq/year, it can be enlightening, and to facilitate the comparison with the AR5, to complement the figure 1.3 d) with the plot of annual GHG emissions in GtCO2-eq. Moreover, we have to keep in mind that the GWP metric has been used by the countries in their INDCs, and by the UNFCCC in their Synthesis report on the aggregate effect of the INDCs. [Olga Alcaraz, Spain]	Figure has been revised to focus on CO2 for simplicity, assuming fractional contribution of other drivers is constant at current level.
17452	15	2			C [Tom Gabriel Johansen, Norway]	Figure has been simplified.
17492	15	2			C [Angela Morelli, Norway]	Figure has been simplified.
11903	15	2			Figure 1.3: It appears that climate sensitivity of the simple climate model used in Figure 1.3 is not consistent with that for the same model used in Figure 1.1 according to the description of those figures in Technical Annex 1.A. I guess that one variant of Figure 1.3, higher response case, shown in Technical Annex 1.A is comparable to Figure 1.1. Anyway, it is advisable to deal with climate sensitivity assumed in such a informative figure in a consistent manner. [Junichi Tsutsui, Japan]	Scales removed because the point of this figure is to focus on timescales/shapes, not absolute numbers.
1059	15	2	15	10	This is one of the key charts for the report. Great work on the graphics in this chart. The descriptor paragraph is a bit confusing. Particularly letters within sub letters a) sub (a). Would it be possible to map descriptor text to corresponding charts with a combination of numbers and letters such as chart 1. [text] a) [text] b) [text] 2. [text] a) [text] b) [text] [Martini Catherine, United States of America]	Figure has been simplified.
6281	15	2	15	10	all the pathways show reduction of anthropogenic CO2 emissions going to zero much later than 2050 - not consistent with Figueres, and also with climate models that hold a 450ppm limit, given the current increase, unless there is VERY significant negative emissions in the future (which is unlikely given the acknowledged 9.7 billion people by 2050 alone). It would be helpful to refer to some basic math in carbon budget - using the ppm realm as a reference point to make stock and flow arguments (how much sink is available, what are the annual flows) [Mathis Wackernagel, United States of America]	Figure has been revised to focus on CO2 for simplicity, assuming fractional contribution of other drivers is constant at current level. Figure does not exclude aerosols, simply assumes net fractional impact of non-CO2 drivers is unchanged. Under that assumption, and given immediate reductions, emissions do not need to reach zero before 2050 to achieve 1.5°C on a mid-range response.
20364	15	2	15	10	Very useful plot. The text on lines 7-8 is a little unclear. The meaning of triangles should be explained in the caption as well. [Olivier Boucher, France]	Triangles removed.
17829	15	2	15	10	Figure 1.3: please avoid using red and green together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Figure has been simplified and uses a colour-blind friendly palette.
12213	15	2	15	10	the triangles could be explained also here. [Jan Fuglestvedt, Norway]	Triangles removed.
2501	15	2	15	10	I am not sure that the calculations using the semi-empirical GMSL model of Kopp et al (2016) were done correctly. The 2100 projections for 1.5/2.0°C are markedly higher than the median of 38 cm for RCP 2.6 in that paper. I suggest discussing with the authors of Kopp et al 2016. [Robert Koppu, United States of America]	Calculations were cross-checked, but scale removed because the point of this figure is to focus on timescales/shapes, not absolute numbers.
1061	15	2	15	2	"CO2-forcing" referenced a number of times but not fully described until page 18. Would it be possible to include a footnote citation with a definition? Or a footnote pointing a reader to a full explanation of the term on page 19? Or possibly list the definition of the term once the first time it appears on page 13? [Martini Catherine, United States of America]	Figure has been revised to focus on CO2 for simplicity, assuming fractional contribution of other drivers is constant at current level. Figure does not exclude aerosols, simply assumes net fractional impact of non-CO2 drivers is unchanged.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15243	15	2	15	2	Figure 1.3: consider explaining the meaning of the triangles in the caption as Figures are not always viewed with the related text which does explain this. [Pauline Midgley, Germany]	Triangles removed.
1062	15	3	15	3	“CO2-forcing” referenced a number of times but not fully described until page 18. Would it be possible to include a footnote citation with a definition? Or a footnote pointing a reader to a full explanation of the term on page 18? Or possibly list the definition of the term once the first time it appears on page 13? [Martini Catherine, United States of America]	Figure has been revised to focus on CO2 for simplicity, assuming fractional contribution of other drivers is constant at current level. Figure does not exclude aerosols, simply assumes net fractional impact of non-CO2 drivers is unchanged.
4746	15	4	15	4	abbreviate "CO2-forcing-equivalent" to "CO2-fe" since this abbreviation has been explained in P13L38. [Ma Lijuan, China]	Figure has been revised to focus on CO2 for simplicity, assuming fractional contribution of other drivers is constant at current level. Figure does not exclude aerosols, simply assumes net fractional impact of non-CO2 drivers is unchanged.
12340	15	13			The concept of 'adaptive pathways' is established in the scientific literature. I certainly disagree that CH 03 analysis relies on 'adaptive pathways' the way they are introduced here (referring to something like time slicing as an adaptive pathway seems a bit far fetched...) [Bill Hare, Germany]	Noted. Section 1.2.3.4 is merged to Box 1.1. We revised the box considering the consistency across chapters.
7152	15	13	15	18	Repetition with page 17 (32-43) [Iulain Florin VLADU, Germany]	Accepted. Section 1.2.4 is moved to Box 1.1
10958	15	13	15	19	I do not find the distinction between propspective and adaptive pathways at all useful. There is no reference to their use in the literature and the adaptive pathways concept is not followed through remaining entirely opaque. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Prospective pathways are fixed pathways designed at the planning stage. Adaptive pathways are ones that would be changed based on the future climate change.
6031	15	13	16	2	The description of prospective vs. adaptive pathways is dealt with quite well in the box, so perhaps this paragraph could be removed to save words. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. It moved to Box 1.1
7932	15	13	16	2	Is there any point at which we can't get onto the adaptive pathways? Presumably it will get more and more difficult, the longer we wait to reduce our emissions? [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	Noted. For example, we may not stay below 1.5oC with more than 66% or more than 90% with current technologies. In such a case, we need to follow adaptive pathways.
1167	15	14	15	16	Does the rest of this SR make a distinction between these 2 types of mitigation pathways? If not, remove. [Petra Tschakert, Australia]	Noted. We merged this subsection to Box 1.1. The concept of "prospective vs. adaptive pathways" is very important when we talk about the very severe targets. We explain this in the box, not in the main text.
14356	15	14	15	17	Sentence too long [Ioannis Daliakopoulos, Greece]	Accepted The sentence is revised and moved to Box 1.1
6442	15	14	15	18	Prospective and adaptive pathways here should be more clearly described, for example using bullet points. [Jonny Williams, New Zealand]	Noted. The text is revised and moved to Box 1.1.
2458	15	14	15	19	It is a major challenge to get people and institutions to change; they need a connection to what is happening. Re. these particular lines, who?--govt? people? Groups? Make more active; too passive at present [Lisa Lucero, United States of America]	Noted. Chapter 1 defines pathways. More detailed discussions are found in the following chapters.
13021	15	18	15	18	They show… Please clarify which is the subject [Caserini Stefano, Italy]	Noted. The text is revised and moved to Box 1.1.
15238	15	32	15	32	copy edit: 'Pathway' should be lower case 'pathway' [Pauline Midgley, Germany]	Editorial. If it is the case: Page 16, Line 32, it is accepted. The text is revised.
15239	15	40	15	40	take into any future measures presumably should be "take into account any future measures" [Pauline Midgley, Germany]	Editorial. If it is the case: Page 16, Line 41, it is accepted. The text is revised.
15240	15	45	15	46	copy edit: "W m2" should be W/m2 or W m-2 - occurs twice in this Chapter; I have not checked any others [Pauline Midgley, Germany]	Editorial. Accepted. They appear in Lines 45-46 in Page 16.
15241	15	49	15	49	copy edit: "warming 1.6°C" should be "warming of 1.6°C" [Pauline Midgley, Germany]	Editorial. Accepted. It appears in Lines 49 in Page 16.
12067	16				Box 1.1 is good but a more precise definition of the term scenario is needed. Many associate the term scenario with climate change projections which is not appropriate. Suggestion: A scenario is a description of how the future may unfold based on ‘if-then’ propositions, and typically consists of a representation of an initial situation and a description of the key driving forces and changes that lead to a particular future state.” from Rothman, D. (2008). A survey of environmental scenarios. Environmental futures: the practice of environmental scenario analysis. J. Alcamo. Amsterdam, The Netherlands, Elsevier: 37-65. [Silvia Serrao-Neumann, Australia]	Noted. The text is revised.
21135	16	1	16	2	the problem of the 'fat tail' of probabalistic warming should be given more explanation regarding the non-negligible probability of significantly exceeding 2C and the risks associated with this and higer levels of warming - cite to Xu and Ramanathan 2017, Well below 2C: Mitigation strategis for avoiding dangerous to catastrophic climate changes, PNAS, doi/10/1073/pnas.1618481114. [Nathan Borgford-Parnell, Switzerland]	This is addressed in Chapter 3
10652	16	1	16	2	To further this discussion, the fat tail is not only non-negligible but includes the potential for dangerous warming; even though the chances are low (5%) they are still possible and the impacts would be devastating so we must err on the side of caution through aggressive mitigation (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]	This is addressed in Chapter 3
2080	16	5	17	44	Its a great idea to have such 'boxes' . Educationally they simply 'work' far better than endless pages of text. [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Thanks
21305	16	5	17	44	Box 1.1: useful box but could be shortened. Some redundance around RCPs and SSPs for example. Introduction of UN terminology on climate-resilient pathways without reference to adaptation is somewhat confusing. [Jan Corfee-Morlot, France]	Noted. However SSPs are very important scenarios which we need to define here. The text on "Climate-resilient pathway" is revised.
21131	16	5	17	44	Box 1.1 does not include an important reference and definition for pathway - Shindell, D., et al., A climate policy pathwasy for near- and long-term benefits. Science 356:493-494 (2017). [Nathan Borgford-Parnell, Switzerland]	Noted. We can't include all related references, instead we include one more reference which define scenarios and pathways.
3126	16	6			Box 1.1 is completely unnecessary, especially in chapter 1. Omit it. Frankly, I am not sure whether this report needs to even mention the SRES, RCP, or SSP scenarios, but it they (RCP and SSP) are necessary, it would only be necessary to BRIEFLY describe them in chapter 2, to the extent useful for policy makers. This implies that if the new SSP scenarios are mentioned, the main numerical values for the input assumptions for each scenario need to be provided in a table. Otherwise the reader would not be able to understand the important differences between the scenarios. [Richard Rosen, Germany]	Noted. There are several comments that Box 1.1 is useful to understand scenarios and pathways, so Box 1.1 remains in Chapter 1. Scenarios and pathways are used not only in Chapter 2, but also other chapters. So It is appropriate to have a box in Chapter 1.
2365	16	6	17	44	The treatment of scenarios, storylines and pathways needs to be consistemt across this report. Chapter 3 for example, bring in some randon unsubstantiated storylines which do not appear supported by any evidence [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We revised the box considering the consistency across chapters.
12214	16	6	17	44	I find Box 1.1 very useful. And I think more attention to how scenarios can be used and which questions they may help to answer would increase the value of the box. [Jan Fuglestvedt, Norway]	Noted. The role of box 1.1 is to provide definitions of scenarios and pathways. How scenarios are used is explained in later chapters.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16104	16	6	17	44	I would think it appropriate in the Box to also be introducing the concept of climate intervention (geoengineering) as being a possible additional option in responding--not just mitigation and adaptation. In that this topic is to be covered in this special report, it is essential that it be included/explained in the discussion in this box. [Michael MacCracken, United States of America]	Noted. Geoengineering is one of options to tackle climate change. Individual options are treated in the main texts.
7394	16	7	16	8	We appreciate that the authors of the Box is excplicitly mentioned in the report. [Øyvind Christophersen, Norway]	Thanks
9197	16	10			A scenario is "plausible"? That may be a little hard to defend? How is that defined? Also, how is "possible" defined? I know many may disagree on the plausible and possible nature of numerous scenarios. It would help if the authors could explain how they define those terms, so we dont get into arguments over if something is plausible... [Glen Peters, Norway]	Noted. Detailed explanation is found by (Nakicenovic et al, 2000).
9198	16	10			How is "comprehensive" defined? Surely that is in the eye of the beholder? [Glen Peters, Norway]	Accepted. "comprehensive" is deleted.
12215	16	10	16	10	I think "internally consistent" could also be mentioned here. [Jan Fuglestvedt, Norway]	Partially accepted. "consistent" is used.
9199	16	10	16	18	Basically, I don't think many scenarios would meet this criteria under reasonable defition of the terms comprehensive, plausible, possible. I thought scenarios were simply about exploring uncertainties, does it matter if they are plausible? I think this text makes scenarios much bigger than the actually are, which could have a negative consequence when you try and communicate your scenarios later (basically, dont oversell yourself, be modest). Or if you stick to the terms, dont complain when people say the scenarios are not plausible or possible and therefor not very useful. [Glen Peters, Norway]	Noted. This is taken from SRES (Nakicenovic et al, 2000) which is often referred to as a scenario definition.
16102	16	12	16	12	Calling these encompassing scenarios "climate change scenarios" and then saying they allow development of estimates of climate change seems to be a bit overlapping--and potentially quite confusing. It would seem to me that one might call the general scenarios "global change scenarios" and then have them including emissions, climate change, impacts, population, etc. and other components. I just think the present labeling could be quite confusing. [Michael MacCracken, United States of America]	Accepted. The text is revised.
21276	16	12	16	17	Sentence too long, not easy to read. Divide or use parenthesis [alessandra conversi, Italy]	Accepted. The sentence is divided.
12217	16	13	16	13	add "adaptation" here? [Jan Fuglestvedt, Norway]	Noted. "adaptation" is to adopt to climate change and does not cause climate change.
12216	16	13	16	17	long sentence; I suggest splitting [Jan Fuglestvedt, Norway]	Accepted. The text is revised.
1805	16	16			innovation, governance, à innovation and deployment, governance, [Tibor Farago, Hungary]	Noted. Without deployment, innovation has no meaning, but as the space is limited, we use only the word "innovation".
2079	16	20	16	55	Its quite unbelievable that SSPs are only recently being applied! This is the future of climate modelling! [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted. we do not say that SSPs are the only pathways recently being developed. RCPs and SSPs are just examples. But they are worth mentioning here, because SSPs are used throughout the following chapters.
7020	16	20	17	44	From this definition of "pathway" (or that in row 32, both agreeing with my own understanding), I do not interpret it as equal to "scenario". I understand that the key issue is that RPCs were - maybe wrongly - called Pathways, but should this IPCC's SR contribute to this confusing terminology? I do not understand the logics in Box 1. [Érika Mata, Sweden]	Noted. Box 1.1 try to define scenarios and pathways. Although it is difficult to clarify, we think it is worth trying.
3270	16	24			'are' is missing after '(SSPs)' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
12938	16	33	16	33	climate resilient development pathway definition here quoted from 2015b and ch5 definition need some coordination. [Joyashree Roy, India]	Accepted. Coordinated.
2698	16	33	16	37	Does not seem to be entirely consistent with the way in which the term is used in Chapter 5 - needs discussion between the two chapter teams. [Penny Urquhart, South Africa]	Accepted. Coordinated.
1278	16	34	16	34	Should be 'fulfill', not 'fulfil'. [Colin Raymond, United States of America]	Editorial. Accepted. The text is revised.
3271	16	41			'account' is missing after 'any' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Editorial. Accepted. The text is revised.
2078	16	41	16	41	"do not take into ACCOUNT" (missing word) [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Editorial. Accepted. The text is revised.
1279	16	41	16	41	The word 'account' seems to be missing. [Colin Raymond, United States of America]	Editorial. Accepted. The text is revised.
15291	16	43	16	43	copy edit: please insert hyphen in "SSP-RCP-based" [Pauline Midgley, Germany]	Editorial. Accepted. The text is revised.
12341	16	50			What is understood as a 'well-below 2°C' pathway is not defined, but a simple relabelling of RCP2.6 (which arguably has even more often been used as a representative of a 'below 2°C' pathway...) could be seen as policy prescriptive. The treatment of probabilities needs be dealt with much more consistently throughout the report. Ch 02 provides a good starting point. [Bill Hare, Germany]	Accepted. The text is revised.
3272	16	52			A word is missing after 'allow' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. Text is revised.
6443	16	52	16	53	The words 'which all.ot to structure' do not make sense. [Jonny Williams, New Zealand]	Taken into account. Text is revised.
6028	16	52	16	53	Weird sentence. Perhaps "...(SSPs), which allow the scenario set to be structured according to varying socio-economic futures and approaches to adaptation and mitigation" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. Text is revised.
16103	16	52	16	53	There is a word or two missing here--clarification needed. [Michael MacCracken, United States of America]	Taken into account. Text is revised.
10959	16	52	17	11	The names of the SSPs are likely to prove tendentious. The key point about the SSPs is missing - they were constructed to describe worlds in which there are different levels of capacity to undertake mitigation and adaptation measures. The names of the SSPs tell us virtually nothing. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
6444	17	1	17	5	Sentence too long. [Jonny Williams, New Zealand]	Noted. But I think the length of the sentence is not too long.
6445	17	1	17	5	Use of 'inter alia' should be changed. A more accessible term should be used. [Jonny Williams, New Zealand]	Taken into account. Text is revised.
5692	17	13	17	43	Box 1.1 is to elaborate Scenarios and Pathways. The text from line 13 onwards is beyond the introduction of the two definitions. Also this part of the text lacks a core making it unclear about what it exactly wants to explain. [Hong Yang, Switzerland]	Taken into account. Text is revised.
19053	17	14	17	14	The word preindustrial should be pre-industrial to be similar in all chapters [Heba Elbasiouny, Egypt]	Editorial. Accepted. The text is revised.
3273	17	17			Should you refer to 'efficient' as 'resource efficient' scenarios to be explicit? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The text is revised. "efficient" is no more used.
21306	17	17	17	21	also need to explain that baseline scenario are the counter-factual assumption so any costing or change calculation is based on this [Jan Corfee-Morlot, France]	Noted. We do not go into detail baseline scenarios
3365	17	24	17	24	ADD another sentence at end that emphasizes the fact that some Polar regions have already exceeded 2.0 warming. [Paul Doyle, Canada]	Noted. Impacts are explained in Chapter 3 in detail.
12218	17	29	17	29	You may add a reference to figure 1.3 [Jan Fuglestvedt, Norway]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6480	17	29	17	30	Sentence needs a reference. [Roger Bodman, Australia]	Noted. This is a common understanding. Because of the space limitation, we do not add a new reference.
1806	17	32	17	36	It repeats the general description of the two sorts of scenarios on p.15 lines 14-18. [Tibor Farago, Hungary]	Accepted. The subsection 1.2.3.4 is removed.
6396	17	32	17	36	This is a much clearer description of prospective and adaptive scenarios than in exec summary - suggest using this wording from the box [Sybil Seitzinger, Canada]	Noted. "Adaptive" pathways become important when we consider a very low level temperature target such as 1.5oC. It is not yet a common idea, so we explained this important concept in the box.
10960	17	32	17	43	Prospective/adaptive are not commonly used terms in WG III literature (and there is no reference) [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Noted. "Adaptive" pathways become important when we consider a very low level temperature target such as 1.5oC. It is not yet a common idea, so we explained this important concept in the box.
15242	17	33	17	34	copy edit: "two thirds chance" should be "two-thirds chance" [Pauline Midgley, Germany]	Editorial. Accepted.
3274	17	35			I understand the difference between 'prospective' and 'adaptive' However, I'm not sure how you can achieve the spirit of the 'adaptive' scenario given that they are all exercises in predicting the future, dependent on a range of assumptions. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted
13022	17	36	17	43	The sentence from "The 1.5°C pathways…" to the end is not clear… please rephrasing or add explanations [Caserini Stefano, Italy]	Accepted. Text is revised.
6446	17	38	17	41	The sentence starting with 'Unless' should be made shorter to make its important message more clear. [Jonny Williams, New Zealand]	Accepted. Text is revised.
1280	17	38	17	43	The difference between these two meanings is unclear from the wording as it stands -- for example, over what time period is 'success in holding the world to 1.5C warming' measured? [Colin Raymond, United States of America]	Accepted. Text is revised.
12219	17	38	17	43	This part of the text is, in my view, heavy and unclear. I suggest the authors try to improve clarity here. [Jan Fuglestvedt, Norway]	Accepted. Text is revised.
1807	17	47			1.2.3.5 Impacts at 1.5°C warming associated with .. [Tibor Farago, Hungary]	Accepted. Text is revised.
3127	17	47			section .1.2.3.5 on impacts should go into chapter 3 [Richard Rosen, Germany]	Noted. Brief description in the framing chapter is also needed.
20651	17	47	18	2	Consider integrating section 1.2.3.5 "Impacts at 1.5C associated with different pathways" into sections 1.2.3.1 through 1.2.3.4. This could involve bringing in information either as an overview from other chapters, OR reducing redudancings that appear in chapters 3, 4, and 5 (for example sections 2.5.2 on economic implications of 1.5C scenarios and 2.5.3 on sustainable development features of 1.5C pathways. The more clarity the reader and especially the decision maker can get about the general characteristics of each of the four pathway types presented in sections 1.2.3.1 to 1.2.3.4 the more useful the rest of the special report will be. Chapter 1 would serve the reader best by familiarising them enough with these four pathway types that they can "see the forest through the trees" in the subsequent chapters. [Koko Warner, Germany]	Noted
17318	17	50			Figure 1.3 panel (f) does not have triangles. [Young-Hwan Ahn, Republic of Korea]	Triangles removed.
5693	17	50	17	51	Figure 1.3, f) did not indicate the years in which temperatures reach 1.5C. [Hong Yang, Switzerland]	Figure is a schematic, to show different timescales: hence the SLR illustration. Adding explicit dates is not relevant to the message of the figure. It is not a projection.
4267	17	50	17	51	Related to comment Nº 11. Triangles have not been included in panels c and d of figure 1.3 as stated in the previous comment Nº 11. Hence the sentence meaning is erroneous. [Pedro Salvador, Spain]	Triangles removed.
12220	17	50	17	51	panels b) and e) only - not f) [Jan Fuglestvedt, Norway]	Triangles removed.
4747	17	51	17	51	The firt word "(f)" need to be double-checked. There is no triangles in panel (f) of Figure 1.3. [Ma Lijuan, China]	Panel deleted.
20857	17	51	17	53	While in Figure 1.3e the sea level rise is shown to be lowest for the 1.5C stabilization scenario, here is stated that sea level will be lower as temperatures warm past 1.5C than as they stabilize at 1.5C. [Heleen de Coninck, Netherlands]	Figure is a schematic, to show different timescales: hence the SLR illustration. Adding explicit dates is not relevant to the message of the figure. It is not a projection.
7718	17	52	17	53	The sentence needs to be broken to improve its clarity [Hilary Inyang, Nigeria]	Accepted. The text is revised.
7191	18				I do not understand why the sub-section 1.2.3.6 on carbon budgets is here in this particular form. It does not add to the report at all. Table 2.2. and the corresponding text seems completely separate from the discussion (that seems highly technical). It is very important to discuss the carbon budget in light of the tight cliamte change stabilization targets and reflecting on the findings of the AR5. [Nico Bauer, Germany]	Section has been partly rewritten. Stronger integration with carbon budget discussion in Chapter 2 will be sought in next draft
9847	18	1	18	2	A relevant citation discussing the implications of different pathways on impacts that could be added here is: 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 (ISIMIP2b). Geoscientific Model Development. https://www.geosci-model-dev-discuss.net/gmd-2016-229/ [Christopher Reyer, Germany]	Noted
3275	18	5			This paragraph is repetitive - the forcing equivalents approach was described earlier. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	The earlier definition of CO2-forcing equivalent emissions has been deleted
14975	18	5	18	27	The concept of "carbon dioxide forcing equivalent" needs better definition, in particular how short-lived forcers are being related to long term CO2 forcing, and applied to a singular transient climate response to emissions. [Farhan Akhtar, United States of America]	A simple approach to relate forcing from SLCFs to CO2 forcing is now given
6282	18	5	18	27	ideal place to link to ppms, and emission amounts consistent with scenarios. (I was surprised to see scenarios that allow for net emissions beyond 2050, and am not sure how this can be consistent with the observed trends, particularly in annual increases in GHG ppms). [Mathis Wackernagel, United States of America]	This link is explained in section 1.2.5.1 for pathways remaining below 1.5C
6034	18	5	18	27	Would it be helpful to have an introductory sentence, question, or alternative title, so that the reader less familiar with this topic can see why this is important to 1.5C pathways? For example "In order to estimate mitigation required to limit to 1.5C, it is important to understand the relationship between emissions, radiative forcing, and global temperature. The concept of cumulative emissions has been helpful in demonstrating ...." [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted
10185	18	5	18	27	I really like this section and the 2-5% per year framing for the degree of cuts. It nicely frames details on pathways etc in other chapters - it could point to chapter 2 explicitly [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thanks
10962	18	5	18	27	Is CO2-fe used in subsequent chapters? [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	It is used in this chapter for illustrative purposes only

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17408	18	6	18	17	Maybe aerosols and albedo could be mentioned here since this logic is not applicable for them. [Tuomo Kalliokoski, Finland]	Noted
12915	18	6	18	7	Correlation coefficient of the linear relationship? [Mustapha Meftah, France]	The correlation coefficient is close to 1 and is usually not given
15244	18	6	18	8	If "The AR5 noted …" I would expect a reference to the relevant section of the AR5, IPCC 2013/2014, not just three older publications from 2009 [Pauline Midgley, Germany]	Reference to AR5 will be included
11894	18	8	18	8	TCRE is the abbreviation of transient climate response to cumulative carbon emissions in AR5. Consistent use is preferable. [Junichi Tsutsui, Japan]	Definition will be made consistent with AR5
1808	18	9			"non-CO2 agents because the majority of these are relatively short-lived": besides these SLCFs, the N2O , PFCs and SF6 should also be taken into account in the overall budget [Tibor Farago, Hungary]	Noted
4268	18	10	18	15	The sentence beginning as "Shine et al., (2005)…" is too long and highly confusing. This sentence must be revised and rewritten. [Pedro Salvador, Spain]	Sentence has been deleted
16105	18	10	18	15	While the short-lived species may be characterized in terms of CO2 when considering long-term climate change, this is just not the case when considering near-term climate change, and imitting the potential of what can be accomplished in slowing near term warming with an aggressive effort to reduce emissions of short-lived forcing agents really hides an important option for decision-makers. The UNEP assessment (Shindell et al.) basically showed that the projected warming from the present to 2050 could be cut in half by going after SLCFs, whereas limiting emissions of CO2 mainly affects the amount of warming in the second half of the century. It is, therefore, a disservice to the audience for this assessment to be suggesting that the issues can be treated together. If one takes the MAGICC model of Raper and Wigley and goes to zero emissions of all species around 2000, the carryover forcing of methane, tropospheric ozone, and black carbon are quickly lost, whereas there is a legacy forcing for CO2 with a long tail. When I did this (see Moore, F. C., and M. C. MacCracken, 2009: Lifetime-leveraging: An approach to achieving international agreement and effective climate protection using mitigation of short-lived greenhouse gases, International Journal of Climate Change Strategies and Management 1, 42-62. doi:10.1108/17568690910934390 and MacCracken, M. C., 2010: Moderating climate change by limiting emissions of both short- and long-lived greenhouse gases, pp. 225-241 in Proceedings of the International Seminars on Nuclear War and Planetary Emergencies: 42nd Session, Erice, Sicily, Italy, 20-23 August 2009, edited by R. Ragaini, The Science and Culture Series: Nuclear Strategy and Peace Technology, World Scientific, Singapore) and then added in the expected 21st century forcing due to 21st century emissions, only about half of the added GHG forcing was due to CO2 (of course, there would be a long carryover forcing to the 22nd century and beyond), with the rest due about evenly to methane and tropospheric ozone (sulfate and dark aerosol forcing sort of tend to cancel each other out). It is really vital to be letting policymakers know the importance of going after methane and the precursors to tropospheric ozone to get an early reduction in forcing. Yes, emissions of these substances will go down with reductions in CO2 emissions--but the change in forcing will be much different than if one simply assumes an equivalent reduction in CO2 emissions. [Michael MacCracken, United States of America]	Agreed. The role of SLCFs mitigation in the context of stringent climate targets is discussed in detail in Chapter 2. Here. The equivalence between SLCF and CO2 forcing is used to illustrate the trade-off between SLCF mitigation and the size of the cumulative CO2 budget.
4748	18	12	18	13	Using "CO2-fe" for short directly since this abbreviation has been explained in P13L38. [Ma Lijuan, China]	Earlier definition of CO2-fe has been deleted
3276	18	13			CO2_fe defined earlier [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Earlier definition of CO2-fe has been deleted
6033	18	15	18	15	Perhaps explain what is meant by efficacies close to unity. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Mention of efficacies has been deleted
12222	18	15	18	15	You may consider changing "climate response" to RF and/or dT since climate response is a broad term [Jan Fuglestvedt, Norway]	Sentence has been deleted
12223	18	16	18	16	You may consider changing "climate response" to RF and/or dT since climate response is a broad term [Jan Fuglestvedt, Norway]	Sentence has been deleted
9469	18	19	18	22	The reader may think you are refering to dividing current rate of warming (degC/year) with rate at wich warming slows down also in degC per year - which gives a dimensionless result and does not make sense. How about rewording this for clarity as: "the current rate of warming (degC per year) with the rate at which warming slows down (fractional swdown per year) ..." if this is what you mean - This has the correct dimension (Years). [David Wratt, New Zealand]	Paragraph has been deleted
12221	18	19	18	27	Important para, but some improvements in explanations would be helpful for the readers [Jan Fuglestvedt, Norway]	Paragraph has been rewritten
20366	18	19	18	27	This paragraph is very important but is a bit dry and the conclusions should be qualified. I could follow the logic and the gymnastics but I doubt every reader will. The possibility that a 2% compound annual reduction rate in CO2-fe emissions might meet 1.5°C is overly optimistic. Remember that 0.98^80 = 0.20… This does not square with the need for zero net emissions by the end of the century or even before. Part (but only part) of the problem is that the rate of warming is certainly larger than 0.1°C/decade (I don't know where this number comes from, it contradicts figure 1.1 and it probably accounts for some of the recent natural variability). In any case this (too) simple model does not explain the need for negative emissions in Figure 1.3 (I would think the green curve is close to an exponential stabilization) or panel c of figure 1 from box 2.1. Furthermore I suspect the rate of CO2 emission reduction must be significantly larger than that of CO2-fe in realistic scenario (right?), so there is a risk that this headline number (which made its way into the Executive Summary in a very opaque statement) is misinterpreted. [Olivier Boucher, France]	Paragraph has been rewritten
16106	18	19	18	27	In that negotiations have been focused on CO2-equivalent emissions (CO2-eq), which depends greatly on the selected period of GWP that is chosen, and there is also discussion of equivalent CO2 (CO2e) with respect to atmospheric concentrations, this introduction of a further new metric (CO2-fe) seems likely to add to confusion, especially among the decision makers this report is aimed at. Box 1.2 does attempt to explain the differences, relate the metrics, illustrate them, etc. I would urge finding a way to make the key point even more forcefully--basically that the COP needs to change the metric it is using, leaving GWP behind now that there is going to be a real attempt to bring GMST under control. I think this report really needs to provide not just an explanation of the different metrics, but a recommendation of what metric they should not be using while also helping the guidance ensures consistency and continuity going from past negotiations to recommending future actions. Reading the box now, it seems to me that the COP will need to figure out what to choose--scientists need to very clearly indicate what can work best, even if it necessitates have one set of metrics for near-term results and another for achieving long-term goals. [Michael MacCracken, United States of America]	Agreed. Box 1.2. now provides a clearer explanation of the shortcomings of using CO2-eq in the context of stringent emission pathways

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5694	18	20	21	11	The text in Box 1.2 is too long and many parts are too technical and not related to the theme of the Box which is on elaboration of long-lived and short-lived climate forcers, emission metrics and emissions balance. Despite the long text, it never gives clear definitions on the individual terminologies. The text can be substantially shortened by giving concise and direct explaination on the terminologies. Technical detailed should be avoided as they are all discussed in much detail in the following chapters. Box 1.2, Figure 1 seems not directly related to the theme of the Box. [Hong Yang, Switzerland]	Box has been re-focused on concepts more directly relevant to the special report that are picked up in later chapters
12812	18	21	18	22	Physics 101: it is not the "stopping distance", but the time to a complete stop that is determined by the speed divided by the deceleration rate! Please reformulate to make this analogy physically correct. [Thomas Stocker, Switzerland]	Paragraph has been deleted
1063	18	22	18	23	Suggest bold this sentence: human induced warming is currently 1.c and increasing at 0.1-0.25c per decade. [Martini Catherine, United States of America]	Paragraph has been deleted
1064	18	22	18	23	This would make a great headline: Suggest bold this sentence: human induced warming is currently 1.c and increasing at 0.1-0.25c per decade. [Martini Catherine, United States of America]	Paragraph has been deleted
12342	18	23			I understand that this is for illustration purposes. However, the illustrative pathway is at odds with the pathways derived in Ch 02 that for example also require net-negative CO2 and are overshoot pathways. So giving such concrete numbers without highlighting very clearly the illustrative nature of the analysis is quite dangerous. [Bill Hare, Germany]	Paragraph has been deleted
17830	18	23	18	23	Reference: Haustein et al 2017. There are details missing in this reference in the list of references. [Wilfran Moufouma Okia, France]	Reference has been fixed
2283	18	23	18	23	Another reference to a human-induced warming rate that could be as high as 0.25 deg C per decade. Please see comments 3 and 45. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Comments could not be identified
1065	18	23	18	24	This would make a great headline: Suggest bold this sentence: To limit total warming to 1.5c via an exponential stabilization pathway this rate of warming must decrease by 2-5%yr [Martini Catherine, United States of America]	Paragraph has been deleted
6481	18	26	18	27	current level and rate' - this is an important point and should be in the executive summary [Roger Bodman, Australia]	Paragraph has been deleted
4371	18	27	18	27	Worth being more explicit: it may not actually be possible to reduce CO2-fe faster than some particular rate without negative emissions on CO2 due to the aerosols [Douglas MacMartin, United States of America]	Paragraph has been deleted
2339	18	28	18	28	I would also add the chances to achieve 1.5/2 degree (see http://www.nature.com/nclimate/journal/v7/n9/full/nclimate3352.html) [Thaler Thomas, Austria]	Paragraph has been deleted
10961	18	30	18	38	We weren't asked to address balance in the invite. Is balance used at all in subsequent chapters in the sense used here? If not no point in introducing it. I suspect countries might have a simpler intepretation - sources = sinks as calculated using the methodology used to report inventories to UNFCCC. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	It is used in Chapter 2 to determine the point in time when balance or carbon neutrality is achieved in 1.5 C consistent pathways
9201	18	30	19	18	You missed the most crtiical point, how are "removals" defined. By my reckoning, that is the most significant issue with the balance text. [Glen Peters, Norway]	This is addressed in Cross-Chapter Box 1.2: whether or not Article 4 of the Paris Agreement is unambiguous in its definition of removals remains a matter of debate.
19386	18	32	18	38	This paragraph should be an active assessment of the science, it shouldn't keep self-referring as "this report". [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	The first paragraph lays out how the report addressed "balance", thus self-reference is justified.
14977	18	32	19	17	The authors should consider framing this section in terms of the scientific literature instead of Article 4 of the Paris Agreement. In several places, the authors apply a framing onto the Paris Agreement that may not be supported by all Parties to the agreement. For example, some may object to the inclusion of SLCFs in the concept of carbon balance in Article 4. Ultimately, the authors underlying intent of this section could be fully maintained on the basis of the science without reference to particular policy discussions. [Farhan Akhtar, United States of America]	Noted
14976	18	35	18	35	There is one temperature goal in Article 2: 2 deg C. Parties agreed to pursue efforts to limit the temperature increase to 1.5. [Farhan Akhtar, United States of America]	Point taken; "goal" will be used instead of "goals"
7021	18	36			Maybe some references could be given on other possible definitions of "balance". [Érika Mata, Sweden]	Noted
16107	18	36	18	38	While the UNFCCC Objective does relate to stabilizing the GMST at some higher value, what this value should be needs considerable discussion. In no sense is 1.5 C really a value that would not have very serious impacts and consequences, especially to the Arctic and cryosphere, but also as a contributor to additional and more frequent conditions that have been considered rare and extreme in the past (the adjusting of the 30-year normal over time really hides the significance of the changes and impacts, especially on forest, urban, infrastructure and other systems that really developed based on baselines that go back well past three decades--some even for several centuries). Thus, it would seem to me that there needs to be some discussion about what the GMST to stabilize at might be. Hansen and colleagues, for example, point out that once the change in GMST exceeded about 0.5 C, it appears there has been a commitment such that significant mass will be lost from the Greenland and Antarctic ice sheets. Also, there is already at 1 C significant loss of corals from bleaching and the likelihood of very intense tropical cyclones seems to be increasing. It seems to me that the report needs to be addressing what combination of emissions and removals can be taking us back to various values of GMST, so rather than a stable GMST, a declining GMST. Indeed, to have any hope of stabilizing the ice sheets at a mass that will not lead to significant coastal inundation may well require lowering the GMST to near zero increase above preindustrial, and indicating what this may take should be explained in this report (I would note that such lowering of the radiative forcing need not be solely by reducing the CO2 concentration--taking the concentrations and RF of non-CO2 GHGs and aerosols to below what are considered preindustrial levels may well be able to assist in lowering the overall RF (I do see this point gets covered starting on line 47--it is an important point to make). [Michael MacCracken, United States of America]	Sentence does not imply that stabilizing GMST is the objective of the convention. It is used here to illustrate the concept of balance, as net zero CO2-fe emissions correspond to temperature stabilization. It follows that declining GMST requires net negative CO2-fe emissions, as discussed in the last paragraph of the section.
15675	18	40	18	45	This paragraph assume that only geoengineering technologies can be used to balance the emmissions and removals and ignore that balance can be achieved by a) preventing overshoot, b) natural GHG removal, such as careful but large ecosystems restoration and others. See eg Karta-Dooley https://www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-WP-2016-08-Negative-emissions.pdf. I suggest DELETION of this paragraph and integrate Karta-Dooley proposals. [Elenita Daño, Philippines]	The paragraph has been misinterpreted. It states that CDR (which can include natural methods) is needed to compensate for anthropogenic CO2 emissions that cannot be eliminated, not to achieve balance per se.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15428	18	40	18	45	This paragraph assume that only geoengineering technologies can be used to balance the emmissions and removals and ignore that balance can be achieved by a) preventing overshoot, b) natural GHG removal, such as careful but large ecosystems restoration and others. See eg Karta-Dooley https://www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-WP-2016-08-Negative-emissions.pdf. I suggest DELETION of this paragraph and integrate Karta-Dooley proposals. [Elenita Daño, Philippines]	The paragraph has been misinterpreted. It states that CDR (which can include natural methods) is needed to compensate for anthropogenic CO2 emissions that cannot be eliminated, not to achieve balance per se.
17378	18	42	18	45	No reference here to Blue Carbon sequestering. Clear leaning towards land based measures [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	It has been clarified that this is not an exhaustive list of CDR measures
4512	18	43			The wording ".. will need to be compensated for by.." is too strict which does not allow another option. [Radim Tolasz, Czech Republic]	Noted
10568	18	43	18	44	Can BECCS be interpreted as an emissoin reduction strategy?, or a combined emiccion reduction and capture strategy?. The concept needs a separation or clarification. [Elemer Briceño-Elizondo, Costa Rica]	BECCS is considered as a negative emission technology. It is discussed in more detail in Chapters 2 and 4.
1809	18	44	18	45	Here is a reference to CDR options and an indication that these are discussed in Chapter 4, Section 4.3.6. Actually CDR options are also essential for the topics elaborated in Ch.2 (see: 2.4.2), thus such reference is also needed here. [Tibor Farago, Hungary]	Reference to Chapter 2 will be included.
6392	18	45			Is there a reason mineral sequestration of CO2 in basalt is not included here? [Sybil Seitzinger, Canada]	It has been clarified that this is not an exhaustive list of CDR measures
17291	18	47	18	50	however this most certainly imply zero or below zero emissions for CO2 (particularly from industry), and positive emissions for gases related to food production; I would spell this out here [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	This point is discussed in the preceding paragraph
12224	18	47	18	53	Some more explanation of how GWP is used would be helpful [Jan Fuglestvedt, Norway]	Explanation is provided in Box 1.2
2502	18	47	21	10	It would be helpful to illustrate CO2-fe pathways for common gases. [Robert Koppu, United States of America]	Box 1.2 Figure shows RCP2.6 emissions for difference CO2-equivalence metrics, including GWP*, which is related to CO2-fe.
19384	18	48	18	50	I suggest removing the rest of this sentence "or zero total-CO2-equivalent emissions …" as it is rather confusing to mention both CO2-fe and CO2-eq. I suggest ending it "need not imply zero anthropogenic emissions of individual gases if they are short-lived". [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	We believe this is an important point to make, which is further illustrated in Box 1.2 Figure 1
3996	18	50	19	2	The authors argue that "Sustained constant emissions of a short-lived climate forcer (SLCF) such as methane could be consistent with gradually declining atmospheric concentrations (Shine et al. 2005; Rogelj et al. 2015a; Schleussner et al. 2016b) and no additional contribution to warming." The last reference (Schleusssner et al., 2016) does not provide such insights. This will require double checking of the facts and corrective action, accordingly. [Valentin Foltescu, France]	References have been deleted.
19385	18	50	19	2	I think this discussion could be made clearer. Surely sustained emissions of a SLCF are equivalent to constant atmospheric concentrations, not "declining"? I think the mitigation opportunity could be explained a bit more. Maybe be explicity in stating that for LLGHGs zero CO2-fe means zero emissions and no further mitigation unless actively removed. For SLCFs zero CO2-fe means constant emissions, but could still represent a mitigation opportunity as negative CO2-fe doesn't mean active removal rather a continous decrease in emission rate. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been reworded to improve clarity
6333	18	50	18	53	As written this is not correct. Sustained constant emissions cannot be consistent with declining atmospheric concentrations, they would result in constant atmospheric concentrations. If I'm missing some technicality here why concentrations would decline under constant emissions, the authors will need to spell it out please. Note though that if concentrations are indeed constant rather than decline, it then is no longer correct to claim that this would result in no additional warming, given climate commitment (section 1.2.5). Suggest the authors make this clear in a separate, additional statement in this same paragraph (I know it is stated further down, but there it refers to total forcing, but here the focus is specifically on the contribution from SLCFs). [Andy Reisinger, New Zealand]	The atmospheric concentration of a SLCs can decline if the emission rate is lower than the rate of removal by natural sink processes.
3277	18	51			SLCF defined earlier [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Redundant definitions will be deleted.
6334	18	52	18	53	The statement "no additional contribution to warming" could be easily misread as meaning "and hence not a problem" (I'm involved in numerous debates e.g. with farmers about this; and chapter 2 makes clear that abatement of SLCFs makes an important contribution to achieving 1.5 and well-below 2 degrees). Suggest re-wording "and hence no additonal contribution to warming above the warming already contributed by current emissions". [Andy Reisinger, New Zealand]	Sentence has been reworded.
6335	18	53	19	2	Revise the sentence to "Even though constant emissions of a SLCF constitute a zero rate of CO2-fe emissions, reducing SLCF emissions would still constitute an important mitigation opportunity as it would reduce their contribution to future warming from all anthropogenic emissions and inrease the likelihood of meeting stringent mitigation goals (see chapter 2)". Rationale: (1) as written, the statement says that "constant emissions constitute a mitigation opportunity" (which is illogical), and (2) you need to make clear that the prospect is to limit further warming, whereas reference to cooling could be misunderstood as "relative to today's levels" - which clearly will not happen given the forcing from all GHGs combined. [Andy Reisinger, New Zealand]	Sentence has been reworded
5578	19				Box 1.2: The purpose of this box remains vague, more stringent explanations are needed. For instance a list of long- and short-lived climate forcers is needed rather than reference to (page 19, line 43) “a basket of greenhouse gases”. The description and explanation of Figure 1 in Box 1.2 needs more details e.g. for explaining differences between the panels for CH4. Check the sentence page 20 line 41 for completeness. [Astrid Kiendler-Scharr, Germany]	Concepts used in the box have been better explained. Figure 1 has been replaced.
12343	19	4	19	7	This section is essentially an attempt to redefine Article 4 of the Paris Agreement and should be deleted. Given the definitions of the convention, Article 4 can only be interpreted as zero global GHG emissions, with GHGs those defined in the UNFCCCC and its implementing decisions. Hence this cannot include "non-greenhouse gas SLCPs" mentioned in these paragraphs and it is misleading to write "Although such emissions are not explicitly covered in Article 4 of the Paris Agreement": they are neither explicitly covered, not implictly, nor in any other way. It might be correct that "... such emissions ... can be included in the definition of balance", but that definition of "balance" would be fundamentally in conflict with the UNFCCC and hence is completely irrelevant to Article 4 of the PA, which should be made abundantly clear. It is very simple: Art 4 of Paris agreement is about greenhouse gases emissions and uptake, it is NOT about radiative forcing balance [Bill Hare, Germany]	Paragraph has been deleted.
13661	19	5	19	6	temperature stabilization should come first in the discussion [Elvira Poloczanska, Germany]	Paragraph has been deleted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12225	19	7	19	7	I don't think there is basis in the Paris Agreement text for including aerosols in the balance definition (although they of course need to be taken into account in scenarios etc). See discussion in Fuglestvedt et al., 2017. [Jan Fuglestvedt, Norway]	Paragraph has been deleted.
16108	19	7	19	7	Rather than "can be included", why does this not say "must be included"? [Michael MacCracken, United States of America]	Paragraph has been deleted.
12344	19	9	19	11	See comment above. Article 4 is not about CO2 concentrations. But about GHGs and sources and sinks. Other intepretations that 'might be' are very problematic and misleading. This should be deleted. [Bill Hare, Germany]	Paragraph has been deleted.
11895	19	9	19	11	In this context, it would be good to refer to UNFCCC Article 2 and clarify the meaning of its ultimate goal, i.e., stabilizing GHG concentration. [Junichi Tsutsui, Japan]	Paragraph has been deleted.
11489	19	9	19	9	It is correct to to stablish interpretations of the Article 4 or any in the Convention? [Meimalin Moreno, Venezuela]	Paragraph has been deleted.
6336	19	10	19	11	I would not say that it is inconsistent, as long as the committed warming is built into the targeted CO2 equivalent concentration level. Suggest re-wording to capture this. [Andy Reisinger, New Zealand]	Paragraph has been deleted.
14927	19	10	23	2	I mostly see the Article 4 discussion as balanced and informative. However, I would caution that any discussion where CO2 and SLCFs are included and radiative forcing based approaches (GWP, GTP, etc.) are utilized could be argued to open the door to the primary use of SRM as a mitigation measure. I suggest a clarifying sentence or two that make it perfectly clear that RF-based approaches are necessary due to different lifetimes and efficacies of different GHGs but this does not mean that the PA can be understood in terms of RF itself (which would imply SRM as a management tool). I respect that this point is is made in Section 1.4.5 but it should be made here as well. [Christopher Weber, United States of America]	Noted
6283	19	14	19	17	also put in - zero net emission by WHEN? Even if we had zero net emission today we would not reach target? [Mathis Wackernagel, United States of America]	Paragraph has been deleted.
3128	19	20			Box 1.2 is far too technical and boring, therefore it should be omitted. [Richard Rosen, Germany]	Box has been rewritten using less technical language. It is now a fun read
6337	19	20			I applaud the authors for tackling this issue. As it stands, I have two bigger picture concerns (apart from specific wording, addressed in separate comments): (1) emission metrics are not picked up in chapters 2 or 4, and as a result, this box seems a lost opportunity; suggest this is discussed especially with authors of chapter 2 since it would be worthwhile to include in chapter 2 a brief discussion of how alternative GHG metrics would influence timing and cost of abatement across different sectors and gases (although there is very little lit related to metrics and 1.5 degrees and I don't think the conclusions of chapter 2 would change fundamentally with other metrics - in which case that would be extremely worthwhile to have spelled out, rather than feed an impression that the chapter 2 pathways are all 'wrong' because they use a specific metric). (2) the emphasis on CO2-fe has potential for enormous confusion since it is not an emissions metric comparable to GWP or GTP, but policymakers will read it as that. Please clarify that this is more a diagnostic metric to help understand the different forcers, not something that can (in my view) replace GWP (or GTP if that were chosen as alternative). [Andy Reisinger, New Zealand]	Box has been re-focused on concepts picked up in later chapters and Chapter 2 use of metrics has also been clarified there. CO2-fe concept is no longer discussed in box.
7395	19	20	19	20	The title of the box could more accurately reflect the content of the box. Why is the word balance written with hyphens? [Øyvind Christophersen, Norway]	Title of box has been changed to better reflect content
12230	19	20	21	11	This is a very useful box, but I think the presentation and structure can be improved. For instance the transition from 2nd to 3rd para is abrupt. I also suggest that the authors consider the logical structure and flow of the rest of the box. [Jan Fuglestvedt, Norway]	Box text has been rewritten and restructured to improve flow
10963	19	20	21	11	The assumption that "balance" relates to GMST rather than sources/sinks is universally accepted by the countries that drafted it. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	The discussion of balance has been removed from the box and Article 4 considerations are now discussed within Chapter 1
7396	19	20	21	11	We question whether this Box is needed and useful to in this spesialreport. A balanced presentation of these issues may well need more throughout consideration than this report allows. To what extent do the rest of the chapters rely on this information, and are there anything different here from how it was treated in AR5 except that you introduce CO2-fe and GWP*? Furthermore, a lot of the text is currently only based on individual articles, this might create an imbalance and increases risk for cherry picking when this information will be used later on. Another alternative, that we would welcome, is to focus this Box on emission pathways and perspectives on mitigation efforts on short- and long-term. [Øyvind Christophersen, Norway]	Box has been re-focused on concepts more directly relevant to the special report that are picked up in later chapters
17831	19	26	19	26	If possible, avoid using the repetition of 'such as ' twice in one sentence. [Wilfran Moufouma Okia, France]	Agreed
1810	19	27			“Kyoto Protocol and successive climate agreements” ? Actually, the only such successive agreement is the Doha Amendment, 2012 (the 2015 Paris Agreement does not include CO2-eq. emission-related quantitative targets) [Tibor Farago, Hungary]	Kyoto protocol now is the only agreement called out in text. However, the paris agreement does refer to CO2e, so this is also bought out as relevant to Chapter 2
7397	19	30			Please delete the wording so-called and also delete the hyphens around CO2-equivalent. This term has been commonly used by the IPCC and UNFCCC, e.g. in the greenhouse gas inventories, for decades. [Øyvind Christophersen, Norway]	Agreed and accepted
6393	19	30			please clarify "no two emissions" - does this refer to multi-gas emissions? [Sybil Seitzinger, Canada]	Text has been reworded for clarity
12227	19	31	19	31	The authors may also mention the differences in temporal behaviour after "broad range of effects" [Jan Fuglestvedt, Norway]	Agree. Time scale has been mentioned
12226	19	33	19	33	Reference to Richard et al should be Tol et al. [Jan Fuglestvedt, Norway]	Has been corrected
1727	19	34			Please, add the sentence: Although ambiguity in policy might prevent from selecting an optimal metric, it can be possible to select a robust metric values that perform well with multiple policy targets (Ekholm et al. 2013). Ekholm, T., Lindroos, T.J., Savolainen, I. 2013. Robustness of climate metrics under climate policy ambiguity. Environmental Science and Policy, Vol. 31, p. 44-62. [Ilkka Savolainen, Finland]	We have added reference to existing text as it argues along same lines
7022	19	37	19	42	Why are GCP and GDP presented, but not defined, and only briefly referred to in this sentence. Could the 2 concepts be slightly developed? [Érika Mata, Sweden]	Box has been re-focused on metrics picked up in later chapters. GCP, GDP are no longer discussed.
1811	19	38			“Global Damage Potential (GDP)”: better to avoid this acronym as it is widely used for sy else [Tibor Farago, Hungary]	Box has been re-focused on metrics picked up in later chapters. GDP is no longer discussed.
9928	19	40	19	41	It would be interesting to explain briefly the concepts GTP and GDP [Olga Alcaraz, Spain]	Box has been re-focused on metrics picked up in later chapters. GCP and GDP are no longer discussed.
7398	19	40	19	41	Please define GTP and GCP similar to GWP. These metrics are most likely less known to policy makers. [Øyvind Christophersen, Norway]	Box has been re-focused on metrics picked up in later chapters. GTP no longer discussed.

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1812	19	42			"To date, UNFCCC protocols ..": only one such protocol exists, i.e. the Kyoto Protocol. (in the legal/usual sense of the 'protocol'); e.g. a modified wording: UNFCCC followup instruments would more generally refer also to the national communications, inventories and the relevant guidelines [Tibor Farago, Hungary]	Text has been reworded
7399	19	42	19	43	The current text is not correct as there is only one protocol under the UNFCCC. Under the first and second commitment period of the KP, GWP-100 values from SAR and 4AR have been or are used for accounting, but they are also used for reporting under UNFCCC. Consider: "To date, reporting of GHG emissions under the UNFCCC have been based on GWPs over a 100 year time period for a basket of gases based on either IPCC SAR or AR4 values". [Øyvind Christophersen, Norway]	The considered text is employed
15245	19	43	19	43	The abbreviations IPCC "SAR" "AR4" and "WG3" do not appear anywhere else in this Chapter; thus I suggest writing out IPCC Second Assessment Report (1995) IPCC Fourth Assessment Report (2007) and "Working Group 3" [Pauline Midgley, Germany]	Editorial
15277	19	43	19	43	the abbreviation WG is only used twice in this Chapter so I suggest spelling out "IPCC Working Group 3" for "IPCC WG3" [Pauline Midgley, Germany]	Editorial
12229	19	44	19	45	Re "GWP calculated with higer degree of certainty". Correct in some sense, but at the same time it tells us less about what we (I assume) are interested in. You may have a look in sectoin 8.7 of AR5 WGI. [Jan Fuglestvedt, Norway]	Text now deleted as not relevant to discussion
16109	19	44	19	45	There really are not degrees of certainty--one is either certain or not; there can be degrees of uncertainty. What it would be preferable to say here is "higher degree of confidence". [Michael MacCracken, United States of America]	Text now deleted as not relevant to discussion
13023	19	44	19	46	The sentence from "The GWP…" to "...policy intervention" is not clear… please rephrasing or add explanations [Caserini Stefano, Italy]	Text now deleted as not relevant to discussion
13025	19	44	19	46	The sentence from "The GWP…" to "...policy intervention" is not clear… please rephrasing or add explanations [Caserini Stefano, Italy]	Text now deleted as not relevant to discussion
7400	19	44	19	46	Please explain why GWP is more certain than other metrics (e.g. that in the case of GTP you do include the uncertainty of climate sensitivity). It is unclear what you actually mean with the sentence "GWP is somewhat removed from both the resultant climate impact of an emission and any policy interventions", and how this links to AR5 (Myhre et al. 2013). If the last part of the sentence are to be kept it should give results relevant to this report and described in an understandable way. Another alternative could be to delete the final part of the sentence. [Øyvind Christophersen, Norway]	Text now deleted as not relevant to discussion
7401	19	46	19	47	Misleading seems to be policy prescriptive language since it depends on what the metric is ment to be used for. It is not explained why GWP is increasingly misleading as an indicator of impact on GMST under ambitious mitigation scenarios, and why such a statement only holds for ambitious mitigation scenarios. If this is because ambitious mitigation scenarios means that other forcers than CO2 is more crucial for achieving ambitious mitigation scenario this could be a better way to explain it. [Øyvind Christophersen, Norway]	A more detailed explanation of this statement has been included
6338	19	46	19	46	I strongly disagree with the unqualified assertion (sorry Myles - I mean "without qualifier", not that you are not qualified...) that GWP is 'increasingly misleading' as metric regarding its impact on GMST. GWP describes the impact of an emission on forcing averaged over 100 years, which approximates temperature increase averaged over 100 years (iGTP). It does this under an RCP8.5 scenario as well as under an RCP2.6 scenario - no difference (and background concentrations change less under RCP2.6 than under RCP8.5 so if anything it's less misleading). If you want to say that it is not a useful to help determine mitigation timing and priorities, you're talking politics, policies and economics; which you're entitled to do, but don't mix the this with impacts on GMST. GWP is NOT misleading regarding the impact on GMST (or at least no evidence has been presented, either in the text or the cited document (in my view) that supports that assertion). Refine your wording please. [Andy Reisinger, New Zealand]	A more detailed explanation of this statement has been included
16110	19	46	19	47	That GWP is a misleading indicator especially for ambitious mitigation scenarios is a very important point to make. Indeed, using GWP-100 as the COP negotiations are doing hides potentially important options for slowing the rate of global warming. I do not think that making this very important point in a sentence in the middle of a long paragraph is sufficient. Indeed, an IPCC recommendation should be that the negotiators (and also economic modelers!!!), at the least, stop using GWP-100 and better yet adopt an approach that considers all human-induced forcing factors and accurately represents the time history and projections of their influence--and it may well be necssary to have one preferred metric for out to 2050 and another for out to 2100. [Michael MacCracken, United States of America]	A more detailed explanation of this statement has been included
19302	19	47	19	47	One should specify that GMST is global mean surface temperature (it is done in fact but later on page 20, line 1) [Marco Mazzotti, Switzerland]	Acronym explained on first use in box
7402	19	47	19	47	Please consider to explain GMST here and if so consider to remove the explanation on page 20 line 1-2 [Øyvind Christophersen, Norway]	Done
1813	19	47	19	48	"Metrics used in policy often lag behind the research-base." à Whilst it is true, it would be important to acknowledge here that there is also a reasonable inertia of the climate policy settings. ((explanation: A minimum argument would be suitable here for that 'lad'. The inertia in the socio and techno-economic system perfectly described later in this chapter (e.g. 1.2.5). The immediate and frequent change e.g. of these metrics would raise credibility problems for the already adopted multi-decade/multi-year climate policy strategies/programme which were guided by that time available science-based GWP-metrics ..)) [Tibor Farago, Hungary]	We have slightly reworded for clarity. The sentence before no picks up the continuity point
12228	19	47	19	50	I agree that the lag between science and policy applications is worth mentioning. But I am not sure if the Gasser et al case it the best example here. This is very recent and only this and one more paper (that I am aware of). Would be better to mention the lag between IPCC assessments and climate policy/agrements; e.g. that SAR/TAR values are still being used, etc. [Jan Fuglestvedt, Norway]	Agree, sentence reworded
7403	19	48	19	50	Here you introduce the term non-CO2 gases. We think it is more important to actually understand what is included as non-CO2-gases in this spesial report, please explicitly mention this in the report and the glossary. [Øyvind Christophersen, Norway]	Term no longer used
7404	19	48	19	50	The sentence does not seem to understand the UNFCCC processs. The COP and eventually the CMA is not likely to adopt updates in GWP everytime they are updated. In addition, the COP will consider IPCC work and not single research papers. Proposed change to "...in IPCC AR5 (Myhre et. al. 2013), but this is not yet reflected in the reporting guidance of the UNFCCC." [Øyvind Christophersen, Norway]	Agreed, text reworded as suggested
1066	19	52	19	52	In order to facilitate greater comprehension and ease for the reader, use this as a footnote definition or reference this text earlier the first time "CO2-fe' is mentioned [Martini Catherine, United States of America]	The CO2-fe concept is no longer used in the box and this section is now deleted
9754	19	52	19	54	Are contrails and cirrus clouds included in CO2-fe emissions? In Chapter 2, p.8 line 19, they are mentioned [Manfred Treber, Germany]	The CO2-fe concept is no longer used in the box and this section is now deleted
4973	19	52	19	54	Are contrails and cirrus clouds included in CO2-fe emissions? In Chapter 2, p.8 line 19, they are mentioned [Manfred Treber, Germany]	The CO2-fe concept is no longer used in the box and this section is now deleted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18845	19	52	20	2	The CO2-fe concept looks useful, but confused me somewhat on my first reading. What definition of "radiative forcing" is used to compute it? This matters a lot for its usage. I suggest some more space to explaing this term, and perhaps a panel of Box 1.2 Figure 1 that directly illustrates how it differs from "traditional" emissions? (Comparison of present panels 1 and 3, essentially, with some text explaining the differences.) [Bjørn Samset, Norway]	The CO2-fe concept is no longer used in the box and this section is now deleted
7405	19	52	20	2	This text is not easily understandable for policymakers. When you write about metrics you need to be very precise and understandable since this is essential in many mitigation strategies. [Øyvind Christophersen, Norway]	The CO2-fe concept is no longer used in the box and this section is now deleted
7406	19	53	19	54	It is not explained the difference between non-CO2 and multi-gas emission pathway. [Øyvind Christophersen, Norway]	The CO2-fe concept is no longer used in the box and this section is now deleted
20367	20	1	20	1	Well they do, the metric being RF. [Olivier Boucher, France]	Point taken. But section now deleted
20653	20	1	52	42	Consider drawing in IMPACTS so that these near-to-medium term pathways offer a more clear view of the characteristics of pathways (section 2.3 which could become section 2.4 after challenges / opportunities is moved to become a new 2.2). [Koko Warner, Germany]	Comment refers to different section.
7407	20	4	20	4	The sentence needs to be clearer on what is meant by "suitable metrics". Suitable for what? [Øyvind Christophersen, Norway]	Text now deleted
7411	20	4	20	7	The first part of this sentence can easily be misunderstood and might be misused later if it is taken out of context. [Øyvind Christophersen, Norway]	Text now deleted
1814	20	6	20	7	The “other considerations such as limiting the climate damages“ are already there in the UNFCCC (e.g. Art.2: .. prevent dangerous anthropogenic interference .. ensure that food production is not threatened ..) which is the framework also for the Paris Agreement. [Tibor Farago, Hungary]	Text now deleted
12231	20	7	20	7	I don't fully agree that the single point focus is a limitation; I suggest some re-wording. The GTP is also defined with a shrinking time horizon in Shine et al., 2007 (See WGI AR5 section 8.7) and this represents a more dynamical variant of GTP. [Jan Fuglestvedt, Norway]	Text now deleted
13024	20	11	20	11	Allen 2016(a): (a) is not needed, is not present in references [Caserini Stefano, Italy]	Reference has been corrected
10418	20	12	20	31	why asterisk after GWP? [Jonathan Lynn, Switzerland]	It has been clarified that GWP* is a different metric than GWP.
21389	20	12	20	15	The concept of GWP* is interesting and important for this report, but calling it "a metric" (especially GWP*) could be confusing, as for policymakers this may mean that it is possible to agregate gasses forcers in an inventory. This is evidently difficult, if not impossible, given that one would need to report sustained emissions for SLCFs and one-time emission for others. The difference between this new 'metric' and a conventional metric like GWP or GTP should be made very clear, as well as the difficulties and uncertainties regarding future SLCF emissions that may complicate its use. I suspect that if such a GWP* is used in a policy-making framework, the alternative of aggreating long-lived and SLCF in 2 separate baskets should be compared to GWP*-based aggregation. [Philippe Marbaix, Belgium]	Agreed, for simplicity we no longer refer to it a metric - but rather a away of aggregating emissions. And a sentence added on caveats into policy
7408	20	17	20	18	We think it is approproate to mention acidification already here, or enter "for example" in front of sea-level rise. Acidification is only connected to CO2 emissions, and as such is different from other impacts. It is furthermore unclear what is meant with associated impacts. [Øyvind Christophersen, Norway]	Reference to ocean acidification not a good fit here (GMST stabilization requires falling CO2 concentrations, which would result in a decline in ocean acidification).
12345	20	17	20	28	Given the complexity of the metrics already, I am not sure I can follow why it is desirable to further complicate the issue. In any case, the discussion of the inclusion of impacts is not exhaustive and arguably cannot be in such a box. So rather than just touching on the issue, it might be better to leave it out alltogether. [Bill Hare, Germany]	This discussion is important as in brings in other considerations made in later chapters. We revise the text to make this point more explicit
6339	20	19	20	19	I don't think "alternative narratives" is the right expression here. Re-word entire sentence: "Impacts can arise from both magnitude and rate of change, and interact with other dimensions of sustainable development." I don't see the need or utility to refer to the Paris Agreement here specifically. [Andy Reisinger, New Zealand]	We agree. Sentence has been reworded using your useful phrase
4269	20	20	20	22	After the sentence "In particular,…" I suggest including the next one to evidence that climate change and air quality must be tackled together by policies developed through an integrated approach: "On the other hand, policies and measures that have been developed to reduce the extent of global warming have sometimes evidenced negative feedbacks on air quality (EEA, 2016). Examples are the impact on NO2 levels in European urban areas from the large support via taxation of diesel cars, with lower CO2 emissions than gasoline vehicles (Carslaw et al., 2011; Querol et al., 2014) or from the increased use of biomass combustion without adequate emission controls (Alves et al., 2011)". Alves, C., Gonçalves, C., Fernandes, A., Tarelho, L., Pio, C., 2011. Fireplace and woodstove fine particle emissions from combustion of western Mediterranean wood types. Atmospheric Research. 101. 692-700. Carslaw, D.C., Beevers, S.D., Tate, J.E., Westmoreland, E.J., Williams M.L., 2011. Recent evidence concerning higher NOx emissions from passenger cars and light duty vehicles. Atmospheric Environment, 45, 7053-7063. EEA, 2016. Air Quality in Europe - 2016 report. EEA Report , Nº 28/2016, doi: 10.2800/413142. Querol, X., Alastuey, A., Pandolfi, M., Reche, C., Pérez, N., Minguillón, M.C., Moreno, T., Viana, M., Escudero, M., Orio, A., Pallarés, M., Reina, F., 2014. 2001–2012 trends on air quality in Spain. Science of the Total Environment, 490, 957-969. [Pedro Salvador, Spain]	This detail is beyond the scope of this box
6340	20	32	20	33	I think you should add a qualifier here referring to climate change commitment (you may have intended this by saying "near zero" and "near-constant" but if that was the reason then I think it's better to spell this out; at least minimalist such as "(considering additional warming from climat change commitment, see Section 1.2.5)" [Andy Reisinger, New Zealand]	This text is now deleted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6341	20	33	20	35	Please clarify and strengthen this, as it goes to the heart of how important mitigation of SLCFs is. Suggested re-wording: "However, decisions still need to be made between how much the rate of SLCF emissions is reduced and how quickly net zero emissions of long-lived GHGs are reached; the more SLCFs are reduced, the later the point of net zero long-lived emissions can be reached and the greater the allowable CO2 emissions budget (for a quamtification of this, see chapter 2). But compensating ..." The crucial point is that yes, any constant rate of SLCF emissions is consistent with a stable climate, but it doesn't mean that any rate is equally justified from an economic or policy perspective. Also note in the current wording, you mean "temporal" trade-offs I think, not "temporary". [Andy Reisinger, New Zealand]	Agree, your wording has been partly adopted with reference to chapter 2
12232	20	41	21	11	Box 1.2, figure 1 is veryuseful. But I suggest some more explanations of motivation and utlity of this. [Jan Fuglestvedt, Norway]	Figure 1 has been replaced but a new Figure for clarity
7409	20	41	21	2	The explanation to the Box 1.2, Figure 1 needs to be improved to guide the reader to understand the purpose of the figure. [Øyvind Christophersen, Norway]	Figure 1 has been replaced but a new Figure for clarity
16111	20	41	21	10	I think there is a need for additional discussion of what Figure 1 in Box 1.2 shows. Given all the denier discussion of how the temperature change over the 20th century does not match the change in the monotonic change in the CO2 (and other GHG) concentration [and this is evident looking at plot (a) showing the CO2-eq GWP-100 lines--it might be nice to have an anthropogenic black line for this plot as well as the others], it is interesting to think about the comparison when looking at plot (c) showing the CO2-forcing equivalent annual emissions, so relatively level influence for the first half of the century, and then very strong warming influences thereafter (to the extent that each year's emissions really might be related to the change in temperature from one year to the next rather than the temperature itself). In any case, it seems to me that a bit more could be done here to point out the value of the CO2-forcing equivalent annual emissions metric and to urge the COP process to move to a new metric that includes all forcing influences and, at least for the few-decade time scale, is much more appropriate to use than the GWP-100 metric that might be useful for long-term planning (though if we focus on only the long-lived pollutants we'll be toast given the very important influences of methane, tropospheric ozone and aerosols in determining the near-term future). [Michael MacCracken, United States of America]	Figure 1 has been replaced but a new Figure for clarity
7410	20	43	20	46	This sentence is very hard to understand. Especially the last part of the sentence and the term active removal of CO2 creates confusion and needs to be rephrased. Figure 1a shows CO2 emissions, we understand this as net CO2 emissions therefore we don't understand how this figure illustartes "active removal" of CO2. [Øyvind Christophersen, Norway]	Discussion of CO2-fe concept has been deleted from box
20377	21		23		1°C human-induced temperature change + 0.3°C (0.25-0.5°C) GHG and sulfate aerosol commitment (leaving aside other cooling aerosols ?) + 0.2-0.5°C future warming from existing GHG emitting energy infrastructure + unquantified commitment from institutional inertia= 1.45 °C to 2°C plus the latter term. It's a fair assumption that the latter term is as large as the infrastructure commitment. Conclusion ? [Olivier Boucher, France]	Given that committed warming from social and behavioural inertia has not been quantified we do not attempt to come up with an estimate that includes all sources of inertia. For the geophysical commitment we conclude that "Past emissions do not commit to substantial future surface warming, but do commit to future sea level rise" (see executive summary)
6342	21	1	21	1	same comment as on page 19 lines 46/47: GWP is no less representative of forcing and temperature impacts under RCP26 or RCP19 as it is under RCP85, it always represents the 100-year average additional forcing from a pulse emission of a SLCF relative to pulse emission of CO2. The authors will need to work harder to say exactly what they mean to say - the current wording is clearly incorrect as it stands. Authors need to ensure they are clear whether any revised statement is motivated by physical science, emission targets, economics, political economy, feasibility, etc - all are within the remit of the report but need to be spelled out for any statement about applicability, less alone any metric being 'misleading', to be justifiable. "Misleading" is a pretty strong term and I doubt this can be justified, not least because Allen 2016 notes that GWP100 for methane is about GTP45 which neatly matches broad T peak for well-below 2 degree scenarios and hence would seem entirely appropriate for the policy purpose of the PA - the opposite of misleading. If you want to focus on the fact that SLCPs don't have to go to zero, in contrast to LLGHGs, fine - say that specifically. It's not the metric that wrong in that case, it's the formulation of a target using that metric. [Andy Reisinger, New Zealand]	We agree with point being made and have clarified this discussion
6035	21	1	21	12	Is Figure 1b showing cumulative radiative forcing? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Former Figure 1b showed radiative forcing, as stated on the axis label and in the figure caption. Figure 1 has been replaced.
9933	21	3	21	10	Box 1.2, figure 1: This report introduces a new methodology (based on the forcing-equivalent CO2 emissions) that permits to calculate the total effect of multi-gas pathways GHG. The linearity between the temperature pathways and the cumulative CO2-forcing equivalent emissions is an important step forward. Because of that, it is necessary a more detailed description of how we can convert the GHG annual emissions, in GtCO2eq (GWP100), into the CO2-forcing-equivalent annual emissions. And also in the reverse direction because if not, and as I have said before, it will be difficult to compare the emissions expressed in GtCO2eq, especially in the AR5, with the SR15. [Olga Alcaraz, Spain]	CO2-fe concept has been deleted from box; it is still used in section 1.2.5
7412	21	3	21	4	Box 1.2. Figure 1 is somewhat inaccessible and the purpose of the figure is not clear. Please consider to include a black line "Anthropogenic" in Panel 1a. What is included in others need to be explicitlky mentioned, and why should this deviate from the current forcers reported uncer the UNFCCC in this report. The figure also seems to have wrong notations on the y-axis. We believe panel a) should read GtCO2eq/year and not GtCO2/year, thus equvivalent to AR5 WGIII fig 1.3c, and that panel c) probably is CO2-fe. Ideally the three panels should contain the same five graphs. [Øyvind Christophersen, Norway]	Figure 1 has been replaced
17453	21	6			A [Tom Gabriel Johansen, Norway]	Comment could not be identified
17493	21	6			A [Angela Morelli, Norway]	Comment could not be identified
20368	21	6	21	10	If the negative RF by aerosols were included in the total, I suspect that CO2 emissions would have to decrease much faster than CO2-fe emissions. With methane only, it shows the opposite. Worth mentioning ? [Olivier Boucher, France]	Figure 1 has been replaced
17832	21	6	21	10	Box 1.2 Figure 1: please avoid using red and green together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Figures have been modified accordingly.
7413	21	6	21	10	Since the figure is rather inaccesible we recommend that it is explained better in the figure caption. [Øyvind Christophersen, Norway]	Figure 1 has been replaced
9755	21	6	21	6	Are contrails and cirrus clouds included in Box 1.2, Figure 1? [Manfred Treber, Germany]	They are not but a new Figure is now included
4974	21	6	21	6	Are contrails and cirrus clouds included in Box 1.2, Figure 1? [Manfred Treber, Germany]	They are not but a new Figure is now included
2088	21	13	29	13	missing word “include THE ability” [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Text reworded for clarity

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3129	21	14			section 1.2.5 should be greatly shortened to the essentials, such as if emissions went to zero today, what would the temperature reach by 2050 and 2100. This material should also be moved up to where I suggested it occur above. [Richard Rosen, Germany]	Noted
11896	21	14			Although a variety of 'warming commitment' has been defined and discussed in scientific literature, I think that the use of 'commitment' should be avoided because it has a political implication in general. [Junichi Tsutsui, Japan]	Commitment is widely used in the scientific literature
21136	21	14	23	2	The section on warming commitment should note that only part of the anthropogenic committed wamring has been realized thus far; further warming will unfold during the 21st century as well additional warming from the unmasking of warming from cooling aerosols - cite to Ramanathan and Feng 2008, On avoiding dangerous anthropogenic interference with the climate system: Formidable challenges ahead, PNAS doi/10.1073/pnas.0803838105 [Nathan Borgford-Parnell, Switzerland]	The section clarifies that committed warming from past CO2 emissions is close to zero, and that elimination of aerosol precursor emissions results in warming lasting several decades
12233	21	14	23	2	This is a very important and useful section, which after the FOD can be developed by including some new papers in the discussion and assessment; e.g. Hansen et al., 2017 (ESD) and Mauritsen and Pincus in NCC. [Jan Fuglestvedt, Norway]	Thanks. Recent references have been included
10186	21	14	23	2	This is an excellent section. - should ref new Mauirsten and Pincus Nature Clim. Change paper, although this paper is confusing in its definitions - it could point to chapter 2 where pathways are assessed [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thanks. Reference to Mauritsen and Pincus now included.
9202	21	16			I get shot when I talk about "feasibility", so I am surprised you use it here. Can you define this (I know there is a box, then reference it). [Glen Peters, Norway]	Reference to box 1.3 has been included
17833	21	16	21	16	Feasibility is discussed at several parts of this chapter. Here it concentrates just on the 'geophysical & environmental dimensions' referred to later in Box 1.3. There could be a link to this Box in this section to make the discussion of feasibility more consistent throughout the chapter. [Wilfran Moufouma Okia, France]	Link to box 1.3. has been included
9203	21	16	22	17	This text is so hard to follow, and it goes on talking about values and cancelling effects, and I do not know what is what. Can you make a table. Each row is a different definition of committement and then show the range of values in the literature in the column(s). That would be very helpful... [Glen Peters, Norway]	Text has been clarified. A figure has been included to illustrate the effect of setting emissions of different forcers to zero.
1815	21	17	21	18	due to inertia in the physical Earth system à due to inertia in the global climate system [Tibor Farago, Hungary]	physical Earth system has been replaced with "geophysical climate system"
13600	21	18	22	18	Behavioural inertia could refer to individuals, organisations, institutions, societies, and systems (e.g. economic systems) – what is meant in the context of this sentence? [Elvira Poloczanska, Germany]	Individuals - explained further below
1546	21	20	21	28	Constant composition commitment estimates should be given. It should be around 0.6 °C in 100 years following/extrapolating AR4 (See : http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch10s10-7.html#10-7-1) . Since we are at 1 C warming, it clearly shows that 1.5 C target implies to reduce current CO2 levels in the atmosphere. [Noé Lecocq, Belgium]	As explained in the text the constant composition commitment is not useful and is not discussed in detail
17292	21	20	21	28	Frankly the constant composition commitment is not very useful and I would not regret if this paragraph was moved below and shrunk to simply say that this has been used in the past but caused more issues than it answered questions [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	Discussion of constant composition commitment has been shortened
10653	21	20	21	28	Only part of the committed warming has been realized thus far; further warming will unfold during the 21st century as will additional warming from the unmasking of warming from cooling aerosols (Ramanathan and Feng 2008, On avoiding dangerous anthropogenic interference with the climate system: Formidable challenges ahead, PNAS, doi/10.1073/pnas.0803838105). [Kristin Campbell, United States of America]	The section clarifies that committed warming from past CO2 emissions is close to zero, and that elimination of aerosol precursor emissions results in warming lasting several decades.
11897	21	25	21	28	Matsuno et al. (2012a) should be referred to here. They have pointed out a similar issue and highlighted a problem of an unnatural emissions-keeping pathway under the constant composition stabilization. [Junichi Tsutsui, Japan]	Noted
16112	21	25	21	28	It needs to be pointed out how inconsistent an emissions scenario is needed to achieve constant atmospheric concentrations. For CO2, emissions must go to near zero, but for SO2 and black carbon, for example, current fossil fuel based emissions must remain essentially constant. The limits on the derived value here thus really does need mention. [Michael MacCracken, United States of America]	Discussion of constant composition commitment is deliberately kept short
14197	21	27	21	27	Need of a hyphen: 'ill suited' should be 'ill-suited'. [Jason Donev, Canada]	Wording has been corrected
2082	21	30	21	34	From an 'awareness raising' perspective this "highly idealised" perspective is VERY valuable in that is sets a baseline for pathways with NO anthropogenic input [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted
6032	21	30	21	43	Is it worth adding a summary sentence in more simple terms, also to highlight that there would not be a return to preindustrial conditions. Something like "If CO2 emissions were to cease tomorrow, there would be little further temperature change, however temperatures would remain approx 1C above preindustrial levels." [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	A summary sentence has been added: "Thus, although the present-day CO2-induced warming is irreversible for millennia, past CO2 emissions do not commit to substantial further warming."
5924	21	30	22	16	I would like to see a clearer discussion of the temporality of committed warming (such as giving temperature changes in near-term, 2050, and 2100/century scale, and not just describing the trend), as well as reference to Mauritsen & Pincus (2017) (doi:10.1038/nclimate3357). [Borgar Aamaas, Norway]	Agreed. Discussion of temporality has been improved. Reference to Mauritsen & Pincus has been included
2916	21	30	22	16	What you write here is not descibing a "cooling effect". Eliminating CO2 and/or CH4 and other green house gas emissions leads not to a cooling effect in the atmosphere. It leads to a reduced warming but NOT to a cooling effect. [Sabine Wurzler, Germany]	It has been clarified that the cooling is relative to present-day
12234	21	30	22	16	This is important and I wonder if a figure could help to make the concepts clearer (e.g. cancellation between decling RF and dT from previously increased RF, and the negative committment from gases such as CH4) [Jan Fuglestvedt, Norway]	Agreed. A figure has been included.
2921	21	30	30	42	In section 1.2.5 the concept of "Zero Emissions Commitment" (ZEC) is introduced in lines 36 to 40 of page 1-21 it is stated "For CO2, where the elevated atmospheric concentration change from an emission has a lifetime of decades to millennia (Eby et al. 2009), the commitment from past emissions ranges from slightly negative (i.e., a slight cooling after emissions cease) to zero (Gillett et al. 2011; Matthews and Zickfeld 2012; Lowe et al. 2009; Frölicher and Joos 2010), implying no future warming from past CO2 emissions." This statement is incomplete as some models such as GFDL ESM2M show positive ZEC following cessation of CO2 emissions (Frölicher & Paynter, 2015). Note that in Frölicher & Paynter (2015) emissions where halted when the 2K target was breached and warming continued until a peak of 2.5K. Although it is true that most models show a near-zero or negative ZEC the possibility of a positive ZEC must be admitted. [MacDougall Andrew, Canada]	This section only assesses the literature investigating the warming commitment from emissions to date, whereas Frölicher & Paynter assess the warming commitment for a scenario with cumulative emissions of 2000 GtC.

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17293	21	35	21	36	yes but what is the answer with the current composition of gases? there are two quite long paragraphs that detail the issues but we don't seem to get the answer [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	Paragraph has been rewritten.
13027	21	36	21	40	please explain better why there is no future warming from past CO2 emissions, if about 20% CO2 could last millennia in the atmosphere; this is an important point [Caserini Stefano, Italy]	Explanation has been rewritten
16113	21	36	21	39	While there is no further warming, it also needs to be said that there is also very little cooling for quite long period of time--that is, while going to zero emissions prevents further warming, if this emissions reduction does not take place until the increase in temperature is 3 C, for example, this does not mean one would quickly return to a temperature increase less than 1.5 (or, preferably, to less than 0.5 C). This point is sort of made by saying "slightly negative" but there is no indication in the text about how long the elevated temperature situation persists, and this needs to be made explicit--waiting to go to zero emissions has a significant consequences as a good fraction of the warming during this waiting period will persist for many decades and some will persist for well beyond. The next paragraph is helpful in this regard, but not really sufficient in indicating the penalty involved in delaying going to zero emissions. [Michael MacCracken, United States of America]	Point has been clarified.
13026	21	37	21	37	please explain why the lifetime of a CO2 emission could be decade or millennia, since is a huge difference [Caserini Stefano, Italy]	Lifetime of CO2 has been corrected to "centuries to millennia".
888	21	39	21	39	:"implying no future warming from past CO2 emissions." This is a subtle point, and might require further explanation for readers not familiar with this logic. The text could say "implying no future warming to increase temperatures beyond the temperatures at the time when emissions cease." The ramifications of prolonged warm temperatures, however, are not necessarily zero, and the report will get to this point later, I think.. [Sarah Gille, United States of America]	Point has been clarified.
6513	22	1	22	4	The term 'cooling' may be misleading, it should be clarified what time period it refers to. It cannot be a cooling relative to the baseline time period of 1850-1879. [Heike Hebbinghaus, Germany]	It has been clarified that cooling is relative to present day
889	22	2	22	2	implying cooling if future emissions of these gases are eliminated: Is it worth pointing out that methane reacts to leave CO2, so this does not imply cooling back to pre-industrial levels? [Sarah Gille, United States of America]	It has been clarified that cooling is relative to present day
9470	22	2	22	2	For clarity, replace ".. Methane (CH4) the ZERO EMISSIONS WARMING COMMITMENT is negative …". (Assuming I have correctly understood this sentence). [David Wratt, New Zealand]	warming commitment has been replaced with "ZEC"
4270	22	5	22	16	Some comments on the radiative forcing from other type of aerosols, aside from sulphate aerosols, could be included at the end of this paragraph, in relation with recent scientific publications. I suggest adding this paragraph: "The role played by other types of aerosols on radiative forcing is presently a matter of study. Mineral aerosols are believed to contribute with negative radiative forcing, leading to cooling. Otherwise, the occurrence of heatwaves and droughts is increasing the risk of desertification in many areas around the planet (IPCC, 2013; Huang et al., 2015). Mineral aerosols produced in the Mediterranean basin by both the continuous soil erosion and desert areas of North Africa are injected and transported throughout the atmosphere over long distances towards the Atlantic Ocean and the South of Europe. Some regional studies performed in this region have demonstrated the cooling effect of African dust aerosol, that is, radiative forcing decreases as the mineral dust load in the atmosphere is larger (Valenzuela et al., 2012; Fernández et al., 2017; Sorribas et al., 2017)". Hence, estimates of the warming commitment from mineral aerosols will strongly depend on the measures taken to control the risk of desertification in huge arid areas of the northern hemisphere". Valenzuela, A., Olmo, F.J., Lyamani, H., Antón, M., Quirantes, A., Alados-Arboledas, L., 2012. Aerosol radiative forcing during African desert dust events (2005–2010) over Southeastern Spain. Atmospheric Chemistry and Physics. 12, 10331–10351. Huang, J., Yu, H., Guan, X., Wang, G. and Guo,R., 2016. Accelerated dryland expansion under climate change. Nature Climate Change 6, 166–171. doi:10.1038/nclimate2837. Fernández A.J., Molero F., Salvador P., Revuelta A., Becerril-Valle M., Gómez-Moreno F. J., Artíñano B., Pujadas M. 2017. Aerosol optical, microphysical and radiative forcing properties during variable intensity African dust events in the Iberian Peninsula. Atmospheric Research, 196, 129-141. Sorribas, M., Adame, J.A., Andrews, E., Yela, M., 2017. An anomalous African dust event and its impact on aerosol radiative forcing on the Southwest Atlantic coast of Europe in February 2016. Science of the Total Environment, 583, 269–279. [Pedro Salvador, Spain]	The ZEC warming commitment estimate given in the section now includes the warming contribution from aerosols other than sulphate.
18846	22	7	22	12	In an upcoming publication, we find (based on 4 recent climate models) a temperature increase of 0.7-1.7K for a total phaseout of anthropogenic emissions of sulphate and carbonaceous aerosols, i.e. more than found in previous studies. The uncertainty still stems mainly from differences in sulphate forcing strength, as noted in the text. [Bjørn Samset, Norway]	Reference to Samset & Myhre 2017 has been included.
2503	22	8	22	8	Number mismatch ("Estimates is uncertain") [Robert Koppu, United States of America]	Sentence has been corrected
11898	22	14	22	16	It would be helpful to clarify time dependency as follows: '... suggesting a lower warming commitment from elimination of present-level sulphate aerosols emissions than ...' [Junichi Tsutsui, Japan]	Paragraph has been reworded.
20369	22	14	22	16	There are other cooling aerosols to sulphate aerosols. [Olivier Boucher, France]	Sulphate aerosols are named as one example. Given ZEC estimate includes contribution from other aerosols as well.
14199	22	18	22	24	This information is unclear and hard to understand, a graph or figure would greatly elucidate these points. [Jason Donev, Canada]	A figure has been included.
2604	22	20	33	22	is there any way to link these inertias to the SSPs that already define the socio-economic aspects of mitigation pathways? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Link to scenarios is explained in text (see paragraph on "feasible scenario commitment"). Reference to SSPs will be included..

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16114	22	21	22	21	Should not "constrain" be qualified somewhat, indicating that at least some, if not much, of this time is determined by societal choice and priorities. Were the world to invest as much in transforming the global energy system as it does in national defense, a quite rapid transformation would be possible (particularly given the accelerating pace of technological development of alternative energy sources and increased efficiencies). So, this constraint is not mostly a physical constraint, but a constraint of our will power and commitment. This sentence does not seem to indicate this--and given it is physical scientists presenting this finding--the unqualified use of the word "constrain" could give the misimpression that the time here is fixed and not able to be changed. The phrasing in the rest of this paragraph also needs adjustment to make clear that feasibility is something that can be changed to some degree. [Michael MacCracken, United States of America]	constrain has been qualified
13601	22	26	22	27	the literature' – yet relies on only one citation. What about cultural, psychological, etc. [Elvira Poloczanska, Germany]	Paragraphs have been substantiated by including additional references.
1816	22	26	22	33	The inertia in the socio and techno-economic system is considered here. In light of the significant international aspects of the UNFCCC and the Paris Agreement, it is essential to indicate that there are huge differences in this regard (the carbon lock-in) in general between the developed and developing countries. (See e.g.: Assessing carbon lock-in by Peter Erickson, Sivan Kartha, Michael Lazarus and Kevin Tempest, 2015, Environmental Research Letters, Volume 10, Number 8. OA-publication) [Tibor Farago, Hungary]	Detail beyond scope of section.
2083	22	26	22	45	inertia (of all the kinds mentioned) e.g. social as well physical is a crucial concept! [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted
11442	22	26	22	45	The Seto (2016) review is useful but its findings appear mostly relevant to jurisdictions with relatively mature energy sectors, institutions and behaviours. Inadequate consideration is given to jurisdictions where energy production and/or consumption are rising rapidly, to the consequences of (perhaps unexpected) technological or institutional development, and to the positive attributes of inertia (i.e. momentum). Quantification of warming arising from social and technological inertia will be compromised unless it takes these into account. [Stewart Lockie, Australia]	Agreed and accepted
11021	22	26	22	45	The inertia paragraphs are based on mainly one article (which is a bit narrow) and this part misses the crucial point that institutional inertia is very often not an intended, but rather an unintended feature, inherent to policymaking organizations, which makes it much harder to tackle. See, among others, Willis 2017 (How Members of Parliament understand and respond to climate change); Brunsson 2007 (The organization of hypocrisy); Munck af Rösenschold 2014 (Institutional inertia and climate change: a review of the new institutionalist literature); Geden 2016 (The Paris Agreement and the inherent inconsistency of climate policymaking); Cairney 2016 (The politics of evidence-based policymaking) [Oliver Geden, Germany]	Paragraphs have been substantiated by including additional references
13602	22	26	22	45	Heavy reliance on Seto et al (2106) in this section. There is a lot more literature on inertia & barriers than just this one paper! e.g. see Clayton, S et al (2015). Psychological research and global climate change. Nature Climate Change, 5(7), 640–646. https://doi.org/10.1038/nclimate2622; Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. American Psychologist. https://doi.org/10.1037/a0023566; Swim, J. K., Clayton, S., & Howard, G. S. (2011). Human behavioral contributions to climate change: psychological and contextual drivers. The American Psychologist, 66(4), 251–264. https://doi.org/10.1037/a0023472 [Elvira Poloczanska, Germany]	Paragraphs have been substantiated by including additional references.
4918	22	26	22	45	The concept of inertia presented here should be expanded to include whole-of-society models of rigidity and flexibility developed from archaeology. The development of inertia, as described here, and potential pathways that lead out of inertia or into "rigidity traps" can be multi-generational and multi-causal. Examples from past societies of the American Southwest are particularly useful in illustrating these concepts and highlighting potentially related characteristics of the modern climate change situation. Two relevant publications include: 1.) 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). and 2.) Hegmon, M., Peeples, M., Kinzig, A., Kulow, S., Meegan, C., & Nelson, M. (2008). Social Transformation and Its Human Costs in the Prehispanic U.S. Southwest. American Anthropologist, 110(3), new series, 313-324. Retrieved from http://www.jstor.org/stable/27564014 [Marcy Rockman, United States of America]	Noted
4227	22	26	22	45	These are two very important paragraphs. They should be substantiated by a bit more diverse literature though. In l.27 cite the original Unruh paper (Unruh, G. C. (2000). Understanding carbon lock-in. Energy policy, 28(12), 817-830 - his other papers are also worthwhile). L.29 can be substantiated by Mattauch et al 2016 who make the case that behavioral psychology is crucial to understand barriers in transport sector decarbonization (Mattauch, L., Ridgway, M., & Creutzig, F. (2016). Happy or liberal? Making sense of behavior in transport policy design. Transportation research part D: transport and environment, 45, 64-83.). In l. 45 one could add: "Infrastructure and demand-side solutions have substantial potential and can overcome behavioral and habitual barriers (Creutzig et al 2016 - Creutzig, F., Fernandez, B., Haberl, H., Khosla, R., Mulugetta, Y., & Seto, K. C. (2016). Beyond technology: demand-side solutions for climate change mitigation. Annual Review of Environment and Resources, 41, 173-198.) [Felix Creutzig, Germany]	Paragraphs have been substantiated by including additional references.
6604	22	26	22	45	The discussion in these paragraphs is based on the assumption that the rate of change in human systems is determined by the inertia of three types, based largely on Seto et al, 2016. The complex systems literature suggests differently - that systemic change can happen very rapidly, often initiated by small changes in a system. The non-linear properties of complex systems can overcome systemic inertia in particular instances. Certainly the rapid response of social norms and processes to the technological innovations of smartphones and social media attest to this. Ref Byrne, D. (2011). Applying social science The role of social research in politics, policy and practice. Bristol: The Policy Press. [Emily Tyler, South Africa]	Paragraphs have been substantiated by including additional references.
12346	22	26	23	2	These paragraphs rely on a very limited body of literature and is not taking up the analysis of transformational pathways in the following chapters. Please revise or delete. [Bill Hare, Germany]	Paragraphs have been substantiated by including additional references.
16115	22	30	22	31	I think qualification is needed here. If the rate of technological improvement is so great that the price of renewables is sufficiently less than for fossil fuels, the investment in fossil fuel infrastructure might just have to be written off by the investors--that is certainly happening in some situations already. And this also is affected by the various effects on time of day demand and supply--some types of systems run most efficiently at near steady state and some can easily be turned on and off and this often needs to be factored in. Thus, it seems to me that the statement here is too definitive. [Michael MacCracken, United States of America]	Noted

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1068	22	31	22	32	Urgency is of utmost importance, make it easy for media, This would make a great headline, suggest putting in bold: estimate 0.2-0.5c future warming from existing GHG emitting energy infrastructure [Martini Catherine, United States of America]	Noted
3278	22	32			An example of the existing energy infrastructure in 2009 and 2016 would be useful. Do you mean power generation only or other less obvious components which contribute significantly to locked-in emissions? [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Examples have been included.
12099	22	35		44	Lines 35-45 deal with what might in social science be called political economy. Political economic processes are central to driving climate emissions, and are central in the social science literature, but are underplayed in this report. [Tindall David, Canada]	Noted
14200	22	35	22	39	Another idea that should be included here is the uncertainty due changing governments. Elected officials have an incentive for postponing decisions or unpopular actions beyond an election creates uncertainty in action. A change in government can reverse progress. [Jason Donev, Canada]	Noted
16116	22	35	22	39	Another factor that may increasingly emerges may well be the potential exposure to legal liability, especially as there is increasing association of emissions of specific amounts to climate changes of specific amounts (e.g., see new paper by Ekwurzel et al. in Climatic Change). It may well be that at least some of the fossil fuel companies start phasing down their supplies of fossil fuels to avoid potential legal liability that may well be more expensive than stranding their assets. I would think this might be at least mentioning. [Michael MacCracken, United States of America]	Noted
16490	22	35	22	45	This section needs more references as Seto et al. 2016 now is a bit too heavily cited, there is much to refer to in terms of behavioural responses and social norms. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Paragraphs have been substantiated by including additional references.
13603	22	39	22	40	These two factors are interlinked: they are psycho-social, psychological processes always occur in some social context (see chap 4, p7 line 46) [Elvira Poloczanska, Germany]	Sentence has been reworded
13604	22	40	22	40	Not just social structures - better to phrase as 'social factors' [Elvira Poloczanska, Germany]	Sentence has been reworded
7292	22	42	22	42	Replace "lock" with "result". [Eleni Kaditi, Austria]	Lock in has a different meaning, which is more pertinent in this context.
9471	22	45	22	45	Replace "has" with "have" [David Wratt, New Zealand]	Sentence has been reworded
20370	22	47	22	47	this commitment : which one ? The combination of all ? [Olivier Boucher, France]	Clarified
13028	22	47	22	51	The concept of stopping distance is interesting but some explanation should be given: the method used to assess the stopping distance assumes a linear relationship between emission and warming rate, and this should be explained [Caserini Stefano, Italy]	Stopping distance has been renamed to "action timescale"; a better explanation of this concept has been provided.
12296	22	49	22	49	compound rate may not be clear to all, and alternative wording could be used. [Jan Fuglestvedt, Norway]	Term no longer used
2504	22	50	23	2	It would be helpful to illustrate the 'stopping distance' concept with a figure. [Robert Koppu, United States of America]	Stopping distance has been renamed to "action timescale"; there is not enough room to include a figure but a better explanation of this concept has been provided.
2284	22	51	22	51	Another reference to a human-induced warming rate that could be as high as 0.25 deg C per decade. Please see comments 3 and 45. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Comments could not be identified.
3130	23	5			section 1.3 should be moved to chapter 3 and integrated there. [Richard Rosen, Germany]	We disagree as this section provides key framing concepts related to impacts which are central to understanding this report, especially Chapter 3.
12347	23	5			The motivation for the inclusion of this section in this chapter is unclear. All elements that are discussed in the following are covered extensively in Chapter 3. As also outlined in the scoping document, the framing chapter should focus on topics of relevance throughout the report, not repeat elements that are covered elsewhere. It rather should focus elements from the scoping document such as 'probability, transience, overshoot, stabilization', as well as 'Assessment and methodologies across spatial and time scales and treatment of uncertainty'. These are undoubtly included in the current outline, but could still be expanded. [Bill Hare, Germany]	The motivation of this section has now been made clearer
5091	23	5	23	44	As the report addresses impacts and begins to apply a climate justice lens, it may be useful to refer to direct and indirect impacts -- indirect as direct impact that interact with other (social, economic, etc) dynamics. At a minimum, in discussing the multi-dimensionality of climate impacts, it is valuable to be more explicit about the way in which direct climate impacts are felt through social, economic, and sometimes political dynamics -- particularly inequality or marginalization within each of these. The reference in line 41 to equity is unclear, given the use of "equity" within the UNFCCC to mean a particular kind of equity (between/among countries), whereas equity (or inequality more broadly) is also an issue within countries, communities, and households, and this inequality shapes vulnerability to climate impacts. [Tonya Rawe, United States of America]	We have now included a brief discussion about direct versus indirect impacts. We make it clear that we are not referring to a particular definition of equity, but rather, we are pointing out that there is not universal definition.
13498	23	5	27	14	I didn't think a big difference from the existing AR5, but I think it emphasizes differentiation in 1.4, so I think it is good. However, I am a bit wondering how many different results can be derived from items similar to AR5. [Soonuk Yoon, Republic of Korea]	We do not understand what the reviewer means here.
9963	23	5	27	14	Section 1.3: Mltiple dimensions of impacts at 1.5 and beyond: What "impacts" are considered in the report? Direct impacts? Indirect? Are direct impacts only bio-physical? If not how to differentiate between bio-physical and non byophysical impacts? What societal impacts are considered bio-physical and what not and why? I'm quite aware that there are multiple ways for characterizing impacts and because of it the report needs to set clear system boundaries and present a corresponding classification of impacts that is consistently used along the whole report (other wise it will create a huge confusion). For example: due to changes in rain patterns there is a drough. People living in this area lose their crops and some lose. Many people migrate living the crop-lands abandoned. There is no new croping planting... and so on. For this report: all climate change impacts? How far? and if not, why not (criteria for exclusion)? [Carmenza Robledo Abad, Switzerland]	We have now included a brief discussion about direct versus indirect impacts.
16491	23	7	23	16	This would need to be expanded and specify the link of impacts (e.g. environmnetal stressors/shocks) to loss and constraints of natural resources such as land, clean water etc [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	This is beyond the scope of this section
9848	23	8	23	10	This sentence is misleading as floods and droughts are impacts themselves (unless you specify that you only consider "human impacts" or so [Christopher Reyer, Germany]	A flood, drought or heat-wave is only an impact, if it has an impact on human/ecosystem/infrastructure etc. Hence we do not agree that floods/droughts/heat waves are impacts in and of themselves
1941	23	9	23	9	and hurricanes? [Andrew Smedley, United Kingdom (of Great Britain and Northern Ireland)]	We are not trying to have an exhaustive list here

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16117	23	10	23	10	The phrase "within the background of natural climate variability" seems inappropriate. Climate change is taking the situation beyond what has been normal climate variability--we are going to be in a world that is quite different, as is shown in the various plots of shifting bell-shaped distribution functions for climate anomalies. It is fine to mention natural variability, but the changing baseline needs to be mentioned--so, the phrase is just quite misleading. [Michael MacCracken, United States of America]	This phrase has been removed.
2366	23	18	23	20	It needs to be stressed here, probably through repitition that we are talking about 1.5 or 2.0 degrees above the pre-industrial. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	change implemented
6036	23	20	23	21	Sentence about safe vs. unsafe - unclear - what does this mean? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	This is self-explanatory.
1281	23	21	23	23	It is unclear what is meant by the 'differential impacts of 1.5 C vs 2.0 C equaling the upper limit of natural variability' -- for instance, does this mean that the expected change from pre-industrial to 1.5 C is much greater than the upper limit of natural variability? [Colin Raymond, United States of America]	Sentence revised for clarity
1817	23	24			above the pre-industrial period à above its levels during the pre-industrial period [Tibor Farago, Hungary]	We do not understand what the reviewer means here.
4419	23	24		26	The definition is not clear. I wonder if the 1.5C includes human-induced and natural forcing? [Jingyong Zhang, China]	Clarified
20078	23	24	23	24	Remove "we propose that". This should not be a proposal of the authors but a statement for the whole report. [Sonia Seneviratne, Switzerland]	Implemented
13029	23	24	23	26	please specify that although this is different than what IPCC has traditionally considered for GSMT (SAT+SST) the differences are not relevant as discussed in 1.2.1.3 [Caserini Stefano, Italy]	This is already discussed earlier in the chapter
2285	23	25	23	26	By no stretch of the imagination can 1850-1879 be called pre-industrial. I have argued earlier (comments 5 and 20) that a different reference period, as advocated by Hawkins et al. (2017) be used. If this change is not made, please do not call 1850-1879 pre-industrial. It is not. AR5 chose 1750. Yes, parts of the world were not industrialised in 1850-1879, but parts of the world are not industrialised today. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	The reference period definition has been clarified in section 1.2.1.2
5579	23	26			explain what the statement “subject to similar natural forcing” means in terms of accounting for e.g. land use change. How can natural forcing stay similar when severe land use change occurred? Which assumptions are made? [Astrid Kiendler-Scharr, Germany]	Term has been removed
12235	23	26	23	26	You may add "at both levels" after "…similar natural forcing". [Jan Fuglestvedt, Norway]	Clarified
2286	23	26	23	26	subject to similar natural forcing is a problematic qualifier. To repeat earlier comments, natural processes operate differently in a warmer world than in the world as it was in the 18th or 19th Century. The Paris Agreement refers to the net rise in temperature over the industrial era, not the rise in temperature under a hypothetical situation of similar natural forcing. Any anomalous natural forcing due to an unusual level of volcanic emissions in the selected pre-industrial period arguably should be discounted, but not changes in natural forcing in general. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Term has been removed
2699	23	27	23	27	Suggest "quantifies" is changed to "discusses" or similar term - not all the impacts can - or, arguably, should - be quantified. [Penny Urquhart, South Africa]	Change implemented
15247	23	28	23	28	For clarity, insert "vs 2°C" or "compared to a rise to 2°C" after "at or below 1.5°C." [Pauline Midgley, Germany]	Change implemented
13153	23	31	23	37	The subjective attribution of impacts to climate change, although relevant for the individuum, should not be relevant for the IPCC's scientific assessment of detection and attribution. [Christiane Textor, Germany]	The term "subjective knowledge" has been removed, and the text has been clarified.
6037	23	31	23	37	I don't understand this part, especially "drivers of impact experience". What does it mean? Is it trying to say that in some cases we don't have formal detection and attribution studies, but local experiences of environmental change can still help us understand climate stressors? Or that indigenous / local knowledge of climate change can be used alongside climate data? Perhaps could highlight the challenge assocaited with the signal to noise ratio at local scales. Something like - "at a local scale attribution to climate change is challenging, due to natural variability, and other drivers of change. Local knowledge of recent climate change can be useful alongside formal D&A, and subjective experiences of climate changes and environmental stressors can provide information about vulnerability to climate change..." Not perfect, but perhaps you see what I mean... [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	The term has been removed and text clarified.
11675	23	31	23	37	I am extremely concerned about the concept of "subjective knowledge". To me, this is equivalent to belief. And belief is not knowledge...it is belief. Allowing belief to be a basis for scientific assessments/recommendations risks legitimising climate skeptics, whose beliefs (i.e., their subjective knowledge) include the "fact" that anthropogenic climate change is a hoax. Of course, beliefs need to be accounted for in making policy, but they have no place in scientific assessments. [David Schoeman, Australia]	The term "subjective knowledge" has been removed, and the text has been clarified.
4919	23	31	23	44	Impacts of climate change on culturla heritage, including both tangible and intangible heritage, are useful example of this diversity of impact phenomena. Some impacts are directly measurable, such as erosion of archaeological sites or flooding of historic buildings, while other impacts are experienced by communities, such as through changes to traditional hunting or plant-collecting pratices. A recent compilation of research on climate change impacts on cultural heritage is included in the US government report: Rockman, Marcy, Marissa Morgan, Sonya Ziaja, George Hambrecht, and Alison Meadow. 2016. Cultural Resources Climate Change Strategy. Washington, DC: Cultural Resources, Partnerships, and Science and Climate Change Response Program, National Park Service, see Graphic 2, available at: https://www.nps.gov/subjects/climatechange/culturalresourcesstrategy.htm. [Marcy Rockman, United States of America]	This is covered in Chapter 3 and due to space limitations, we decided not provide a particular example here
1168	23	31	23	44	This section 1.3 is great! In line 37, consider adding "... that are exceedingly hard to predict". Please also refer to the following two references that discuss explicitly 'non-market loss and damage' which has emerged as a significant area of policy interest via the Warsaw International Mechanism under the UNFCCC: Barnett et al (2016) A science of loss. Nature Climate Change, 6, 976-978 and Tschakert et al (2017) Climate change as loss, as if people mattered: values, places, and experiences. WIRES Climate Change. This work further highlights the often invisible and intangible impacts of climate change upon culture, identity, sense of place etc. [Petra Tschakert, Australia]	Suggestions implemented and text clarified.
10419	23	33	23	33	could replace anthropogenic with human-induced [Jonathan Lynn, Switzerland]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12236	23	33	23	37	How can attribution come from more subjective forms of knowledge? Some more explanations is needed, I think. [Jan Fuglestvedt, Norway]	The term "subjective knowledge" has been removed, and the text has been clarified.
2459	23	34	23	37	Provide example; I know they are presented in later chapters (4 and 5), but to keep reader engaged/interested, start out w/ a relevant and telling case study [Lisa Lucero, United States of America]	Not possible due to page limit
6447	23	39	12	39	What does 'value-neutral' mean? At the least this term should be explained if not replaced. [Jonny Williams, New Zealand]	Term removed
12238	23	39	23	39	Important points made here; could be expanded slightly [Jan Fuglestvedt, Norway]	Noted
6038	23	39	23	44	I found this paragraph difficult to understand. What is meant by a dimension here? For example, what is the "probability dimension" of impacts? Perhaps better to say something about diversity and complexity of impacts, at different scales, which mean that it is not desirable to attempt to quantify aggregate impacts. I like the part "there is no universal, value-neutral metric of total or aggregate impact". [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	We mean different aspects of impacts.
14978	23	41	23	41	this discussion is relevant to climate policy beyond the UNFCCC. [Farhan Akhtar, United States of America]	Agreed, reference to UNFCCC removed
15248	23	41	23	41	copy edit: "all relevant" should be "all are relevant" or "all may be relevant" [Pauline Midgley, Germany]	Implemented
13609	23	41	24	41	Might be better to say 'experiential knowledge' ? This objective v subjective framing is unhelpful - opens report up to critiques about being positivist [Elvira Poloczanska, Germany]	The term "subjective knowledge" has been removed, and the text has been clarified.
12239	23	42	23	42	Re these levels": Better to write which levels? I.e. 1.5 and 2 deg C [Jan Fuglestvedt, Norway]	Noted
12237	23	43	23	43	I think the authors should mention also here (not only at line 39) that such weights are based on value judgements. [Jan Fuglestvedt, Norway]	This is assumed
12916	23	43	23	44	Why? Links with other effects? [Mustapha Meftah, France]	This is expanded on in the following sections
14979	23	47	27	2	This discussion is too detailed for this section. The authors should present only a framing within this chapter and save discussions on these specific impacts for chapter 3 [Farhan Akhtar, United States of America]	We are not discussing specific impacts in this section, but explaining key framing concepts
5695	23	49	23	55	The text here was seen earlier. Repetition should be avoided. [Hong Yang, Switzerland]	This is not discussed earlier, as we are specifically focusing on impacts
16118	23	50	24	2	It seems to me that the special situation of the Arctic simply has to be mentioned in this subsection--they are the prime example of the regional conditions exceeding the global average, and the consequences of this for the world will be very large, including as a result of sea level change, induced changes in mid-latitude weather, possible changes in the global ocean overturning circulation, and so on. Omission of the Arctic here is simply not plausible. [Michael MacCracken, United States of America]	There are several possible examples we could have used. We are just illustrating a point here. Chapter 3 will deal with impacts in detail
14201	23	52	23	53	If the average warming is 1.5oC, why would fewer instances be lower than higher? There's probably some deep statistical reason for this, but I don't see it, sorry. [Jason Donev, Canada]	This part of the sentence has been removed.
1818	23	53			fewer instances, lower) than the impacts of the 1.5°C warming at local/regional level. [Tibor Farago, Hungary]	This part of the sentence has been removed.
6039	23	53	23	54	I think it's a bit confusing to say that the time of occurrence of 1.5C will vary widely between regions. It makes sense, because it refers to "local" 1.5C, but it's confusing if read quickly, given the report's focus on the 1.5C global, and all the other things in the report about when 1.5C might occur globally. Suggest highlighting that it refers to local warming or removing. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	We now refer to regional warming
1069	23	53	23	55	Make it easy for media, this is what average people will really care about, when will my area reach 1.5c. Suggest putting this in bold: the time of occurrence of 1.5c above pre-industrial levels will vary widely for different regions, depending on different emissions pathways, with some regions, for example parts of Africa, warming faster than others. [Martini Catherine, United States of America]	This will be covered in the SPM
1819	23	54			levels will vary widely à levels vary widely ((explanation: it is already the situation for many regions – as already mentioned above in that section)) [Tibor Farago, Hungary]	We don't quite understand the point being made
5580	23	55			Figure 1.2 shows very little data over Africa due to data gaps. It remains unclear at this stage how a faster warming over parts of Africa is diagnosed. [Astrid Kiendler-Scharr, Germany]	This is from the references used at the end of the sentence, rather than Fig 1.2
2917	24	1			Replace "rainfall" by "precipitation" [Sabine Wurzler, Germany]	done
6628	24	1	24	2	Rainfall changes may differ not only for diferent seasons but also for different intra-regional locations within each of the geographical areas considered (that obviusly may be very wide to reduce them a manageable number. [Castor Muñoz Sobrino, Spain]	We already refer to regional differences earlier in the paragraph.
2460	24	2	24	2	add to end of sentence, ' resulting in arid and tropical zones expanding. [Lisa Lucero, United States of America]	This is not a point we are trying to make.
4420	24	5		14	How the 1.5C increases the occurrence of some extreme? What's the difference between 1.5C and 2.0C. [Jingyong Zhang, China]	Differences in extreme events between 1.5 and 2.0 is covered extensively in Ch3, we are simply introducing key concepts here.
2287	24	6	24	6	It can only be true that "any increase in global mean temperature implies substantial increases in the occurrence of some extreme events" if the climate system is balanced on a knife-edge. A vanishingly small perturbation of the climate system that induces a vanishingly small increase in global-mean temperature would not in general be expected to cause a substantial increase in anything. Some rewording of this sentence is needed. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	we now refer to "an increase in the global mean temperature by 1.5 or 2.0, " rather than "any increase"
10569	24	6	24	7	what is the scope to these conclusions? [Elemer Briceño-Elizondo, Costa Rica]	We don't understand the point
20079	24	9	24	10	While the number of cold extremes would decrease, the temperature on the coldest days of the year would display a particular large warming (see same study). From this point of view, while cold periods would have less risks of extreme cold days, they would display extreme risks of warm anomalies which are associated with different types of impacts (e.g. ice, snow and permafrost melting). Might be worthwhile to mention this as well. [Sonia Seneviratne, Switzerland]	Suggestion implemented
14202	24	9	24	9	"warming may also imply decreased occurrence of some extremes, such as cold extremes in high-latitude regions". Could the evidence/certainty language used elsewhere be used here? [Jason Donev, Canada]	Not here
1820	24	10			"impact of an additional 0.5°C warming" à impact of an additional /or further/ warming ((explanation: unclear what should be meant here under additional 0.5°C, i.e. additional to what?)) [Tibor Farago, Hungary]	We mean 1.5 versus 2.0. This has been clarified.
13662	24	10			This seems like a summary of results, elaborating too little on key concepts for the framing? [Elvira Poloczanska, Germany]	We disagree. We are not summarizing impacts of 1.5 here, but introducing concepts. The fact that some extremes become less frequent is important to explain.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5581	24	10			while the possibility of decreased occurrence of extreme events under a warming climate should be mentioned, it is unclear if the given example of cold extremes is the most relevant [Astrid Kiendler-Scharr, Germany]	The reviewer does not suggest what else would be more relevant.
13606	24	12	24	13	AND human cultures [Elvira Poloczanska, Germany]	Not sure what the reviewer means by human cultures.
13605	24	13	24	13	comment still relevant : impacts do not depend only on climate characteristics but also on socioeconomic characteristics that drive vulnerability [Elvira Poloczanska, Germany]	We already refer to vulnerabilities broadly
13283	24	15	24	30	Figure 1.4: Suggest using blue and brown colours for tropical and midlatitude, e.g. to indicate wetter and drier; red and blue elsewhere in the report is typically associated with temperature rather than precipitation. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13284	24	15	24	30	Figure 1.4: Consider switching the axes around (x-axis precipitation threshold; y-axis probability) - if intended inference here is that for a given threshold what is the probability of the threshold being exceeded, switching axes might be more intuitive for readers. (I found this seemingly simple graph, quite difficult to match up with the inferences in the text of the main report). Hence would be worth testing differences here. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13285	24	15	24	30	Figure 1.4: Explain in x-axis label or caption non-linear scale for probability, as this may not be intuitive for all report audiences. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13286	24	15	24	30	Figure 1.4: Integrate legend labels next to the lines, rather than in a separate box, as easier for people to associate each line with meaning. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
9472	24	15	24	33	Figure 1.4 and associated text: I suggest clarification is needed of whether this figure illustrates the generally expected behaviour for Tropical latitudes and for mid-latitudes. I particular, do you really expect a lower probablility of a particular precipitation threshold being exceeded at low latitudes under a fiture warmed climate than under today's climate? If not (ie if this is just a result for one study fron S America) I suggest you remove this figure and text as it could be misleading - or at the very least add a statement about whether or not this is just expected behaviour for the selected South American locations. [David Wratt, New Zealand]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
9254	24	16			Identify locations in Figure 1.4 itself [Cynthia Rosenzweig, United States of America]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
5582	24	16			Figure 1.4: Overall it is very difficult to understand the figure and the conclusion presented (modest versus large changes of risk) is not visualized in the figure. Consider different ways of plotting. [Astrid Kiendler-Scharr, Germany]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
3279	24	16			it might be easier to understand the graph if probability was increasing from 0 to 1 along the x-axis, rather than decreasing. That way, we would focus on the high probability events, rather than focusing in the bottom left as we do with the current graph layout. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
6448	24	16	24	18	Again the colours used in the lines should be changed for clarity. Also different symbols could be used instead of circles for all lines. [Jonny Williams, New Zealand]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
650	24	16	24	30	Figure 1.4 is hard to understand. Why is the tropical different from midlatitudes? [Zong-Ci Zhao, China]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
690	24	16	24	30	Figure 1.4 is hard to understand. Why is the tropical different from midlatitudes? [Zong-Ci Zhao, China]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
4255	24	16	34	1	Captions of figures 1.4 & 1.5 are repeated in the text. Reduced captions describing the figure will avoid this [Francisco Molero, Spain]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
17454	24	19			B [Tom Gabriel Johansen, Norway]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
17494	24	19			B [Angela Morelli, Norway]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
6040	24	19	24	19	It it really showing the "variety" of impacts. Perhaps: "Illustration of potential for contrasting impacts of 1.5C on extremes in different locations". [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
12240	24	19	24	19	What is figure 1.4 based on? [Jan Fuglestvedt, Norway]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
3366	24	19	24	30	Fig. 1.4. Place Fig after explanation of it in text and shorten up the caption considerable since already dealt with in text. The caption is actually a clearer description of Fig than text explanation. Need to rework both. Also see comments on fig on p.60 below. [Paul Doyle, Canada]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
12865	24	19	24	30	Most of the text in legent of Figure 1.4 is repeated in the main text (lines 24:32 to 25:2). It is suggested that after "1,5°C world" (line 21), just write "see the main text". [Jorge Carrasco, Chile]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
7293	24	19	24	30	The text for Figure 1.4 is exactly the same as lines 32-40 on page 24 and lines 1-2 on page 25. The text for the Figure should be deleted and a summary should be provided. [Eleni Kaditi, Austria]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13030	24	19	24	30	Fig. 1.4: source of the figure? [Caserini Stefano, Italy]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
16119	24	19	24	30	Two points: First, while I appreciated that this report is looking at possible future changes, I really think the preindustrial baseline for these stations also needs to be shown (as derivable from models as is the 1.5 C line) in order to show what changes have occurred so far and to provide context for understanding the further change. Second,I would think it would be useful to also have curves for a few other values of global warming, say 2.5 and 3.5 C (also derivable from models) to show where we are headed given the Paris Accord with present commitments (i.e., roughly 3.5 C) and what aggressive actions might realistically do (2.5 C) and so what difference might be made by bringing the GMST back toward a .5 C or 1.5 C temperature increase. Adding these additional curves would lead to a much richer description of the various types of situations that exist. I'd also note it would be nice if there could be curves shown for additional locations, such as in mid-latitudes or monsoonal locations. [Michael MacCracken, United States of America]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11676	24	19	24	40	Eliminate repeated text here and elsewhere...there are a few figure captions repeated in the text. [David Schoeman, Australia]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
5696	24	19	25	2	The caption of Figure 1.4 is repeated exactly in the following text. The repetition should be avoided. [Hong Yang, Switzerland]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
10366	24	19	25	2	Text underneath Figure 1.4 is a repetition of the caption for Figure 1.4. [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
4749	24	19	25	2	The cpation of Figure 1.4 and the following paragraph are mostly duplicative. [Ma Lijuan, China]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
11490	24	19	25	2	This example seems confusing and weakly contextualized regarding both the previous paragraph and de whole section. There would be useful add any sentence to better contextualize it. This topic is covered on the section 3.4.4.2.2, may be it would be possible to be more consistent with section 3.4.4.2.2 which is clear enough. [Meimalin Moreno, Venezuela]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
11491	24	19	25	2	It is not clear the source of the example and data provided here, it is a result from this report or it is fron a previous reference? [Meimalin Moreno, Venezuela]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
4513	24	20			Be specific with "two South American locations". [Radim Tolasz, Czech Republic]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13607	24	24	24	24	impacts 'of' or impacts 'at' 1.5°C? The heading uses 'at'. There is a semantic difference. This point was raised at 1.5 conference [Elvira Poloczanska, Germany]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13663	24	30	24	31	This needs to be in line with the conclusions from 1.2.1.1 [Elvira Poloczanska, Germany]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
15249	24	32	24	32	Please provide citations to the research underlying Figure 1.4 [Pauline Midgley, Germany]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
4907	24	32	24	33	In the text "Figure 1.4 shows the probability of daily rainfall exceeding a threshold in any given year in two South American locations.", please specify the corresponding two locations (or at least in Figure 1.4 caption), since there are large differences between the climates at a given mid-latitude location, depending if they are placed at low or at high altitude (Andes mountains). [Rubén Piacentini, Argentina]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
4908	24	32	24	33	The corresponding reference to the results shown in Figure 1.4 must be included in the figure caption and in the text. [Rubén Piacentini, Argentina]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
6041	24	32	24	40	Repetition (copy/paste) between main text and caption. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
12813	24	32	25	2	Text is a copy of the figure caption. [Thomas Stocker, Switzerland]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
4514	24	32	25	2	Same text as in Fig 1.4 description. [Radim Tolasz, Czech Republic]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
10420	24	32	25	2	repeats caption in 1-24 lines 19-30 [Jonathan Lynn, Switzerland]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13608	24	36	24	36	This statement assumes that 'objectivity' exists – this is an epistemological position! [Elvira Poloczanska, Germany]	The page and line number appear to be wrong for this comment. We assume this is referring to the use of the word "subjectivity", which is no longer used.
13664	24	40	24	40	please clarify this sentance, impacted from a climatological persective, does this mean only climate changes or does it mean detected and attributed impacts in ecological, economic and social systems? [Elvira Poloczanska, Germany]	We have clarified the sentence
13665	24	52			This seems like a summary of results, elaborating too little on key concepts or methods for the framing? [Elvira Poloczanska, Germany]	The page and line number do not match the comment.
890	25	2	25	2	It would be helpful for readers who haven't seen this type of figure to explain how to read this---the horizontal difference is the critical metric, I guess. [Sarah Gille, United States of America]	Figure 1.4 has been removed after consideration, but the overall concept is still explained in the text.
13666	25	2	25	3	In light of a regional cooling ocean , this mean value is biased. This means that such a statement is valid for a lot of countries or a large fraction of land mass. [Elvira Poloczanska, Germany]	Page and line number do not correspond, not sure what this comment is referring to
13667	25	3	25	4	This sentence is not clear – do you mean impacts of 1.5 global mean temperature can be regionally higher /lower or the regional temperature? [Elvira Poloczanska, Germany]	Page and line number do not correspond, not sure what this comment is referring to.
13668	25	4	25	4	And rates of warming which are important for coping and adaptation [Elvira Poloczanska, Germany]	Page and line number do not correspond, not sure what this comment is referring to.
4164	25	5		18	Increasing atmospheric carbon dioxide levels will also impact air quality and composition. Long-term changes in ocean heat will also lead to further coral degredation, disruption of ecosystems and marine life and potential for further ocean degredation through increased red tide events etc. [Michelle Leslie, Canada]	We of course agree. We are simply explaining that the drivers of impacts are not necessarily driven by temperature alone
3367	25	5	25	5	Sub-heading not precise. Suggest "Indirect impacts related to global warming" or something similar. [Paul Doyle, Canada]	We do not think the suggested heading is more precise
13092	25	5	30	15	General comment: pages 25-30 read more "fluently" than the preceeeding pages in this introduction. If an editor or author change occurred for this section I would recommend they do an 'overpass' for the rest of the chapter to improve expression - to bring the expression and style to the highest level possible. [Veryan Hann, Australia]	Noted
4421	25	7		8	The hydrological cycle highly depends on the change of temperature, therefore, the authors should present what's the hydrological cycle is not related to warming. [Jingyong Zhang, China]	We of course agree that changes in temperature affect the hydrological cycle. The sentence simply states that changes in the hydrological cycle affect precipitation.
13669	25	7	25	7	The rest of this paragraph discusses temperature only [Elvira Poloczanska, Germany]	This is not the case
11899	25	8	25	9	Oki and Kanae (2006) is a bit old. Citing new literature would be preferable. [Junichi Tsutsui, Japan]	More recent reference used
13031	25	10	25	11	It is important to contrast impact.. ; I agree but this is a value judgment - usually IPCC reports prefer more neutral statements. I suggest writing: Other impacts could be driven by… [Caserini Stefano, Italy]	Change implemented

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4422	25	11		12	What forcing is related to ice-sheet melt and sea-level rise except for warming? [Jingyong Zhang, China]	We are simply explaining that some impacts are due to long term accumulations whereas others are felt instantly
2563	25	15			Report"Changes in agricultural water availability caused by upstream changes in glacier volume are a typical example" but the infromation show in the text only discuss the irritaiton 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 thsese papers are very important for water demand under climate change, should also be cited in the text. Wang Xiaojun?Zhang Jianyun?Shahid Shamsuddin?Ouyang Rulin?Guan Tiesheng?Xue Jianguo?Zhang Xu?Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China?Mitigation and Adaptation Strategies for Global Change?2017?22?4??595–608? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Bi Shouhai?Forecasting industrial water demand in Huaihe River Basin due to environmental changes?Mitigation and Adaptation Strategies for Global Change?2017? Wang Xiaojun?Zhang Jianyun?Amgad ElMahdi?Shamsuddin Shahid?He Ruimin?Xia Xinhui?Jiang Zhuo?Impact of climate change on regional irrigation water demand in Baojixia irrigation district of China?Mitigation and Adaptation Strategies for Global Change?2016?21?2??233-247? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Xie Wei?Du Chaoyang?Shang Xiaochuan?Zhang Xu?Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics?Environment?Development and Sustainability?2016?1-14? Wang Xiaojun?Zhang Jianyun?Yang Zhifeng?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Liu Hongwei?Historic water consumptions and future management strategies for Haihe River basin of Northern China?Mitigation and Adaptation Strategies for Global Change?2015?20?3??371-387? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Mou Xinli?Potential impact of climate change on future water demand in Yulin city, Northwest China?Mitigation and Adaptation Strategies for Global Change?2015?20?1??1-19? [Xiaojun WANG, China]	The suggested inclusion of these papers is not justified.
2576	25	15			Report"Changes in agricultural water availability caused by upstream changes in glacier volume are a typical example" but the infromation show in the text only discuss the irritaiton 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 thsese papers are very important for water demand under climate change, should also be cited in the text. Wang Xiaojun?Zhang Jianyun?Shahid Shamsuddin?Ouyang Rulin?Guan Tiesheng?Xue Jianguo?Zhang Xu?Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China?Mitigation and Adaptation Strategies for Global Change?2017?22?4??595–608? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Bi Shouhai?Forecasting industrial water demand in Huaihe River Basin due to environmental changes?Mitigation and Adaptation Strategies for Global Change?2017? Wang Xiaojun?Zhang Jianyun?Amgad ElMahdi?Shamsuddin Shahid?He Ruimin?Xia Xinhui?Jiang Zhuo?Impact of climate change on regional irrigation water demand in Baojixia irrigation district of China?Mitigation and Adaptation Strategies for Global Change?2016?21?2??233-247? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Xie Wei?Du Chaoyang?Shang Xiaochuan?Zhang Xu?Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics?Environment?Development and Sustainability?2016?1-14? Wang Xiaojun?Zhang Jianyun?Yang Zhifeng?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Liu Hongwei?Historic water consumptions and future management strategies for Haihe River basin of Northern China?Mitigation and Adaptation Strategies for Global Change?2015?20?3??371-387? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Mou Xinli?Potential impact of climate change on future water demand in Yulin city, Northwest China?Mitigation and Adaptation Strategies for Global Change?2015?20?1??1-19? [Xiaojun WANG, China]	The suggested inclusion of these papers is not justified.

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2537	25	15			Report"Changes in agricultural water availability caused by upstream changes in glacier volume are a typical example" but the infromation show in the text only discuss the irritaiton 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 thsese papers are very important for water demand under climate change, should also be cited in the text. Wang Xiaojun?Zhang Jianyun?Shahid Shamsuddin?Ouyang Rulin?Guan Tiesheng?Xue Jianguo?Zhang Xu?Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China?Mitigation and Adaptation Strategies for Global Change?2017?22?4??595–608? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Bi Shouhai?Forecasting industrial water demand in Huaihe River Basin due to environmental changes?Mitigation and Adaptation Strategies for Global Change?2017? Wang Xiaojun?Zhang Jianyun?Amgad ElMahdi?Shamsuddin Shahid?He Ruimin?Xia Xinhui?Jiang Zhuo?Impact of climate change on regional irrigation water demand in Baojixia irrigation district of China?Mitigation and Adaptation Strategies for Global Change?2016?21?2??233-247? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Xie Wei?Du Chaoyang?Shang Xiaochuan?Zhang Xu?Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics?Environment?Development and Sustainability?2016?1-14? Wang Xiaojun?Zhang Jianyun?Yang Zhifeng?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Liu Hongwei?Historic water consumptions and future management strategies for Haihe River basin of Northern China?Mitigation and Adaptation Strategies for Global Change?2015?20?3??371-387? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Mou Xinli?Potential impact of climate change on future water demand in Yulin city, Northwest China?Mitigation and Adaptation Strategies for Global Change?2015?20?1??1-19? [Xiaojun WANG, China]	The suggested inclusion of these papers is not justified.
1150	25	16	25	18	Should reference Leonard et al (2014) which is one of the earlier papers on compound events [full citation: Leonard, M., Westra, S., Phatak, A., Lambert, M., van den Hurk, B., McInnes, K., Risbey, J., Schuster, S., Jakob, D. & Stafford-Smith, M., 2014, A compound event framework for understanding extreme impacts, Climatic Change 5(1), pp 113-125. [Seth Westra, Australia]	Citation added
15309	25	19	25	19	Climatic and anthropogenic changes with decreasing rainfall trends thea continuous gradual warming causing a progressive decline of average stream flow, impacting the water availability of east Mediterranean island states. In Crete, a indicative example of Mediterranean Island, the impact of climate change on the supply potential ranges from 51.3 Mm^3 to 75.4 Mm^3 under 2 C of global warming, depending on the RCP–SSP formulation (Koutroulis et al., 2016). Koutroulis, A.G., Grillakis, M.G., Daliakopoulos, I.N., Tsanis, I.K. and Jacob, D., 2016. Cross sectoral impacts on water availability at+ 2 C and+ 3 C for east Mediterranean island states: The case of Crete. Journal of Hydrology, 532, pp.16-28. [Manolis Grillakis, Greece]	This is not justified
2605	25	21	25	33	mention something re: climate feedbacks and system thresholds? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	It is not clear how this would fit in this section
6043	25	21	25	33	I think it is important to highlight natural variability as an important source of uncertainty in potential impacts at 1.5C. We tried to summarise sources of uncertainty in impacts of 1.5C in James et al. (2017) WIRES Climate Change. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Implemented
5092	25	21	25	33	What are the implications then of this uncertainty for the discussion of impacts? If not discussed later, what does the uncertainty imply for how direct climate impacts (drought, flood, etc) will affect vulnerable populations? What does this imply for the ability to prepare or the way in which drivers of vulnerability may matter more than the impact itself? [Tonya Rawe, United States of America]	This is discussed in Chapter 3
16120	25	21	25	33	I would think that key examples to mention regarding overshoot and return versus avoiding not exceeding a value would be the situations for the ice sheets (and so for sea level rise) and for biodiversity loss (as a result of both climate change and ocean acidification). These would be essentially irreversible losses and both deserve mention. [Michael MacCracken, United States of America]	This is covered in Chapter 3 and due to space limitations, we decided not provide a particular example here
20523	25	21	25	33	Should talk about uncertainty of changes in the scale and frequency of extreme weather events associated with 1.5 degrees, as well as uncertainty associated with extremes of human (e.g. Kates. R.W. et al, 2006, Reconstruction of New Orleans after Hurricane Katrina: A research perspective. PNAS, 103: 40, 14653-14660, doi: 10.1073/pnas.0605726103) and ecosystem responses (e.g. Palmer G et al. 2017 Climate change, climatic variation and extreme biological responses. Phil. Trans. R. Soc. B 372: 20160144. http://dx.doi.org/10.1098/rstb.2016.0144) associated with 1.5 degrees. It is these extremes rather than the general trends that should be the focus of this entire report and that will be defining of impacts on ecosystems and people, their responses and ability to adapt. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	This section is about sources of uncertainty. The inclusion of the suggested literature is not well justified.
13670	25	25			Risks in the WGII context is essentially the « risk of climate change impacts » ie interaction of hazards and vulnerability and exposure of human and natural systems (see WGII SPM and chp 19). See WGII glossary AR5. Please ensure consistancy across chapters in the use and definition of risk [Elvira Poloczanska, Germany]	The word risk is not used at the specified page and line number
6042	25	26	25	29	Sentence beginning "For example" is difficult to follow, suggest rephrasing. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Sentence clarified
13032	25	29	25	33	This sentence is awkward, please clarify [Caserini Stefano, Italy]	Sentence clarified
6449	25	33	25	33	A full stop is missing at the end of the sentence. [Jonny Williams, New Zealand]	Fixed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6044	25	36	25	36	This is a bit of a weird title. Suggested removing "different". Perhaps better to distinguish 1.3.1 as referring to physical climate, and 1.3.2. as refering to ecosystems. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	We agree. The section has now been renamed to "Impacts on ecosystems" - although this may still change through later edits of the entire chapter and report.
9631	25	36	25	48	Considering the evolution of species,natural adaptation of species is important process following climate change.in addtion,making full use of the natural adaptation process of species and ecosystems can improve the ability to adapt to climate change for biodiversity and ecosystem conservation. [Jianguo Wu, China]	This is true and now captured by some careful rewording. Chapter 3 should be dealing with evolutionary adaptation more concretely.
13671	25	38			This repeats the legend of Fig 1.4 word for word [Elvira Poloczanska, Germany]	Noted.
5093	25	38	25	40	Assuming the refernece to population dynamics is in regard to human population, along the same lines as the comment re: population growth, population dynamics do not alone impact ecosystems -- rather, population AND its consumption patterns will impact ecosystems. From an equity perspective, it's important to not oversimplify the pressure on ecosystems to "more people" and inadvertantly imply that fewer people is necessarily better. [Tonya Rawe, United States of America]	The reviewer is mistaken, this text is about populations of organisms, not people, and no implications for human population change are made. The language has been modified to avoid any false impression for this matter.
17834	25	38	25	48	This section could be strengthened by incorporating references after each statement made throughout the paragraph. [Wilfran Moufouma Okia, France]	Noted.
16121	25	38	25	48	Again, biodiversity loss deserves mention as irreversible, and also, quite likely, the complexity and resource provision of natural ecosystems--once torn apart, re-creation would seem to be quite unlikely, especially given the long development times of ecosystems. It seems to me that at least some of what is mentioned (e.g., carbon fluxes, etc.) is really more technical than should be included in this introductory chapter--what deserves most mention would seem to me to be what is most familiar to the main audiences of this report, which are impacts in ways that will affect sustainability and typical residents, etc. [Michael MacCracken, United States of America]	Some reference to biodiversity changes is now made, however we refrain from quick conclusions about reversibility. On the other hand, carbon fluxes are of direct importance for the climate system and have been a common topic in past IPCC assessments, considered "not too technical".
10570	25	42	25	48	Also important is to emntion the consequences of climate change to structure and succesional dynamics of very vulnerable ecosystems. The land cover might remain but it'll be subjected to slow degradation and replacement by other typs of species/cover or no cover at all in the long term. [Elemer Briceño-Elizondo, Costa Rica]	The revised text is now slightly more specific regarding the nature of the changes that may occur, however we have refrained from attempting to rank ecosystems by vulnerability.
17379	25	44	25	48	The sequestering capacity in oceans/coastal areas is higher than land based sinks, and sequestered for much longer, especially in seagrass areas - also severely under threat. Incorporating Blue Carbon as a Mitigation Action under the United Nations Framework Convention on Climate Change: Technical Issues to Address (Murray and Vegh, 2012) http://nicholasinstitute.duke.edu/sites/default/files/publications/blue-carbon-unfccc-paper.pdf [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Correct, we have now included seagrass ecosystems among those mentioned for important carbon cycle feedbacks (although the list remains of course still non-exhaustive).
10367	25	47	25	47	recommend 'temperate forest ecosystems' [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Instead, the list has been significantly expanded.
17835	25	48	25	48	Reference: Pan et al 2011. There are details missing from this paper in the lister of references. [Wilfran Moufouma Okia, France]	Taken into account.
6629	25	51	25	55	Fluviomarine and shallow marine ecosystems may be also strongly affected by changes in rainfall, which may affect the salinity, the water trophic status, the accrection of sediments with high organic matter content, the biogas generation (frequently methane), etc; and then modifying the local productivity and the coastal morphology, favouring the ocurrence of red tides etc [Castor Muñoz Sobrino, Spain]	This is true but corresponds to a rather minor effect at the global scale and is therefore not mentioned.
20524	25	51	26	3	Would benefit from concise broader explanation of the importance of indirect impacts. 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. https://www.gov.uk/government/publications/england-biodiversity-strategy-climate-change-adaptation-principles [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	We have included some wording for this, but the point is particularly important for the newly introduced subsection on ecosystem impacts of climate mitigation efforts.
2288	25	53	25	53	One can talk of "heavy rainfall events", but "heavy weather events" would perhaps be better called "severe weather events". [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Good point, however we have changed this now to "extreme weather events" which is even better.
20371	25	53	25	54	Not sure hurricane is the best example of an extreme event (with increased intensity / frequency presumably associated to climate change) that affect ecosystems. [Olivier Boucher, France]	Why not, it is an example among other possible ones. However we have adapted the language to make clear that it is the change in frequency or intensity that causes the change, not the hurricane itself (some ecosystems are well adapted to hurricanes).
4909	25	54	26	2	In relation to the text: "As stated in Section 1.3.1.3, ocean acidification is driven by increasing atmospheric CO2 concentrations (e.g., Hoegh-Guldberg et al., 2007), which then impacts marine ecosystems. In addition to these, human use or other human impacts play a major role which can even dominate over change in climate." Please, explain in more detail: "human use". [Rubén Piacentini, Argentina]	Yes, this has now been greatly reformulated and is hopefully more clear.
1821	26	1			human use or other human impacts play à human use of natural resources or other human impacts on ecosystems play [Tibor Farago, Hungary]	Yes, this has now been greatly reformulated and is hopefully more clear.
4423	26	1			Human use or other human impacts refer to what? [Jingyong Zhang, China]	Now made specific (agriculture, forestry, fisheries, urbanization, pollution … etc)
15308	26	1	26	1	Additional example of ecosystem impact driver can be found in the soil temperture which consists a controlling factor of biological processes that affects the soil respiration and hence the net carbon and nutrient flux from soils to the atmosphere (Andresen et al., 2015). This is of great importance especially for the permafrost areas that comprise 24% of the land in the northern hemisphere that consist a massive carbon pool sequestered during the Late Quaternary that can be emitted back into the atmosphere after a potential defreezing (Grillakis et al., 2016). Andresen L. C., S. Bode, A. Tietema, P. Boeckx, and T. Rütting. 2015. Amino acid and N mineralization dynamics in heathland soil after long-term warming and repetitive drought. SOIL. 1:341–349. 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 [Manolis Grillakis, Greece]	This is true but goes way beyond the ecological detail considered necessary for this framing chapter. We trust the reviewer has made his points also for chapter 3.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9632	26	1	26	18	how to certain delay reponse of ecosystem and biodiversity to climate change,evolution or genetic variation of species following climate change may be challenge [Jianguo Wu, China]	We do not understand this comment.
17836	26	1	26	2	human use or other human impacts play a major role which can 1 even dominate over change in climate please provide a reference for this statement. [Wilfran Moufouma Okia, France]	It seems unnecessary to point out that the creation of the world's agricultural lands represents a stronger forcing of ecosystem change than recent and historical climate change.
12814	26	1	26	3	Where is this assessed? A forward reference to within this report, or to a different report would be most useful. [Thomas Stocker, Switzerland]	We are surprised by this remark. Human land use still dominates changes in most of the world's ecosystems, although this may of course change with higher levels of climate change. We have nevertheless modified the language in order to indicate that such assessment will naturally depend on local and regional circumstances.
12815	26	6	26	18	This is an important subchapter but misses to mention the consequence of a sequence of extreme events. For example, a sequence of 1-sigma events can be as harmful, or even more harmful than a single 2-sigma event. For drought occurrence in the contet of 1.5 to 2°C warming this has been addressed recently by Lehner et al., 2017, doi: 10.1002/2017GL074117. [Thomas Stocker, Switzerland]	Extreme events are now mentioned with slightly better language, we hope. The actual assessment will have to take place in chapter 3.
20243	26	6	26	18	In the section on Cumulative impacts, permanence and irreversibility, the topic is barely discussed. More information on kinds of thresholds that could be crossed, phase/state changes, historical examples, etc. Also, this is an important category of inquiry for social dimensions as well as ecosystems dimensions but is not directly treated. [Joshua Loughman, United States of America]	For the framing, we merely want to point out that the cumulative impacts exist and need to be considered. It will be up to chapter 3 to discuss these more specifically - a full account of these aspects can probably only be given by AR6.
14928	26	6	26	18	I strongly suggest the discussion of ecosystem impacts and irreversibility be expanded. Coral reefs are surely not the only example of an ecosystem at risk from irreversible impacts due to overshoot! [Christopher Weber, United States of America]	The framing chapter only has the ambition to introduce these concepts. The actual assessment across different types of ecosystems will have to take place in chapter 3.
6045	26	6	26	18	Quite a lot of concepts here: premanence, irreversibility, overshoot, resilience. Perhaps warrants a couple more sentences to explain. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	We have removed permanence as it is not an ecological concept anyway, really. We have tried to explain the other terms somewhat better, space permitting.
1282	26	7	26	7	The term 'its parts' should read 'their parts'. [Colin Raymond, United States of America]	thanks.
891	26	7	26	7	its --> "their" [Sarah Gille, United States of America]	thanks.
1070	26	8	26	10	This is an excellent, world class scientific report. It will be important to highlight the human elements of it. Why should we care? How does science impact me? My family? My life? Make it easy for someone to see this through the science. Only 12% of human pop is science literate: Suggest putting the following sentence in bold:"in an assessment of cumulative human impacts to the California current marine ecosystems climate change was the top threat among several other anthropogenic factors [Martini Catherine, United States of America]	The IPCC assessment report is written for science-literate experts. We gladly acknowledge the existence of many public and private bodies and organizations that are doing a fantastic job to bring the findings of the IPCC to a broader audience.
4910	26	10	26	10	Add a "," before etc in the text: "anthropogenic factors (e.g., nutrient inputs, coastal engineering impacts etc.)." [Rubén Piacentini, Argentina]	thanks.
1283	26	13	26	13	A citation is needed regarding the speculation that ecosystem resilience may decline at higher levels of warming. [Colin Raymond, United States of America]	Taken into account.
2289	26	13	26	13	This sentence reads awkwardly. Should the "that" be moved so that it appears immediately before "the resilience"? [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Indeed, the whole sentence has been rewritten and should be less awkward now.
20525	26	13	26	18	Oliver TH, Isaac NJ, August TA, Woodcock BA, Roy DB, Bullock JM. Declining resilience of ecosystem functions under biodiversity loss. Nature Communications. 6: 10122. PMID 26646209 DOI: 10.1038/ncomms10122 ; Oliver TH, Heard MS, Isaac NJ, Roy DB, Procter D, Eigenbrod F, Freckleton R, Hector A, Orme CD, Petchey OL, Proença V, Raffaelli D, Suttle KB, Mace GM, Martín-López B, ... Bullock JM, et al. Biodiversity and Resilience of Ecosystem Functions. Trends in Ecology & Evolution. 30: 673-84. PMID 26437633 DOI: 10.1016/j.tree.2015.08.009 [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
3956	26	13	26	18	Suggest adding a pointer to the possiblity of ecosystems (or the individual organisms therein) being able to adapt, acclimate or migrate in the face of climate change [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	Yes this has been mentioned now in very general terms.
9849	26	14	26	14	You may wish to extend this defintion of resilience with the concept of ecological resilience (to maintain similar functioning and structure under change). As developed by Holling/Gunderson/Scheffer [Christopher Reyer, Germany]	We have made the wording slightly more generic but have not seen a strong enough reason to expand this further.
10571	26	14	26	15	There is research on the effect of current 0,5°C increase. A 2°C scenario is likely to enhace the adverse effects according to that research. [Elemer Briceño-Elizondo, Costa Rica]	The current increase is on the order of 1 degree already, but more importantly, we do not understand which research the reviewer wants us to refer to here.
2290	26	15	26	15	The sentence that begins in this line should start either with the words "An example is reef ecosystems" or with the words "Reef ecosystems are examples". [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Indeed, the whole sentence has been rewritten and should be less awkward now.
12954	26	17	26	18	It might be useful here to re-phrase the sentence to include the possibility that we might see an emergence of novel ecosystems. Hence, the reefs themselves might not recover as expected but might transform in the process to another similar but fundamentallty different system. This has implications then for eg marine based livelihoods in developing countries in particular, and to tourism sector both indirectly and directly. [Johanna Nalau, Australia]	There is very little literature about genuinely "novel" ecosystems, hence we prefer not to introduce this term here.
20526	26	19	26	19	At this juncture, it is important that there should be mention of need for adaptation actions in relation to ecosystems. See: Oliver, T.H.; Smithers, R.J.; Beale, C.M. and Watts, K. (2016) Are existing biodiversity conservation strategies appropriate in a changing climate? Biological Conservation 193, 17-26. Oliver, T.; Smithers, R.J.; Bailey, S.; Walmsley, C. and Watts, K. (2012) A decision framework for considering climate change adaptation in biodiversity conservation planning. Journal of Applied Ecology 49:6, 1247–1255. CORRIGENDUM: (2015) 52, 538–538. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	We recognize the wish of the reviewer that we may cite more of his papers but this would more appropriately have to occur in chapter 3.
20527	26	19	26	19	It would be beneficial if there was explicit mention of the relevant SDGs [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	We do not understand why section 1.3.2 should make such reference to SDGs, this is made elsewhere in the report.
20528	26	21	26	21	This section would also benefit from explicit mention of all relevant SDGs [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Will consider the suggestion and look for relevant references. The context of SDGs are discussed in section 1.4.
6048	26	21	27	14	Would IPCC risk framework be a useful framework for this section? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Yes.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20652	26	21	27	14	For all of section 1.3, consider treating this as an extension of the introduction of the four pathway types from section 1.2.3, providing more detail around the multiple dimensions of impacts for each pathway type (as much as possible). If this is not possible to group impact intensities with the four pathway categories, then consider moving section 1.2 BEFORE section 1.2.3 (more general introduced as a "why readers should care about the findings summarised in this special report / what's at stake in general at 1.5C). [Koko Warner, Germany]	Will check and consider when appropriate. Impacts and pathways are discussed in details in Chapter 3.
4729	26	23	26	24	There is increasing evidence that climate change is having observable and often disastrous effects on human communities. It would be more proper to state that the impacts of climate change have disastrrous effects, not the climate change itself. [Spyros Schismenos, China]	Disagree. The sentence remains as is.
6046	26	23	26	25	Is it worth explaining somewhere the difference between attribution to climate change (WGII) and attribution to anthropogenic climate change (WGI)? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Individual attribution is difficult to separate at this point in time. We can only make estimates.
5094	26	23	26	25	The reference to the effects of climate change coinciding with socio-economic and political constraints is very welcome. These factors are a lens or filter through which all climate change impacts will be felt. [Tonya Rawe, United States of America]	Yes, thank you.
16122	26	23	26	27	This seems a bit too jargony--why not give a few examples, like low-lying coastal environments, the Arctic, etc.? Your audience is concerned with real people's lives and livelihoods, not trying to figure out what "climate-sensitive physical conditions and socio-economic/political constraints" refers. [Michael MacCracken, United States of America]	Thank you. Will provide examples for greater clarity or rephrase the paragraph.
19665	26	23	27	2	section on the human dimensions of impacts at 1.5 and beyond. Given the statemnet made on page 4, line 7 about the incluison of more social science literature in this report - this section needs to be expanded and balanced with the section on physical impacts. [Tara Shine, Ireland]	This can not be expanded for lack of space. Will discuss with Please refer to Chapter 3 for more detailed discussion
19666	26	23	27	2	This section would benefit from the literature on the social dimesions of climate change and on the impacts of climate change on the enjoyment of human rights. Several texts explore the impacts of climate change on the full range of human rights e.g. http://www.wri.org/sites/default/files/climate_justice_equity_and_justice_informing_a_new_climate_agreement.pdf [Tara Shine, Ireland]	This can not be expanded for lack of space. Will discuss with See Chapter 5 for more detailed discussion
20530	26	23	26	27	This paragraph would be better condensed slightly to ensure greater clarity and coherence with IPCC AR5 definitions, which notably and very helpfully changed from AR1-4 in relation to vulnerability, e.g. that socioeconomic and political constraints relate to adaptive capacity, that vulnerabilities are a product of climate sensitivities x adaptive capacities, and that impacts are a product of vulnerabilities x exposure. Suggested new wording: "There is increasing evidence that climate change is having observable and often disastrous effects on people, especially where climate-sensitive biophysical conditions and socioeconomic/political constraints on adaptive capacities(IPCC 2014c; World Bank 2013; IPCC 2012a) combine to create high vulnerabilities. The character and severity of impacts depend not only on these vulnerabilities but also on their exposure to climate extremes." [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Changes were made in the text. Will change the text accordingly.
2461	26	23	26	27	Anthropological literature provides strong case studies and ideas for dealing with climate change. Several examples are in Fiske et al. 2015, of which I am one of the authors (I am a Maya archaeologist who studies the impact of climate change on societies and sustainable practices): Fiske, Shirley, Susan Crate, Carole Crumley, Kathleen Galvin, Heather Lazarus, George Luber, Lisa J. Lucero, Anthony Oliver-Smith, Ben Orlove, Sarah Strauss, and Richard Wilk 2015 Changing the Atmosphere: Anthropology and Climate Change. American Anthropological Association Climate Change Task Force Report, Arlington, VA. http://www.aaanet.org/cmtes/commissions/upload/GCCTF-Changing-the-Atmosphere.pdf [Lisa Lucero, United States of America]	Will evaluate the appropriateness of this concern for this sub-section. Will appreciate if the reviewer could provide the mentioned literature as the same was not found in the stated web site.
19667	26	23	27	2	Attention in this section also needs to be given to the differential impacts on men and women and differential societal impacts e.g. on vulnerable and marginalised communities. There is an important body of literature on the gender dimsisons of climate change and climate responses to be referenced here. [Tara Shine, Ireland]	Will mention this. However, there will be little details in this section as discussions of the different aspects of impacts and risks w are discussed in Chapter 3.
20529	26	24	26	24	Should state 'biophysical' not just 'physical'. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Sure. Thanks.
9255	26	25			Cite: Rosenzweig, C., Solecki, W., Romero-Lankao, P., Mehrotra, S., Dhakal, S., & Ali Ibrahim, S. (Eds.). (2018). Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge: Cambridge University Press. In Press [Cynthia Rosenzweig, United States of America]	This has been cited already.
13672	26	25			Some regional differentiation or more comprehensive consideration of types of ecosystems would be useful here. What about an analysis of system properties defining vulnerability? What are the methods of assessment? [Elvira Poloczanska, Germany]	Methods of assessment is covered by another section
9850	26	25	26	25	you may wish to add the latest Turn Down the Heat report which also includes a stronger social vulnerability under climate change section (see full ref below). The chapters of the TDTH report have also been updated and published as peer-reviewed papers in Regional Environemtal Change (Volume 17 Issue 6. Schellnhuber HJ, C Reyer, W Hare, K Waha, IM Otto, O Serdeczny, M Schaeffer, CF Schleußner, D Reckien, R Marcus, O Kit, A Eden, S Adams, V Aich, T Albrecht, F Baarsch, A Boit, N Canales Trujillo, M Cartsburg, D Coumou, M Fader, H Hoff, G Jobbins, L Jones, L Krummenauer, F Langerwisch, V Le Masson, E Ludi, M Mengel, J Möhring, B Mosello, A Norton, M Perette, P Pereznieto, A Rammig, J Reinhardt, A Robinson, M Rocha, B Sakschewski, S Schaphoff, J Schewe, J Stagl, K Thonicke (2014) Turn Down the Heat: Confronting the New Climate Normal. The World Bank, Washington [Christopher Reyer, Germany]	Will consider when appropriate.
5095	26	26	26	27	The reference to exposure, vulnerability, and adaptive capacity is unclear, given that vulnerability to climate impacts is generally understood to be a combination of exposure, sensitivity, and adaptive capacity. [Tonya Rawe, United States of America]	This was the previous IPCC vulnerability framework. AR5 is into the risk framework (risk is a function of hazard, exposure and vulnerability).
1822	26	27			vulnerability, resilience and adaptive capacity [Tibor Farago, Hungary]	This is not the IPCC framework (please see above).
20531	26	30	26	30	This section should mention ecosystem services and natural capital (e.g. see Millennium Assessment, TEEB etc), as a prelude to subsequent introduction of the idea of ecosystem-based adaptation (e.g. see https://www.iucn.org/theme/ecosystem-management/our-work/ecosystem-based-adaptation-and-climate-change). [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	This is elaborately discussed 1.3.2

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3327	26	30	27	2	I consider that governance is important in the sectoral impact and adaptive capacity, however always in the reports appear the States as responsible, if we review who integrates the State one of the elements is the population: in the IPCC reports make emphasis on the responsibility of each person, it would also be interesting a non-scientific guide but the population without experience in climate change understand in simple words the impact, similar to the policy brief of the decision makers.If we say it with simple words, people will not become aware of the increase of 1.5 degrees, SDG etc. [Fátima Castaneda, Guatemala]	The comment is not understandable.
9473	26	31	26	35	Please provide some literature references to support the statements made in this paragraph. [David Wratt, New Zealand]	Will attempt to find references.
12241	26	32	26	35	I feel that the point about spatial and temporal differences are repeated too often. Could be checked if some can be omitted. [Jan Fuglestvedt, Norway]	Done. Will review and reduce accordingly.
13033	26	32	26	35	This sentence is "The impacts… ...consequences" could be avoided, has been already repeated previously [Caserini Stefano, Italy]	Done. Will review and revise accordingly.
16123	26	33	26	34	Again, the connection to real people needs to be made, so I'd recommend inserting examples where one can. For change over 1.5 C, for example, specifically mention the Arctic (and elsewhere as appropriate). [Michael MacCracken, United States of America]	Will include examples as could possibly accommodated. However, this is a framing chapter, where the discussion of concepts/issues are more important
6047	26	35	26	35	I don't really understand the link between vulnerability and intergenerational consequences? Not very precise statement? What are "these impacts" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	References will be included
16124	26	35	26	35	What does "intergenerational consequences" mean? It] would help to give an example (perhaps sayingsomething like that future generations will not be able to live as their forbearers have lived, disvaluing traditional indigenous knowledge, practices, and ceremonies). [Michael MacCracken, United States of America]	Well taken. Will consider as far as available references allowed as well as the pages restriction
1649	26	37	126	39	I would also add "professional technical capacity" to the list. The adaptive capacity of architects, engineers and building owners/managers to incorporate resilience and adaptive techniques is a central challenge. See, Keenan, J.M. (2015). Adaptive Capacity of Commercial Real Estate Firms to Urban Flooding New York City. Journal of Water and Climate Change, 6(3), 486-500. [Jesse Keenan, United States of America]	Professional and technical capacity is one of the specific categories of adaptive capacity. There are other specifics, such as economic, education policies, organizational and institutional types of adaptive capacities.
4920	26	37	26	43	A forthcoming white paper from the US Global Change Research Program (anticipated publication via globalchange.gov is October 2017) on interdisciplinary social science approaches to vulnerability will provide highly relevant background for this section. This paper will include discussion of how vulnerability of a community can have deep historical roots. Both tangible and intangible cultural heritage can help explicate this vulnerability. As well, attention climate impacts on and adaptation efforts for tangible and intangible cultural heritage can help address equity, social justice, and support community coherence and resilience. [Marcy Rockman, United States of America]	Very helpful comments. Will see how the paragraph can be modified to take this into account. Will need a copy of the mentioned reference.
16492	26	37	26	43	Need to add impacts on human health and wellbeing here, refer to the work carried out by the Lancet Countdown (http://www.lancetcountdown.org/) tracking the connection between Climate Change and Health see Watts et al 2016 for more details (http://www.sciencedirect.com/science/article/pii/S0140673616321249). [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Will mention as an example. Details would be placed are found in appropriate chapter (e.g. Ch 3 impacts)
5096	26	37	26	43	reference to governance capacity is helpful and welcome; discussion of adaptive capacity would benefit from reference to capacity of individuals (not just sectors). Could consider a brief discussion point on what shapes a person's adaptive capacity (e.g. access to resources, information, livelihoods options to adapt -- this flags the underlying role of inequality in access as a driver of vulnerability). This would be particularly useful in light of the reference in the line 24-25 to socio-economic and political constraints and the reference on pg 27, line 6, to the most vulnerable being affected most. Understanding at least at a surface level what drives that vulnerability would help tee up discussion later in greater depth. Further, the discussion of urban vulnerability seems out of place, given the complexity of factors that shape vulnerability and adaptive capacity. Some in urban environments would be far less vulnerable than some in rural environments. Or not. The factors are far more complex than urban vs. rural. [Tonya Rawe, United States of America]	Good point. We need to look for appropriate references.
1904	26	39	26	43	I would strongly recommend mentioning that adaptive capacity to 1.5C is likely to manifest very differently from the capacities required to adapt to 2-4C+. This does not come across clearly in the chapter but is an important distinction in clarifying adaptation to different degrees of warming. [Lindsey Jones, United Kingdom (of Great Britain and Northern Ireland)]	Covered in Ch 3
13673	26	40			Some regional differentiation or more comprehensive consideration of types of ecosystems would be useful here. What about an analysis of system properties defining vulnerability such as organism sensitivity according to physiological principles? What are the patterns of adaptation and limits to adaptation for organisms and ecosystems ? What are the methods of assessment? [Elvira Poloczanska, Germany]	Discussed in section 1.3.12 on ecosystem.
4826	26	41	26	42	Why single out highly populated urban regions as special sites of equity and justice questions? Communities likely to be entirely displaced by CC have equally im if not more urgent, justice-claims. See Draper, J. and McKinnon, C., 'The Ethics of Climate Induced Displacement and Resettlement under review at WIRES Climate Change. [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Will improve the phrase/sentence to reflect the reviewer's concerns.
5213	26	41	26	43	… poses several equity, social justice, and sustainable development issues. The statement is given without references. The references are either missing or the statement is given here as an opinion without reference. This should be referenced. [Arthur Lee, United States of America]	Will include references.
16125	26	42	26	42	several does not seem like it really is the best word choice--are there only several, etc. How about saying something like "a range of intercoupled issues involving equity, social justice and sustainable development"? [Michael MacCracken, United States of America]	Thank you. Will consider the suggestion.
13674	26	42	26	43	Worth mentioning physiological tolerances here. Ecosystem can respond at many levels from genes to community eg Scheffers et al 2016 Science 354 for discussion [Elvira Poloczanska, Germany]	Please see Section 1.3.2. Reference to ecosystem will be moved to section on the Ecosystems.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14357	26	43	26	43	Italy and the Netherlands are the most freshwater-sensitive EU28 countries at a 1.5oC warming, due to the high dependency of agriculture on irrigation and the relatively high water demand in total (domestic, industrial, and agricultural sectors) of the former, and the higher sensitivity in terms of population density for the latter country (Koutroulis et al., 2018) Koutroulis, A.G., Papadimitriou, L.V., Grillakis, M.G., Tsanis, I.K., Wyser, K. and Betts, R.A., 2018. Freshwater vulnerability under high end climate change. A pan-European assessment. Science of The Total Environment, 613, pp.271-286. [Ioannis Daliakopoulos, Greece]	Irrelevant to this subsection
15310	26	43	26	43	According to Koutroulis et al., (2018), Italy and Netherlands are the most freshwater-sensitive EU28 countries at a 1.5oC warming, due to the high dependency of agriculture on irrigation and the relatively high water demand in total (domestic, industrial, and agricultural sectors) of the former, and the higher sensitivity in terms of population density for the latter country. Koutroulis, A.G., Papadimitriou, L.V., Grillakis, M.G., Tsanis, I.K., Wyser, K. and Betts, R.A., 2018. Freshwater vulnerability under high end climate change. A pan-European assessment. Science of The Total Environment, 613, pp.271-286. [Manolis Grillakis, Greece]	Irrelevant to this subsection.
13675	26	44	26	45	Give an example e.g. larval phase of many fish species compared to adult phases [Elvira Poloczanska, Germany]	Will check and consider when appropriate.
13676	26	45	26	45	Change to eg forests (please provide citation) rather than notably forests, as long-term successional processes are found in many other ecosystems [Elvira Poloczanska, Germany]	For consideration and will include references, if any.
15251	26	45	26	45	Are you sure that the desired reference for projected risks and impacts is IPCC 2013, the WGI AR5 SPM, rather than the WGII AR5 SPM (2014a/c)? [Pauline Midgley, Germany]	Will check. Correction made.
16126	26	46	26	47	I'd suggest changing to "heat extremes, bleaching of coral reefs, and more." I do not see why one would have "or". [Michael MacCracken, United States of America]	Editorial
7719	26	47	26	47	Change “analysis” to “analyses” [Hilary Inyang, Nigeria]	Editorial
16127	26	47	26	47	Change "analysis" to "analyses"--should this not be plural like "studies"? [Michael MacCracken, United States of America]	Editorial
2084	26	48	26	50	Who is the audience? Can, e.g. “non-linearity” be assumed to be understood by the readership? Its a complex (excuse the pun) concept! Does it need unpicking? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Point well taken. Will consider ways of simplifying the language.
6049	26	50	27	1	What does this mean? "non-linearity may ensue from the framing of the investigated question" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	This paragraph will be sub-section has been modified.
16128	26	50	27	2	Hansen et al., based on the shifting distributions of summertime NH land surface temperature anomalies, has found that the likelihood of what were three-sigma warm episodes based on the 1951-80 normals has increased from about 0.1% to about 10% (and his curves even seem to show the recent occurrence of what would have been a five-sigma event. This is clearly very nonlinear. Traditional practice of updating the three-decade baseline normal tends to hide this very important non-linearity. As I commented for the IPCC climate extremes report, this practice of updating normals may make sense with a stable climate, but it makes little sense in a changing climate given that different aspects of the environment and society came into (and come into) being based on different normals. For example, the boundaries of urban areas and sea level were based on a normal of perhaps the 19th or earlier centuries; forest development and landscapes may be based on several century normals; soil development has an even longer baseline. Thus, it seems to me that this discussion of non-linearity is overly optimistic--and have not really been adequately examined. [Michael MacCracken, United States of America]	This paragraph will be sub-section has been modified.
13677	27	1	27	1	Rainfall impacts coastal marine systems as well [Elvira Poloczanska, Germany]	Agreed.
13678	27	1	27	15	This paragraph needs clarification : my interpretation of what you are trying to convey here and in first paragraph of the section below is : ecosystems are complex and are influenced by climatic, biotic and other variables at a range of temporal and spatial scales, impacts can be additive, synergistic or antagonistic. Other non-climatic human drivers eg exploitation, land use, can dominate and increase difficulty of detecting and attributing climate-driven change (see WGII chp 18) [Elvira Poloczanska, Germany]	This paragraph will section has been be modified.
17837	27	1	27	2	The reference Whan et al 2015 only focuses on temperature and soil moisture thresholds. Perhaps another reference could be added as well as Whan to strengthen the more wide-rangeing statement said before? "non-linearity may ensue from the framing of the investigated question, for instance when using threshold-based indices to define extreme events" [Wilfran Moufouma Okia, France]	Well taken and will search for other references
3328	27	1	29	3	Poor description of Justice, Poverty and Sustainable Development, just as it emphasizes graphs etc., these elements must be developed but in depth with elements of SDG poverty reduction. The question should be: Why is it useful to consider the IPCC elements for poverty reduction? [Fátima Castaneda, Guatemala]	This part of the subsection is now subsumed with Section 1.4
19668	27	5		14	This section needs to be expanded to reflect the growing literature on the justice and equity dimensions of climate change. [Tara Shine, Ireland]	The expanded discussion is in another section of chapter 1 and Chapter 5.
20532	27	5	27	14	This paragraph should also mention that the most vulnerable segments of society are vulnerable due to their greater immediate reliance on benefits from ecosystem services delivered by biophysical resources that are degraded, climate sensitive, and/or inaccessible due to lack of land rights (e.g. http://www.fao.org/docrep/017/i1688e/i1688e.pdf). The paragraph should also pay heed to the fact that developed countries are not immune from extreme events and are tall 'houses of cards' that have furthest to fall (e.g. Hurricanes Katrina, José and Irma). [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	See section 1.2.2
1103	27	5	27	14	I miss references to the relationships with security, conflict and migration in the chapter (about which an increasing amount of literature is becoming available) which seems relevant in a SD context. Maybe add here. [Rob Swart, Netherlands]	For consideration See Section 1.4.
16493	27	5	27	14	Gender vulnerability in relation to disasters and climatic shocks should probably be specified here e.g. more women die in cyclone strikes, heat waves, more women suffer from food insecurity etc. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Chapter 3 takes on the climate change impacts in more details. We can mention though in this section about differential vulnerability which results from gender among others
1169	27	5	27	14	This discussion should be more specific to 1.5C (i.e. see risk tables in Ch13 WGII and link to section 5.2). Should also include impacts of climate response measures (adaptation and mitigation) on poverty, equity, justice and sustainable development (link to sections 5.3 and 5.4). Any new references here that help with the framing? [Petra Tschakert, Australia]	Discussed in section 1.4

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17319	27	5	27	14	Title of this paragraph is too borad. In addition, it could be better to move this paragraph to the following section (1.4), which discusses the impact of 1.5? more detailed with consideration for ethics and equity. [Young-Hwan Ahn, Republic of Korea]	This subsection will be improved, modified or moved to another section. (applicable to comment lines 1902 to 1924).
5097	27	5	27	14	This paragraph is where a discussion of some of the other factors driving vulnerability would be beneficial (again). There is refernece to vulnerability & adaptive capacity, without the benefit of a clearer discussion of the factors that shape both. And the paragraph quickly pivots to economic growth, which curtails the discussion of what shapes vulnerabiulity and adaptive capacity. See comment above, re: pg 6, line 54, regarding the inadequacy of only referencing economic poverty or unequal income distrubution. And see comment above, re: pg 26, line 23-25, regarding the welcome refernece to socio-economic and political constraints. Without a more nuanced discussion that extends beyond economic growth, the last sentence and refernece to multi-dimensional inequalities does not convey as much information as it could. References to gender inequality as an example may be helpful -- or a brief (2 sentence) discussion of how gender can impact vulnerability, quite differently for men and women, rendering one more vulnerable than the other or vice versa in different circumstances. [Tonya Rawe, United States of America]	Section has been rewritten
2085	27	6	27	14	Accurate discussion of “poverty, equity, justice and sustainable development" but too succinct? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Thanks.
2291	27	6	27	6	Perhaps a word other than "vulnerable" can be used in this line. The point is being made that those who are must vulnerable to other threats are those that also tend to be most vulnerable to climate change. By definition of the word vulnerable, climate change disporportionately effects those segments of society that are vulnerable to climate change. Maybe "impoverished", "disadvantaged" or some similar word could be used instead of "vulnerable. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Editorial
1071	27	6	27	7	Important to make stories of vulnerable communities accessible to amplifiers. Suggest putting the following in bold: Climate change disproportionately affects the most vulnerable segments of society, in both urban and rural areas [Martini Catherine, United States of America]	Done
9537	27	7			delete last) [Shuzo Nishioka, Japan]	Editorial, done.
9563	27	7			delete last) [Shuzo Nishioka, Japan]	Editorial, done.
892	27	7	26	7	Impacts can be cumulative (Halpern et al. 2008) and their total impact: This seems to refer to "the total impact of impacts". Perhaps this can be reworded. For example "Impacts can be cumulative, and their net effect ...." [Sarah Gille, United States of America]	For consideration and will include references, if any.S1913
15252	27	7	27	7	copy edit: double end parentheses on citation; delete one [Pauline Midgley, Germany]	Editorial, done.
9851	27	7	27	7	you may wish to add the latest Turn Down the Heat report which also includes a stronger social vulnerability under climate change section (see full ref below). The chapters of the TDTH report have also been updated and published as peer-reviewed papers in Regional Environemtal Change (Volume 17 Issue 6. Schellnhuber HJ, C Reyer, W Hare, K Waha, IM Otto, O Serdeczny, M Schaeffer, CF Schleußner, D Reckien, R Marcus, O Kit, A Eden, S Adams, V Aich, T Albrecht, F Baarsch, A Boit, N Canales Trujillo, M Cartsburg, D Coumou, M Fader, H Hoff, G Jobbins, L Jones, L Krummenauer, F Langerwisch, V Le Masson, E Ludi, M Mengel, J Möhring, B Mosello, A Norton, M Perette, P Pereznieto, A Rammig, J Reinhardt, A Robinson, M Rocha, B Sakschewski, S Schaphoff, J Schewe, J Stagl, K Thonicke (2014) Turn Down the Heat: Confronting the New Climate Normal. The World Bank, Washington [Christopher Reyer, Germany]	Taken into account.
4424	27	8		10	How climate change is projected to slow down economic growth? [Jingyong Zhang, China]	Will add examples to make this statement more understandable.
6605	27	8	27	10	There is an implicit assumption in this paragraph that economic growth alleviates poverty and supports sustainable development. This needs to be acknowledged for the reasons given in comment 2 above - that the issue is presented as conceptually closed. [Emily Tyler, South Africa]	What is comment 2?
5214	27	8	27	10	Climate change is projected to slow down economic growth and make poverty reduction more difficult … This assessment contradicts the statement made later in lines 23-26. If climate change is projected to only slow down economic growth and makes poverty reduction more difficult, then mitigation should only help contribute to climate change response favorably. This assessment needs to assess whether there is literature that shows climate change may also have no impact or even help with economic growth in some instances. For example, would a longer growing season in some instances help with growth in an agricultural economy. That kind of question needs to be answered in a more comprehensive assessment. [Arthur Lee, United States of America]	Maybe among other things? In any case, will look up for additional references to support the assessment.
1650	27	9	27	9	Given the percent (%) costs associated with adaptation in places like Africa. I believe stronger language is warranted. For instance, instead of saying "slow down," I would say "slow down or stall." See, De Cian, E., Hof, A. F., Marangoni, G., Tavoni, M., & van Vuuren, D. P. (2016). Alleviating inequality in climate policy costs: an integrated perspective on mitigation, damage and adaptation. Environmental Research Letters, 11(7), 074015. This is also consistent with the language on page 28, line 32. [Jesse Keenan, United States of America]	Will access the suggested reference and modify the language if necessary.
6050	27	10	27	12	This sentence, taking the conclusion from the World Bank report, sounds as if like we already know the answer to the questions about avoided impacts 1.5C? Suggest removing this sentence: it answers a question that has still to be assessed in Chapter 3. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Point well taken.
13034	27	10	27	12	That all these adverse impacts could be avoided holding warming below 2°C ha to be demonstrated and is an objective of this Special report. I suggest not to rely on a Wold bank report for such an important statement [Caserini Stefano, Italy]	Well taken. Additional references will be accessed, if available.
16129	27	11	27	11	While "could be avoided" is inside a quote, that is too strong a statement--this might better have said "could be limited" or something similar. [Michael MacCracken, United States of America]	Editorial/ language/ style
13679	27	11	27	11	Addressing vulnerability seems relevant here. [Elvira Poloczanska, Germany]	Thank you
13680	27	11	27	11	Or less…this discussion is not well developed eg see Crain et al 2008 Interactive and cumulative effects of multiple human stressors in marine systems, Ecology Letters 11 or Fulton 2011 Interesting times: winners, losers, and system shifts under climate change around Australia, ICES J of Marine Science 68 [Elvira Poloczanska, Germany]	Section 1.3.2 deals with impacts on ecosystems
3131	27	17			section 1.4 should be shortened to about 2 pages, at most, since most of these issues will be repeated later in the report. [Richard Rosen, Germany]	Rejected: the goal of chapter 1 is to set the stage for the rest of the chapters, and there fore the points in the scoping outline, which are in section 1.4, need to be included.

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13681	27	17			Box 3.6 in Chapter 3 discusses coral reefs, refer to this and ensure consistency with chp 3 assessment [Elvira Poloczanska, Germany]	not sure to what this is referring
9964	27	17			Section 1.4: As "equity" and "fairness" depend on societal values and these differ, it is necessary to introduce the definition of these terms in the main text of the document (onad not only in the glossary) and to secure a consistent treatment all along the report [Carmenza Robledo Abad, Switzerland]	Accepted - this is now done in section 1.1.1
20537	27	17	27	17	At some point in this chapter it is absolutely vital that due regard is given to the North-South divide in research and its implications for policy and practice. Blicharska, M.*; Smithers, R.J.*; Kuchler, M.; Agrawal, G.K.; Gutiérrez, J.M.; Hassanali, A.; Huq, S.; Koller, S.H.; Marjit, S.; Mshinda, H.M.; Masjuki, H.H.; Solomons, N.W.; Van Staden, J. and Mikusi?ski, G. (2017) Steps to overcome the North-South divide in research relevant to climate-change policy and practice. Nature Climate Change, 7(1), 21-27. *These authors contributed equally to this work. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Noted - This evolving matter is referenced through the chapter.
2462	27	17	27	32	highlight the critical importance of the need to take into account the intersection of climate change and sustainability goals [Lisa Lucero, United States of America]	agreed, the text was edited to reflect this
1823	27	18			with consideration for justice, ethics and [Tibor Farago, Hungary]	the title reflects the given outline - it was not changed
5215	27	23	27	26	The IPCC AR5 acknowledged that 'adaptation and mitigation have the potential to both contribute to and impede sustainable development, and sustainable development strategies and choices have the potential to both contribute to and impede climate 26 change responses' (Denton et al. 2014). This statement contradicts the statement made earlier in lines 8 to 10 on the same page. If climate change is projected to only slow down economic growth and makes poverty reduction more difficult, then mitigation should only help contribute to climate change response favorably. This assessement needs to assess whether there is literature that shows climate change may also have no impact or even help with economic growth in some instances. For example, would a longer growing season in some instances help with growth in an agricultural economy. That kind of question needs to be answered in a more comprehensive assessment. [Arthur Lee, United States of America]	agreed, as a framing chapter these issues are not extensively dealt with here
20533	27	24	27	26	Without mention of maladaptation, this statement is nonsense if one refers to the IPCC AR5 definition of adaptation; 'The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects'. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	agreed, the text was edited to make more consistent
16130	27	24	27	27	The word "mitigation", used twice in these few lines, is a bit problematic. In the IPCC context it presumably means emissions reduction, but in normal usage and the disaster reduction community it means steps to moderate the impacts of climate change. I would really suggest avoiding the term and using other words to get across what is meant here. [Michael MacCracken, United States of America]	understood, the term is used widely in the report and will likely remain, but made its use more specific and concise
13682	27	25			This seems like a summary of results, lacking a consideration of key concepts for the framing? The concept of adaptation needs elaboration, as well as adaptation capacity and limits to adaptation. [Elvira Poloczanska, Germany]	agreed, the text was edited to reflect this
1824	27	28			may differ amongst all world regions and various countries. [Tibor Farago, Hungary]	agreed, the text was edited to reflect this
12955	27	31			Consider whether this could address both sustainable development and disaster risk reduction given that Paris, Sendai and SDGs are supposed to be implemented in an integrated manner. [Johanna Nalau, Australia]	Good point. We will consider and add appropriate text
16131	27	31	27	32	Agreed, but the availability of financial resources and the stability and degree of climatic/ecological services (and so opportunity to build up empiricaland technical knoweldge, etc.) must also be paramount as well. This items mentioned in this list certainly matter, but to me seem secondary to having an environment of value to be sharing and capable of development at all. If indeed Middle Eastern nations have a climate so warm that people cannot survive outside of air-conditioned buildings, the process aspects will be secondary as they likely seek to flee the region. [Michael MacCracken, United States of America]	agreed, text associated with this issue is added elsewhere in this section
20534	27	32	27	32	More fundamentally, "A healthy, properly functioning natural environment is the foundation of sustained economic growth, prospering communities and personal wellbeing." (UK Natural Environment White Paper 2011) [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	agreed, text associated with this issues is added elsewhere in this section
19669	27	34		43	This section omits social feasability and ethical feasabilty. [Tara Shine, Ireland]	Agreed. This is theme is picked up significantly in 1.4.1
12939	27	34	27	43	The framing chapter can avoid in mnay places explanations such as these whole paragraph and leave it for chapters to take up [Joyashree Roy, India]	agreed, we have trying to shorten and condense
15253	27	35	27	35	I suggest "This report defines feasibility ..." in place of "The report defines the feasibility ..." [Pauline Midgley, Germany]	agreed, the text was edited to reflect this
13683	27	37	27	38	In light of a much cooler ocean co-defining the mean of 1.5°C, this mean value is biased . This means that such a statement is valid for a lot of countries or a large fraction of land mass. [Elvira Poloczanska, Germany]	agreed, the text was edited to make more consistent
17838	27	38	27	38	Reference: IPCC 2013a is not listed in the references (it is IPCC 2013). [Wilfran Moufouma Okia, France]	agreed, the text was edited to reflect this
16132	27	39	37	41	Regarding this issue of "economic feasiblity", it somehow needs to be noted that when facing a systemic threat, the notion of economic feasibility really tends to get changed. Every nation had to change what the amount of money devoted to national and international security to fight World War II--this upended and overturned the economies of its participants. The threats and damage from climate change are going to become paramount for a number of socieites and this is going to change what is considered economically feasible. The point needs to be made in this paragraph that the various feasibilities can change: technological by the degree of investment in research and promotion of uptake of the technology; economic feasibility will be affected by the degree of impacts being felt or (hopefully) just projected; and institutional feasibility can also change depending on the degree or impact being felt and the quality of leadership and foresight. As presently phrased, the paragraph makes it seems as these aspects are unchangeable--and this is simply not the case. [Michael MacCracken, United States of America]	agreed, aspects of feasibility are extensively dealt within in the section in box 1.3
1651	27	40	27	41	This is a run-on sentence and should be separated into two sentences at the conjunction. [Jesse Keenan, United States of America]	agreed, the text was edited

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5099	27	40	27	41	reference to "environmental damages" rendering some pathways not socially acceptable -- more than environmental damages may render something social unacceptable. i.e. cultural damages or infringement on livelihoods -- for example in the land sector where land tenure (formal or customary) is uncertain or where pastoral livelihoods are a core part of cultural identity. Worth expanding that reference to environmental damages to include social or cultural damages. This will help make concrete (again) the multi-dimensionality, trade-offs, and feasibility issues. [Tonya Rawe, United States of America]	agreed, the text was edited to reflect this
15254	27	43	27	43	It seems odd for there to be a reference in this sentence to the WGI AR5 Glossary (Planton 2013). Not obvious what is being defined and not typical WGI vocabulary. Please check this is really what was intended here [Pauline Midgley, Germany]	agreed, the text was edited
17839	27	43	27	43	Is this the correct reference? Planton 2013 refers to the WGI AR5 Glossary, which does not include the terms institutional or feasible. [Wilfran Moufouma Okia, France]	agreed, the text was edited
21307	27	46			Section 1.4.3 - this section could link up with earlier material - (section 1.1) (see my general comments above) - it is much better written, thorough and helps set out a clear storyline for the chapter/report. You might want to integrate some discussion of a "human rights" perspective. For a brief discussion in the context of climate change and SDGs you can see: Shine, T. and G. Campillo (2016), "The Role of Development Finance in Climate Action Post-2015", OECD Development Co-operation Working Papers, No. 31, OECD Publishing, Paris. http://dx.doi.org/10.1787/18a859bf-en [Jan Corfee-Morlot, France]	Noted - Some text has been moved up
5697	27	46	29	3	Issues relating to justice, equity and ethics are scattered in a number of places and some contents are repetitive (e.g., section 1.3.3.2). Should be streamlined and focused on what are special concerning the 1.5C warmer world compared with other degrees of warming. [Hong Yang, Switzerland]	Noted - Text moved up.
9538	27	46	29	3	It is better to shorten and focus more on differences on 1.5 degree and 2.0. Present description is rather general. Please point out some important specific points of 1.5 case for helping audiences to understand its importance. [Shuzo Nishioka, Japan]	Noted - text has been revised to reflect this distinction.
9564	27	46	29	3	It is better to shorten and focus more on differences on 1.5 degree and 2.0. Present description is rather general. Please point out some important specific points of 1.5 case for helping audiences to understand its importance. [Shuzo Nishioka, Japan]	Noted - text has been revised to reflect this distinction.
12243	27	46	29	3	I find this section essential. But in order to make it accessible for a broader audience I suggest some shortening and sharpening. [Jan Fuglestvedt, Norway]	Noted - some text has been moved up
16494	27	46	29	3	There is nothing in this section describing Trapped Populations, only references to forced migration and displacement, this is an important gap. Impact on the most vulnerable will not only be observed among those who move but also among those who 'cannot move' and end up trapped. There is a large body of literature describing this coming out of the UK Gov-led 2011 Foresight Report and thereafter by key migration scholars such as Black and Collyer 2014, Black et al 2011, Black et al 2013, Adger et al 2015, Geddes et al 2012, Geddes 2015 and more. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Noted - However, while we make a single reference to migration, much of the discussion in the section is about vulnerability in the broader sense, affecting the range of vulnerable communities. The discussion around adaptation is not only about migration as an adaptation strategy, but also addresses adaptation challenges of all populations.
16495	27	46	29	3	This section also potentially need to adress the development of adaptive capacity more critically and look into the dangers and potential hidden agendas coming out of the change in language, e.g. (1) people are no longer coping but adapting, (2) they are no longer adaptive but more or less resilient e.g. bouncing back. There is plenty of literature addressing how such change in language and framing may end up adding onto people's vulnerability instead of supporting them, see, for example, Erikson et al 2015 (http://www.sciencedirect.com/science/article/pii/S0959378015300509) and Cannon and Muller-Mahn 2010 (https://link.springer.com/article/10.1007/s11069-010-9499-4). [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Noted - these issues are coved in depth in Chapter 5.
15018	27	46	29	3	As noted, human rights and justice are not matters that should be addressed in this report. Moreover, this section conflates a variety of different topics -- human rights, ethics, justice -- in a manner that is confusing and does not advance the IPCC's scientific mandate. In addition, certain portions of this - such as lines 8-10 on page 28, lines 35-36 on page 28 - are overly policy prescriptive; and some sections of this appear to recite policy arguments rather than scientific review. Some of the statements also make factual assertions regarding issues that are not established fact and where there are wide divergences of views -- notably footnote 3 on page 28 -- which could make this section appear more as advocacy. The entire section should be substantially modified and shortened to keep within the scope of the report and to present a balanced view. [Farhan Akhtar, United States of America]	Noted - This section is reworked to focus on equity as linked to 'ethics' and development, following AR5 WGIII Ch3 and 4. A new paragraph is introduced, grounding equity in UNFCCC language and framing. Footnote 3has been changed to reflect the multiple dimensions of Human Rights.
5100	27	46	29	3	Section 1.4.1 is extremely helpful and should be referenced earlier in the document -- flagging it as where concepts of justice and equity are further elaborated. Particularly useful elements include: the specifics regarding human rights (pg 27, line 50), the notion of rights and responsibilities as the core policy question and as a means of clarifying root causes, distribution, and management of climate risks (pg 28, line 8-10), the elaboration of the three key points and most especially the reference to power dynamics (pg 28, lines 15-25), and reference to procedural and distributive justice (pg 28, lines 37-38). Some of the points could be brought up earlier in the document -- e.g. on page 6 when human rights, ethics, and governance are first discussed and the ethics and governance discussions are weak. [Tonya Rawe, United States of America]	Noted - some of the text has been moved up to 1.1.
19671	27	48		49	There is a larger literature on human rights and climate change to be referenced. An assement of the impacts on substantive and procedural rights as per the 2015 report by OHCHR for COP 21 would be useful in this section http://www.ohchr.org/Documents/Issues/ClimateChange/COP21.pdf [Tara Shine, Ireland]	Noted - Some sources added
2606	27	48	28		no mention is made to a 'solution' for this. Is 1.5 deg a more 'equitable' target than 2 deg? It should perhaps be made clearer that while 1.5 deg would have implications for equitable economic development, it has also arisen as a way of addressing these equity and justice challenges. [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Rejected - Comment difficult to follow. Text addresses both impacts and policies.
19670	27	48	29	3	section on Justice, equity and ethics - can this section also look at the difference between 1.5 and 2 in terms of ethics, equity, human rights and justice? [Tara Shine, Ireland]	Thank you. Will consider the suggestion.

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4827	27	48	27	49	Important work by Simon Caney and others should be referenced here. Caney, S., 'Climate Change, Human Rights and Moral Thresholds' in Human Rights and Climate Change (Cambridge: Cambridge University Press, 2010), edited by Stephen Humphreys, pp.69-90; Shue, H., 'Human Rights, Climate Chnage, and the Trillionth Ton' in Shue, H., 'Climate Justice: Vulnerability and Protection' (Oxford: Oxford University Press, 2014); Bell, D., 'Does anthropogenic climate change violate human rights?' in Calder, G. and McKinnon, C., eds, 'Climate Change and Liberal Priorities' (Routledge, 2012); Moellendorf, D., 'The Moral Challenge of Dangerous Climate Change' (Cambridge: Cambridge University Press, 2014). [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - the suggested references have been added.
4921	27	48	28	10	On 6 October 2016, the UN Human Rights Council unanimously adopted resolution 33/20 which affirms cultural heritage as a human right in the face of intentional destruction. While climate change has not yet been addressed as intentional destruction, cultural heritage should be recognized here as a key component of the life and health of migrants, refugees, indigenous peoples, and indeed all peoples as citizens of the planet. The UN Framework Convention on Climate Change Warsaw Mechanism for Non-Economic Loss and Damage due to Climate Change also recognizes cultural heritage as a component of non-economic loss and damage. On these bases, it is recommended that cultural heritage in relation to loss due to climatea change be included as a right and a subject of climate change justice and ethics here. The recent US government document prepared by the US National Park Service, Cultural Resources Climate Change Strategy (Rockman, Marcy, Marissa Morgan, Sonya Ziaja, George Hambrecht, and Alison Meadow. 2016. Cultural Resources Climate Change Strategy. Washington, DC: Cultural Resources, Partnerships, and Science and Climate Change Response Program, National Park Service, available at: https://www.nps.gov/subjects/climatechange/culturalresourcesstrategy.htm.) includes in Graphic 2 a major compilation of observed climate impacts on cultural heritage. [Marcy Rockman, United States of America]	Thank you. Will consider the suggestion.
9256	27	49			Cite: Reckien, D., Lwasa, S., Satterthwaite, D., McEvoy, D., Creutzig, F., Montgomery, M., Schensul, D., Balk, D., and Khan, I. (2018). Equity, environmental justice, and urban climate change. 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
4911	27	49	28	1	In the text (and in other similar texts): "For example, how will an average global temperature rise of 1.5°C impact upon the human rights of specific persons: their rights to water, shelter, food, health and life, the rights of migrants, of refugees, of indigenous persons, of women and children?", please, includes also the "people with disabilities". [Rubén Piacentini, Argentina]	Accepted
13266	27	50	27	51	For evidence of the ways in which climate change harms human rights to "water … food, health and life" see Simon Caney 'Climate Change, Human Rights and Moral Thresholds' in Human Rights and Climate Change (Cambridge: Cambridge University Press, 2010), edited by S. Humphreys, 69-90 - which focuses on the human rights to food and water, the human right to health and the human right to life - as well as noting human rights to develop and human rights not to be subject to involuntary displacement. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted - these have been cited
2564	27	51			Report"their rights to water, shelter, food, health and life, the rights of migrants" should add some of the data such as the paper for water equity in Yellow River, see the paper with attachment file "Gini coefficient to assess equity in domestic water supply in the Yellow River" , should also be cited in the text. [Xiaojun WANG, China]	Thank you. Will consider the suggestion.
2577	27	51			Report"their rights to water, shelter, food, health and life, the rights of migrants" should add some of the data such as the paper for water equity in Yellow River, see the paper with attachment file "Gini coefficient to assess equity in domestic water supply in the Yellow River" , should also be cited in the text. [Xiaojun WANG, China]	Thank you. Will consider the suggestion.
2538	27	51			Report"their rights to water, shelter, food, health and life, the rights of migrants" should add some of the data such as the paper for water equity in Yellow River, see the paper with attachment file "Gini coefficient to assess equity in domestic water supply in the Yellow River" , should also be cited in the text. [Xiaojun WANG, China]	Thank you. Will consider the suggestion.
20535	27	51	27	51	Land rights (or lack of them) are perhaps the most fundamental in many developing countries, so should be mentioned (e.g. https://www.landesa.org/blog-secure-land-rights-climate-change-resilience-go-hand-in-hand/ ; http://www.landcoalition.org/en/regions/global-including-europe/event/cop22-side-event-secured-indigenous-and-community-land-rights-key-climate-change-adaptation ; https://www.weforum.org/agenda/2016/11/indigenous-peoples-are-the-real-climate-experts/). [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Thank you. Will consider the suggestion.
2292	27	51	27	51	How is "health" a human right, when some individuals my inherit poor health or disease the cure of which is beyond medical science? Or others may damage their health by employing their freedom to eat what they want or fail to take exercise. The reference to health in the Universal Declaration of Human Rights is "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control." Health itself is not a right; the right is to an adequate standard of living and social security. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Healthcare is named in an international treaty (ICESCR rather than UDHR) to which states have signed up.

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12100	28				Framing needs to consider more than moral philosophy. This is a report largely for experts. Framing may need to be tailored differently for different audiences, and needs to be based in part on research about communication. For example, consider some of the following references: Benford, R.D. and Snow, D.A., 2000. Framing processes and social movements: An overview and assessment. Annual review of sociology, 26(1), pp.611-639. Lakoff, G., 2014. The All New Don't Think of an Elephant!: Know Your Values and Frame the Debate. Chelsea Green Publishing. Leiserowitz, A., Maibach, E.W., Roser-Renouf, C., Feinberg, G. and Howe, P., 2013. Climate change in the American mind: Americans' global warming beliefs and attitudes in April 2013. Marshall, G., 2015. Don't even think about it: Why our brains are wired to ignore climate change. Bloomsbury Publishing USA. Haidt, J., 2012. The righteous mind: Why good people are divided by politics and religion. Vintage. Hulme, M., 2009. Why we disagree about climate change: Understanding controversy, inaction and opportunity. Cambridge University Press. [Tindall David, Canada]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
12101	28				There is some brief discussion to different views of nature based on the environmental ethics literature. It should also be noted that there is a literature on differences in how people view nature, in environmental sociology. Here, to simply things somewhat, researchers see people who view the natural world mostly in anthropocentric terms at one end of the spectrum, and people who see things in biocentric terms at the other end of the spectrum. Most people are somewhere in between. The NEP scale has been a very fruitful measure in environmental sociology, and is highly predictive of environmental attitudes and behaviours. See for example: Dunlap, R.E., 2008. "The new environmental paradigm scale: From marginality to worldwide use." The journal of environmental education, 40(1), pp.3-18. [Tindall David, Canada]	Noted
17320	28	1			Another persons who may be vulnerable to the impact of climate chagne and may have difficulty on adaptation would be the old. Moreover, most of the developed countries are aging societies, the damages from the impact of climage change and the cost of adapation would occur differently depending on the demographic structure. [Young-Hwan Ahn, Republic of Korea]	Accepted
1072	28	1	28	10	People are most motivated by security. How will climate change impact security. Suggest putting this in bold for amplifiers: Climate Change threatens human security in a variety of ways including the displacement of 100's of millions of people that may lead to severe and prolonged conflict with preferential impacts on the poor and disenfranchised [Martini Catherine, United States of America]	Accepted - sentence changed
20536	28	1	28	2	Poverty, inequity, and injustice, which are intrinsically linked to climate change, are incompatible with sustainable development. Very odd phasing, which is incomprehensible. Do you mean that they need to be addressed by sustainable development? [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - sentence changed
1652	28	1	28	2	The "which" should be deleted. The sentence should read as follows, "Poverty, inequity, and injustice are intrinsically linked to climate change and are incompatible with sustainable development (O' Brien et al. 2012)." [Jesse Keenan, United States of America]	Accepted - sentence changed
12956	28	2	28	5	Climate change is already impacting people at large scale in terms of human security, not just "could impact human security" [Johanna Nalau, Australia]	Accept - 'could' is deleted

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4912	28	2	28	5	Includes another important reference at the end of the text: "As indicated by Stern 2014, climate change is a problem of risk management on an immense scale and the consequences of business-as usual could significantly threaten human security in a variety of ways including the displacement of hundreds of millions of people that may lead to severe and prolonged conflict (Ionesco et al. 2016)." The suggested reference is: Colin P. Kelley, Shahrzad Mohtadi, Mark A. Cane, Richard Seager and Yochanan Kushnir. Climate change in the Fertile Crescent and implications of the recent Syrian drought, PNAS, vol. 112, no. 11, 3241–3246, 2015. doi: 10.1073/pnas.1421533112. Significance There is evidence that the 2007?2010 drought contributed to the conflict in Syria. It was the worst drought in the instrumental record, causing widespread crop failure and a mass migration of farming families to urban centers. Century-long observed trends in precipitation, temperature, and sea-level pressure, supported by climate model results, strongly suggest that anthropogenic forcing has increased the probability of severe and persistent droughts in this region, and made the occurrence of a 3-year drought as severe as that of 2007?2010 2 to 3 times more likely than by natural variability alone. We conclude that human influences on the climate system are implicated in the current Syrian conflict. Abstract Before the Syrian uprising that began in 2011, the greater Fertile Crescent experienced the most severe drought in the instrumental record. For Syria, a country marked by poor governance and unsustainable agricultural and environmental policies, the drought had a catalytic effect, contributing to political unrest. We show that the recent decrease in Syrian precipitation is a combination of natural variability and a long-term drying trend, and the unusual severity of the observed drought is here shown to be highly unlikely without this trend. Precipitation changes in Syria are linked to rising mean sea-level pressure in the Eastern Mediterranean, which also shows a long-term trend. There has been also a long-term warming trend in the Eastern Mediterranean, adding to the drawdown of soil moisture. No natural cause is apparent for these trends, whereas the observed drying and warming are consistent with model studies of the response to increases in greenhouse gases. Furthermore, model studies show an increasingly drier and hotter future mean climate for the Eastern Mediterranean. Analyses of observations and model simulations indicate that a drought of the severity and duration of the recent Syrian drought, which is implicated in the current conflict, has become more than twice as likely as a consequence of human interference in the climate system. Available at: http://www.pnas.org/content/112/11/3241.abstract. [Rubén Piacentini, Argentina]	Noted - There is reference to Voski in 1.4.2 (37 FOD) making the same point.
7294	28	4	28	4	Replace "threaten human security" with "affect humans". [Eleni Kaditi, Austria]	Rejected - 'human security' is a term used in art in IPCC AR5 (Adger et al. 2014, now referenced)
4828	28	4	28	5	Thinking about the ethics of climate displacement is emergent. Add references to Draper and McKinnon (as above); Biermann, Frank, and Ingrid Boas. “Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees.” Global Environmental Politics 10, no. 1 (February 1, 2010): 60–88. doi:10.1162/glep.2010.10.1.60; Eckersley, Robyn. “The Common but Differentiated Responsibilities of States to Assist and Receive ‘climate Refugees.’” European Journal of Political Theory 14, no. 4 (May 21, 2015): 481–500. doi:10.1177/1474885115584830; Johnson, Craig A. “Governing Climate Displacement: The Ethics and Politics of Human Resettlement.” Environmental Politics 21, no. 2 (March 1, 2012): 308–28. doi:10.1080/09644016.2012.651905; Mayer, Benoît. The Concept of Climate Migration: Advocacy and Its Prospects. Edward Elgar Publishing, 2016; Nine, Cara. “Ecological Refugees, States Borders, and the Lockean Proviso.” Journal of Applied Philosophy 27, no. 4 (November 1, 2010): 359–75. doi:10.1111/j.1468-5930.2010.00498.x.; Ödalen, Jörgen. “Underwater Self-Determination: Sea-Level Rise and Deterritorialized Small Island States.” Ethics, Policy & Environment 17, no. 2 (May 4, 2014): 225–37. doi:10.1080/21550085.2014.926086; Zellentin, Alexa. “Climate Migration. Cultural Aspects of Climate Change.” Analyse & Kritik 32, no. 1 (2010): 63–86. [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	These are useful refs. Ref now added to Adger et al. (2014), covering these matters synthetically in IPCC AR5.
13610	28	6	28	6	vuilnerable and disadvantaged segments [Elvira Poloczanska, Germany]	Rejected - not clear what the comment is proposing
16133	28	8	28	10	Fine to be thinking that concerns over rights and responsibilities may drive us toward a more equitable world. It seems to me, however, that a more powerful force may well be enlightened self interest. This was the argument made in California following the Second World War that led to the most effective educational infrastructure in the world during the second half of the 20th century--basically, if those with money wanted to really sustain and grow their wealth, they needed to have a well-educated (indeed the best educated) work force in the US (and then the world) and that investment in education was thus in their direct economic interest. As the state has become more ethnically diverse and the middle class whites pulled back from supporting low cost education in the late 20th century, the state's economy became weaker and California became a less desireable place to be. Over the past decade or so, the earlier argument has returned to the fore--to make California strong, there must be investment and that includes of minorities so that the work force can be strong and sustain all the invested wealth of the oler, mostly white population. Thus, the argument for seniors to approve school bonds and education budgets is no longer mainly because it is the moral and just thing to do, but because it is in their personal self-interest. All are in the same boat, and investment in everyone's development is essential to having a strong economy. Well, the same argument applies globally and many of the wealthier countries (not including the US Government, unfortunately, but many individuals and charities, fortunately) understand that it is more than just a moral imperative to contribute to equity and sustainable development, it is also in our own self-interest, and in my view this perspective also needs mention. With global climate change, disease outbreaks anywhere can spread quickly across the world; the interconnected world economy provides a much greater variety of food items than can be produced in any single nation; the global ecosystem is interconnected through migrating species and depends on the health and cleanliness of the global ocean; and much more. Fortress countries will no longer be able to survive as the climate shifts--it is in all of our best interests to be encouraging equitable and sustainable development. [Apologies for the sermonizing, but I think the point of global interconnectedness needs to be made.] [Michael MacCracken, United States of America]	Rejected - very interesting points raised but outside of the scope of SR1.5

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12957	28	8	28	10	This sentence is unclear. Who's rights and responsibilities are we talking about? How would this change things if these were the core policy questions? [Johanna Nalau, Australia]	Accepted - Sentence changed
13267	28	8	28	8	The text refers to the "responsibilities of people" and rightly notes that it is a "core policy problem". However, the chapter does not have a discussion of the principles of justice concerning the fair distribution of these responsibilities. This is a key issue (and features in the UNFCCC which emphasizes "equity" and the doctrine of "common but differentiated responsibilities and respective capacities" (article 3.1).) It is therefore vital that the chapter includes a discussion of the equitable distribution of responsibilities. As many (most notably Onora O'Neill) have argued, rights can only be meaningful and effective only if accompanied by a set of responsibilities. Since the chapter refers to rights at several occasions it is essential that it also delineates the correlative responsibilities. There is an enormous literature on this which should be incorporated. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Accept - References to Kolstad et al. have been added
13268	28	8	28	8	comment continued: The discussion generally focuses on three principles of equity - the Polluter Pays Principle, the Beneficiary Pays Principle, and the Ability to Pay Principle. For discussion of these three principles (and the equitable distribution of greenhouse gas emissions) see Simon Caney 'Cosmopolitan Justice, Responsibility, and Global Climate Change', Leiden Journal of International Law, vol.18 no.4 (2005), 747-775; Simon Caney 'Environmental Degradation, Reparations, and the Moral Significance of History', Journal of Social Philosophy, vol.37 no.3 (2006), 464-482; Simon Caney 'Climate Change and the Duties of the Advantaged', Critical Review of International Social and Political Philosophy, vol.13 no.1 (2010), 203-228; Simon Caney 'Just Emissions', Philosophy & Public Affairs, vol.40 no.4 (2012), 255-300. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Kolstad et al.
13269	28	8	28	8	cont. For other discussions see Henry Shue (2014) Climate Justice and Darrel Moellendorf (2014) The Moral Challenge of Dangerous Climate Change. In addition to the above there is also discussion of the responsibilities to create and maintain effective political structures which ensure that agents comply with their climatic responsibilities. For discussion of these "second order responsibilities" see 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)]	Kolstad et al.
19672	28	10			The footnote refers to the Principles of Climate Justice which are grounded in human rights and can provide a framework for ethical climate action. The priciples can be accessed on the website of the Mary Robinson Foundation - Climate Justice http://www.mrfcj.org/principles-of-climate-justice/. Therwise the full range of huamn rights are affected by climate change - see materials on the website of the OHCHR http://www.ohchr.org/EN/Issues/HRAndClimateChange/Pages/HRClimateChangeIndex.aspx [Tara Shine, Ireland]	Noted - Clarified as international human rights
13685	28	10	28	10	reference format needs revising [Elvira Poloczanska, Germany]	Accepted - revised
15255	28	10	28	10	Footnote 3, suggest a citation is included in the footnote to identify the source of "Human rights include …" [Pauline Midgley, Germany]	Accepted - footnote has been revised.
4165	28	12		33	The financial cost of climate change is not just limited to economic growth but can disrupt local economies already in place and put added financial burdens on people, especially those in more isolated and rural areas and those that are more vulnerable to increased financial burdens. [Michelle Leslie, Canada]	Noted - this is featured in Chapter 1 and discussed in depth in Chapter 5
13504	28	12	28	12	Justice and equity shold be defined even though there are some definition on page 9 [Dong-Woon Noh, Republic of Korea]	Accepted - justice and equity are defined as they appear in AR5.
13684	28	12	28	13	Needs specification and clarity : This language is virtually non-comprehensible to uninformed readers unless accompanied by specific examples [Elvira Poloczanska, Germany]	Accepted - Section now moved and contextualised.
1825	28	12	28	22	All three justice-related asymmetries are already acknowledged in UNFCCC! (i) "the largest share of historical and current global emissions .. has originated in developed countries, that per capita emissions in developing countries are still relatively low" (Preamb., CBDR and Art 3.1); (ii) "..developing country Parties, especially those that are particularly vulnerable to the adverse effects .." (3.2, 4.4); (iii) "all countries .. in accordance with their .. respective capabilities" (Preamb, 4.3, 4.4, 4.5). It would be correct to add in line 17 such reference: To some extent, the UNFCCC is already based on these justice-related pillars (the 'common but differentiated responsibility' for the global problem, 'respective capabilities' of the societies to cope with it and their differing vulnerabilities). [Tibor Farago, Hungary]	Mention of UNFCCC added
19673	28	12	28	23	There is a fourth asymmerty which is in climate action - if developig countries are not supported to deliver their climate ambition (through actions on the ground), they risk being 'left behind' as the rest of the world moves to a low carbon future. See for example this report of the Mary Robinson Foundation - Climate Justice. Zero Carbon Zero Poverty the Climate Justice way Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights (2015). http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	Noted - this issue is discussed in earlier parts of this Chapter and extensively covered in Chapter 5
1170	28	12	28	33	The discussion on 'asymmetries' is good, but is better expressed as 'triple injustice': see UNRISD (2016) Policy Innovations for Transformative Change, p. 150 [Petra Tschakert, Australia]	Noted but the asymmetries discussion offers a better framing here.
4829	28	12	28	33	See comment 1 above for additional important references for intergenerational justice issues. Questions about where costs and responsibilities lie have been very well and precisely articulated in the climate ethics literature, which is not referenced properly here. See for example McKinnon, C., 'Climate Justice in a Carbon Budget', Climatic Change, 133/3, 2015, pp. 375-84; 'Climate Change and the Duties of the Advantaged', Critical Review of International Social and Political Philosophy vol.13 no.1 (2010), pp.203-228; Shue, H., 'After you: may action byu the rich be contingent upon action by the poor?', in Henry Shue, 'Climate Justice: Vulnerability and Protection' (Oxford: Oxford University Press, 2014); [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Noted - Shue 2014 is added.
2505	28	13	28	14	This appears to be policy prescriptive ("Mention of human rights by the Paris Agreement is a major step") [Robert Koppu, United States of America]	Accepted - Rephrased
13686	28	19	28	19	Please provide a defintion for climate dislocation [Elvira Poloczanska, Germany]	details provided
6450	28	19	28	20	Sentence should be reworded for clarity. [Jonny Williams, New Zealand]	Accepted - sentence has been reworded
1826	28	20			Intergenerational equity issues also need to be considered here in line with the UNFCCC that was adopted in order "to protect the climate system for the benefit of present and future generations of humankind, on the basis of equity". ((explanation: Intra- and intergenerational aspects were already important during the negotiations of the Convention and these reflected in its text: see e.g, its Preamb, Art. 3.1. etc.)) [Tibor Farago, Hungary]	Noted - intergenerational equity issues are discussed extensively in other sections dealing specifically on sustainable development, in Chapter 1 and Chapter 5.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15256	28	22	28	22	grammar: "possibility by " should be "possibility for " [Pauline Midgley, Germany]	Accepted - reworded
17840	28	25	28	25	is referring to justice and asymetry, which are not mentioned in this reference, which focuses more on climate change impacts. [Wilfran Moufouma Okia, France]	Noted - we are using this reference to indicate that there are significant differences in impacts between 1.5oC and 2oC in terms of extreme weather events, water availability, agricultural yields, sea-level rise and risk of coral reef loss. Just as importantly, climate impacts between these temperature ranges are most pronounced for particularly vulnerable regions and societal groupings with limited adaptive capacity. This aspect speaks to the asymmetry discussion.
7295	28	27	28	27	Reference to NDCs should be made, and not to INDCs. [Eleni Kaditi, Austria]	Accepted - INDCs Changed to NDCs
10368	28	27	28	27	the term INDC has not been used before in this chapter, and should be defined. (I)NDC may be a suitable alternative, to reflect ratification of the Paris Agreement by some countries. [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - INDCs Changed to NDCs
15257	28	27	28	27	First and only occurrence in this Chapter of acronym INDCs - use full name or define here "Intended Nationally Determined Contributions (INDCs)" [Pauline Midgley, Germany]	Accepted - INDCs Changed to NDCs
11494	28	27	28	27	It is correct the use of INDCs achronyms instead of NDCs? Please check it out for consistency betwen chapters [Meimalin Moreno, Venezuela]	Accepted - INDCs Changed to NDCs
13035	28	27	28	27	please change INDC to NDC, this is the first time that INDC is used; NDC is preferable and has been already defined previously [Caserini Stefano, Italy]	Accepted - INDCs Changed to NDCs
13036	28	27	28	28	countries don't pledge what is possible in their capacity, but what they decide to feel more convenient; I suggest delete from "despite" to "capacity" [Caserini Stefano, Italy]	Accepted - adjusted to reflect the comment
7296	28	28	28	28	Reference to the provisions of the Paris Agreement in regards to support expected to be provided by developed countries to developing countries on technology, finance and capacity-building should be made. [Eleni Kaditi, Austria]	Noted - These appear elsewhere.
12958	28	28	28	31	Mitigation and Adaptation are about climate governance. I would rephrase the sentence. [Johanna Nalau, Australia]	Reject - the suggestion does not add anything new
2074	28	31	28	33	“sustained technology transfer” does not do justice (excuse the pun) to Professor Humphrey's learned discussion of exactly what 'technology transfer' may be given its historical genesis and particularly failures of implementation to date. As such 'technology transfer' is as much a critique of current operating trade environments as it is about, for example, renewables, etc... [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted - we have made a slight change to this phrasing. (The full argument not altogether relevant to the report)
2086	28	31	28	33	There are, also, opportunities for 'new economics' in e.g. renewables, etc. So, more generally, should an argument be framed in positive or negative connotations? Is your glass half empty or half full? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
20372	28	31	28	33	Repeated from page 7 lines 31-33. [Olivier Boucher, France]	Rejected - Different context .
2506	28	35	28	36	This appears to be policy prescriptive ("Justice considerations need to be an integral part") [Robert Koppu, United States of America]	Accepted - text has been reviewed and changed
13037	28	35	28	38	Although I agree, this a prescriptive statement; usually IPCC reports prefer more neutral statements. I suggest writing: "Could be" instead of "need to be" [Caserini Stefano, Italy]	Accepted - text has been reviewed and changed
7297	28	35	28	45	Reference to the principle of common-but-differentiated-responsibilities (CBDR) and historical responsibilities (HR) of the Convention should be made. [Eleni Kaditi, Austria]	Accepted - Included in section 1.1
9257	28	36			Add: Climate change amplifies vulnerability and hampers adaptive capacity in cities, especially for the poor, women, the elderly, children, and ethnic minorities. These people in urban settings often lack power, adequate services and functioning infrastructure. Gender inequality is particularly pervasive in urban areas contributing to differential consequences of climate changes (Reckien et al., 2018) [Cynthia Rosenzweig, United States of America]	Noted - These issues raised elsewhere in section 1.1.
17841	28	36	28	36	Reference: Shue 2014. There are details missing from this paper in the lister of references. [Wilfran Moufouma Okia, France]	Accepted - Reference has been added
19674	28	36	28	38	The issues relating to procedural justice should be further developed - access to information and the right to participation are critical to climate justice and equitable climate solutions. It may be good in theis section to outline both the substantive and procedural rights affected by climate change and also to show how procedural rights can inform more inclusive and effective climate policy. the right to participation of the people most vulnerable to climate impacts is critical to effective climate action and should be highlighted in this chapter. see for example: UNEP 2015 http://web.law.columbia.edu/sites/default/files/microsites/climate-change/climate_change_and_human_rights.pdf and Mary Robinson Foundation (2016) Incorporating Human Rights into Climate Action Version 2 May 2016 at http://www.mrfcj.org/wp-content/uploads/2016/05/Incorporating-Human-Rights-into-Climate-Action-Version-2-May-2016.pdf [Tara Shine, Ireland]	Accepted - Added sentence and UNEP ref.
4830	28	39	28	42	See referenecs in comment 1 above. [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Noted
17842	28	41	28	41	Reference: Sen and Nussbaum is missing from the list of references. [Wilfran Moufouma Okia, France]	Rejected - this is referring to Klinsky and Winkler and their use of Sen and Nussbaum's capabilities approach
13038	28	41	28	41	insert a reference for Sen and Nussbaums [Caserini Stefano, Italy]	Rejected - this is referring to Klinsky and Winkler and their use of Sen and Nussbaum's capabilities approach
15258	28	41	28	42	If referring to "Sen and Nussbaum's capabilities approach", shouldn´t there also be a specific citation? [Pauline Midgley, Germany]	Rejected - this is referring to Klinsky and Winkler and their use of Sen and Nussbaum's capabilities approach
19675	28	41	28	43	Add reference to work by Shue, Henry [Tara Shine, Ireland]	Accept - Ref included
1827	28	41	28	45	The “capability” issue was already an essential factor considered during the negotiations of the UNFCCC (+ the Kyoto P. and Paris A.). That is why the ‘respective capabilities’ is mentioned in the UNFCCC and various provisions, instruments were also adopted in this regard (incl. finance and technol. coop.). It is not a novelty for the climate policymakers; so, it would be correct to add (line 45); pls., add: "..and climate impacts. In a general sense, the capability issue was already a key item in the UNFCCC, and some provisions and instruments were included in the Convention and in also the Paris Agreement to address this problem. [Tibor Farago, Hungary]	Rejected - here the reference to 'capability' is about individuals rather than countries.
14203	28	44	28	44	“‘operationalizing’ equity” is unclear in this context and should be explained more fully. [Jason Donev, Canada]	noted and action taken as suggested

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5586	28	47			check grammar [Astrid Kiendler-Scharr, Germany]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
4425	28	47		49	Something wrong with the sentence, please check the grammar. [Jingyong Zhang, China]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
19676	28	47		51	See also the Journal of human rights and the environment issue on climate justice March 2016 and publications by the editor by Grear, Anna e.g. from 2014 ISBN:9781783477234 DOI:http://dx.doi.org/10.4337/9781784711900. Davis, K.et al. 2017. 'The Declaration on Human Rights and Climate Change: a new legal tool for global policy change'. Journal of Human Rights and the Environment 8(2) Grear, A. 2015. Deconstructing Anthropos: a critical legal reflection on 'Anthropocentric' law and Anthropocene 'humanity'. Law and Critique 26(3), pp. 225-249. (10.1007/s10978-015-9161-0) [Tara Shine, Ireland]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
1284	28	47	28	49	These sentences are not well-formed and should be rewritten. [Colin Raymond, United States of America]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
1653	28	47	28	49	This sentence contains a number of non-content errors. It should read as follows, "For example, within nature-centric aspect of environmental ethics, there are those who argue that ecosystems have a right to exist in their natural state (Attfield 2014)." [Jesse Keenan, United States of America]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
11677	28	47	28	49	There is an issue with this sentence...perhaps incorrect terminal punctuation? [David Schoeman, Australia]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
2700	28	47	29	3	This is an important paragraph, which could be further developed - and ideally picked up in Chapters 4 and 5. [Penny Urquhart, South Africa]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
16134	28	47	28	49	With respect to the argument for preminence of the natural environment, it might be useful to point out that during the nuclear winter studies an estimate was made (in the second SCOPE volume by Harwell et al.) that the natural world, unaltered by significant human intervention, had the capacity to support/sustain about 200 million people (at a relatively modest level). Given the global population is 7B going on 10B, technological development and ongoing progress are absolutely essential to overall survival (there is no way the technologies of 1900 or 1950 could support the population of 2000, or that the technological capacity we have now will be able to support the projected population of 2100, and this is even assuming the climate is stable). It is really only faith that technology will come to enable ongoing support of the growing global population--having an environment that is not changing seems more likely to enable the development of needed technological capacity than if a rapidly changing climate is demanding large resources for recovery and relocation. Certainly aim to limit disruption of the productive natural environment, but that alone would not be able to sustain us. [Michael MacCracken, United States of America]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
4922	28	47	29	3	Re-stating comment above regarding cultural heritage as human right, as this comment is also relevant here, particularly with respect to traditional and indigenous lifeways. Restating comment is: On 6 October 2016, the UN Human Rights Council unanimously adopted resolution 33/20 which affirms cultural heritage as a human right in the face of intentional destruction. While climate change has not yet been addressed as intentional destruction, cultural heritage should be recognized here as a key component of the life and health of migrants, refugees, indigenous peoples, and indeed all peoples as citizens of the planet. The UN Framework Convention on Climate Change Warsaw Mechanism for Non-Economic Loss and Damage due to Climate Change also recognizes cultural heritage as a component of non-economic loss and damage. On these bases, it is recommended that cultural heritage in relation to loss due to climatea change be included as a right and a subject of climate change justice and ethics here. The recent US government document prepared by the US National Park Service, Cultural Resources Climate Change Strategy (Rockman, Marcy, Marissa Morgan, Sonya Ziaja, George Hambrecht, and Alison Meadow. 2016. Cultural Resources Climate Change Strategy. Washington, DC: Cultural Resources, Partnerships, and Science and Climate Change Response Program, National Park Service, available at: https://www.nps.gov/subjects/climatechange/culturalresourcesstrategy.htm.) includes in Graphic 2 a major compilation of observed climate impacts on cultural heritage. An additional reference that is particularly useful with respect to the impacts of climate change on indigenous and traditional lifeways is Nakashima, D.J., Galloway McLean, K., Thulstrup, H.D., Ramos Castillo, A. and Rubis, J.T. (2012). Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation. Paris, UNESCO, and Darwin, UNU. [Marcy Rockman, United States of America]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
17321	28	48			Irrelevant period in the middle of the sentence [Young-Hwan Ahn, Republic of Korea]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
3368	28	48	28	48	CHANGE to "....example,within Environmental ethics, there.....nature, arguing that...." [Paul Doyle, Canada]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
15259	28	48	28	48	copy edit: "example within Environmental ethics. There " should be "example, within environmental ethics, there " and "argue" should be "arguing" [Pauline Midgley, Germany]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
13039	28	48	28	48	delete the point after ethics [Caserini Stefano, Italy]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
3369	28	49	28	49	CHANGE to .....equity "proponents argue" that..... [Paul Doyle, Canada]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
17843	28	49	28	49	Reference: Arrfield 2014. There are details missing from this paper in the lister of references. [Wilfran Moufouma Okia, France]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
16135	28	49	28	50	I thought sustainability and intergenerational equity was leaving at least as much capacity for survival as was provided to one's own generation. If all we leave future generations is a natural environment and not also the technological capacity that has developed, only a small fraction of the human race will survive for long. [Michael MacCracken, United States of America]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20538	28	49	28	50	Intergenerational equity argues that we should leave the natural state as much as possible for future generations. This seems very odd phrasing. Would it not be better to quote the Bruntland Report (http://www.un-documents.net/ocf-02.htm), which states that "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."? [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
11443	28	49	28	50	This is not true. Intergenerational equity is based on the idea that what we do now should not limit the ability of future generations to meet their needs. It is not based on the idea that ecosystems should be preserved in a 'natural' state. Indeed, in much of the world intergenerational equity concerns are likely to be realised through rehabilitation, more diverse managed systems, etc. [Stewart Lockie, Australia]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
4831	28	49	28	50	There is no consensus on the view that 'intergenerational equity argues that we should leave the natural state as much as possible for future generaitons' - and, as stated, it is not even clear what this means. This sentence should be removed. [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
2087	28	50	28	50	missing word “there ARE other approaches” [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
3370	28	50	28	50	CHANGE "as much as possible" to "undisturbed" [Paul Doyle, Canada]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
729	28	50	28	50	It reads "However, there other…" I think it should read " However, there are other…" [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
11444	28	50	29	1	The sentence "However, there other approaches…" makes no sense. [Stewart Lockie, Australia]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
1285	28	50	29	3	More redundant and/or poorly written sentences. [Colin Raymond, United States of America]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
15260	28	51	28	51	copy edit: "social-ecological system view," should be either "a social-ecological system view," or "social-ecological system views," [Pauline Midgley, Germany]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
3371	29	1	29	1	CHANGE "onto' to "on" [Paul Doyle, Canada]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
15261	29	1	29	1	copy edit: "onto" should be "on" [Pauline Midgley, Germany]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
3372	29	2	29	2	CHANGE "may" to "are" and ADD "than others" to end of sentence. [Paul Doyle, Canada]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
17844	29	2	29	3	is not talking about definitions, is this the correct reference being used here? [Wilfran Moufouma Okia, France]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.
2340	29	3	29	3	what is missing is a little bit debate on justices (procedural/distributional justices), intergenerational justices (especially debate on David Schlosberg is missing), different forms of justices (Utilitarianism, Rawlsians and Libertarianism, of course there are more forms) and discussion on environmental and climate justices needs an extension (see Schlosberg D, Collins L B (2014): From environmental to climate justice: climate change and the discourse of environmental justice. WIREs Climate Change 5, 359-374. doi: 10.1002/wcc.275; Schlosberg D (2007): Defining environmental justice: Theories, movements, and nature. New York: Oxford University Press; Schlosberg D, Collins L B, Niemeyer S (2017): Adaptation policy and community discourse: risk, vulnerability, and just transformation. Environmental Politics 26, 413-437. doi: 10.1080/09644016.2017.1287628; Thaler T, Hartmann T (2016): Justice and flood risk management: reflecting on different approaches to distribute and allocate flood risk management in Europe. Natural Hazards 83, 129-147. doi: 10.1007/s11069-016-2305-1; Reese G, Jacob L (2015): Principles of environmental justice and pro-environmental action: A two-step process model of moral anger and responsibility to act. Environmental Science & Policy 51, 88-94. doi: 10.1016/j.envsci.2015.03.011; Montgomery MC, Chakraborty J (2015): Assessing the environmental justice consequences of flood risk: a case study in Miami, Florida. Environmental Research Letters 10, 095010. doi:10.1088/1748-9326/10/9/095010; Johnson C, Penning-Rowsell E, Parker D (2007): Natural and imposed injustices: the challenges in implementing ‘fair’ flood risk management policy in England. The Geographical Journal 173, 374-390. doi: 10.1111/j.1475-4959.2007.00256.x; Hunold C, Young IM (1998): Justice, democracy, and hazardous siting. Political Studies 46, 82–95. doi: 10.1111/1467-9248.00131; Holland, B. (2017): Procedural justice in local climate adaptation: political capabilities and transformational change. Environmental Politics 26, 391-412. doi: 10.1080/09644016.2017.1287625; Harrison JL (2014): Neoliberal environmental justice: mainstream ideas of justice in political conflict over agricultural pesticides in the United States. Environmental Politics 23, 650-669. doi: 10.1080/09644016.2013.877558; Grineski SE, Collins TW, Chakraborty J, Montgomery MC (2015): Hazardous air pollutants and flooding: a comparative interurban study of environmental injustice. GeoJournal 80, 145-158. doi:10.1007/s10708-014-9542-1; Grineski SE, Collins TW, Ford P, Fitzgerald R, Aldouri R, Velazquez-Angulo G, de Lourdes Romo Aguilar M, Lu D (2012): Climate change and environmental injustice in a bi-national context. Applied Geography 33, 25-35. doi: 10.1016/j.apgeog.2011.05.013; Elliott JR, Pais J (2006): Race, class, and Hurricane Katrina: social differences in human responses to disaster. Social Science Research 35, 295-321. doi: 10.1016/j.ssresearch.2006.02.003; Dixon J, Ramutsindela M (2006): Urban resettlement and environmental justice in Cape Town. Cities 23, 129–139. doi: 10.1016/j.cities.2005.08.003; Colton C (2007): Environmental justice in a landscape of tragedy. Technology in Society 29, 173-179. doi: 10.1016/j.techsoc.2007.01.006; Chakraborty J, Collins TW, Montgomery MC, Grineski SE (2014): Social and spatial inequities in exposure to flood risk Miami, Florida. Natural Hazards Review 15, 04014006. doi: 10.1061/(ASCE)NH.1527-6996.0000140; Bullard RD, Wright B (2009): Race, place, and environmental justice after Hurricane Katrina: struggles to reclaim, rebuild, and revitalize New Orleans and the Gulf coast. Boulder, CO: Westview Press [Thaler Thomas, Austria]	Accepted - References made to Kolstad et al. for this discussion in IPCC AR5
17845	29	3	29	3	is focusing in. [Wilfran Moufouma Okia, France]	Noted - This sentence has been adjusted to argue that a strong relationship exists between human and ecological systems.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19677	29	6			section on governance - should being in literature on procedural rights and the importance of civic space / civil society and local community participation [Tara Shine, Ireland]	Noted
3329	29	6	29	46	Governance should not be seen only from a Western point of view, I consider that information is weak, but if we consider tribal and indigenous peoples there is no governance. [Fátima Castaneda, Guatemala]	comment unclear
16496	29	6	29	46	I would perhap link this section to power, especially, in relation to adaptive capacity, see Eriksen et al 2015 for a good critical example. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2701	29	6	29	46	Suggest this section needs to mention adaptive capacity of institutions at different levels as a critical governance factor, as wel as the role of adaptive learning across institutions, stakeholder groups and scales [Penny Urquhart, South Africa]	Noted
5102	29	6	29	46	Governance appears to be more advanced in adaptation, especially given the call originally in the Cancun Adaptation Framework for transparency and participatory approaches in adaptation, reiterated in the Paris Agreement. It's worth a discussion of the early recognition in adaptation efforts of hte importance of governance and the need for more and better governance related to mitigation actions, particularly as this is where trade offs will be starkest: potentially negative social impacts of some mitigation actions today to avoid potentially worse climate impacts on generations of tomorrow. Mitigation actions are also where we have seen past evidence of poor social (and environmental) outcomes and some of hte greatest expressions of concern among civil society today, whehter in regard to hydrodams for hydroelectricity, REDD, or BECCS. [Tonya Rawe, United States of America]	Noted
2341	29	6	29	6	be aware of SI organised by Linda Sygna "1.5°C Climate Change and Social Transformation" (Issue 2, 2018) in Current Opinion on Environmental Sustainability (COSUST). I assume some papers should perfectly fit. [Thaler Thomas, Austria]	will review the paper
20539	29	6	29	6	This section should give prominence to the global adaptation goal in the Paris Agreement (Article 7.1), it is currently not mentioned. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Noted
17294	29	6	29	6	I would strengthen this section to include politics in addition to governance [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	OK, will consider comment
12244	29	8	29	10	This is a quite general statement and if you want to refer to the literature i think more references than one is needed; alternatively you could write "e.g.". [Jan Fuglestvedt, Norway]	Agreed and noted. Changes will be made accordingly
2607	29	8	29	46	perhaps make a reference to the emerging interest around polycentric climate governance and its role in relation to 1.5 deg? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Noted and will look for literature on the issue.
13611	29	14	29	14	revise reference (remove ", L.") [Elvira Poloczanska, Germany]	Noted
11678	29	14	29	14	Again, what is a "scalar" interaction? [David Schoeman, Australia]	A brief explanation of scalar interaction will be included
9295	29	18	29	22	The statement, "A systematic review of the literature (Kivimaa et al. 2017) suggests that major policy transformations to low carbon transitions require policy experimentation as an explicit approach to governance" may be supported by additional references from policy learning contexts between cities and city-to-city learning. An example of such a reference is: "Campbell, T. (2012) Beyond Smart Cities: How Cities Network, Learn and Innovate, Earthscan, London." [Siir KILKIS, Turkey]	Noted and references will be assessed
9852	29	18	29	22	An example would help this paragraph more concrete [Christopher Reyer, Germany]	noted and will consider the inclusion of an example drawn from the cited references and others
12959	29	18	29	22	The private sector is already innovating and trialling different sustianability measures eg Google, Nike, so there is a need to include the private sector in the governance discussion and not only focus on governments. This section seems to imply that it is governments that are mainly responsible for taking transformative steps resulting in adaptive governance whereas what they can do is intrinsically tied to private sector and what technological innovations are even available. [Johanna Nalau, Australia]	very relevant remark; suggested additions will be made by mentioning the important role of the private sector
7933	29	18	29	22	It might be worth explaining that long term policy signals are needed to encourage reduction in emissions here? Isn't there a risk that 'policy experimentation' might discourage investment from private companies since low carbon technologies require significant investment to implement and companies won't want to invest in something that might be out of favour in a couple of years? [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	will consider highlighting the time frame of policy responses and governance
2293	29	19	29	20	The virtues of "extensive trials and smaller experiments" are identified here, but further down the same page, at line 53, there is reference to "leap-frogging development to new and emerging low and zero carbon emissions". Is there contention here? Is there a risk that in trying, for the best of reasons, to hit the 1.5 deg C target, that the "extensive trials and small experiments" are omitted, leading to sub-optimal progress? [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted
3373	29	20	29	20	Eliminate commas after experiments and capacity. [Paul Doyle, Canada]	Noted and action taken
10421	29	20	29	20	drop comma after experiments [Jonathan Lynn, Switzerland]	noted and action taken
1073	29	21	29	22	Suggest put in bold: adaptive and flexible governance systems will be key to transitioning to 1.5c global warming and reducing further temperature increase [Martini Catherine, United States of America]	bold are only used for the executive summary to highlight the main claim/statement
7136	29	21	29	22	Comment: Governance will only be succesfully implemented if sensitve to the needs and reactions of the governed populations. Suggestion: As a result adaptive and flexible governance systems sensitive to the needs of their populations will be key to transitioning to a 1.5°C global warming and reducing further temperature increase. Sa,me references as above [Jamie Clarke, United Kingdom (of Great Britain and Northern Ireland)]	Noted
13612	29	22	29	22	also assymetry in the impacts of response strategies - some groups may benefit more than others (e.g. Hurricane Katrina) See p29 lines 41-42 [Elvira Poloczanska, Germany]	Noted
3374	29	22	29	22	CHANGE to "will be key to reducing a further increase in temperature beyond 1.5". [Paul Doyle, Canada]	Noted
3375	29	24	29	24	ADD ".....it is not at all certain....." [Paul Doyle, Canada]	noted and action taken as suggested
14204	29	24	29	24	“To date it is not certain that …” Could the evidence/certainty language used elsewhere be used here? This is inconsistent language. [Jason Donev, Canada]	in this sentence the word "certain" is used for a different purpose than the one the certainty/probability IPCC language is being used.

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1828	29	24	29	25	At least, it is already clear that the existing NDCs are not sufficient (if compared with the assessments from the IPCC-AR5 or UNEP-EGR), moreover there is an increasing gap between the science-based assessments and the policy responses (as it was demonstrated by Farago (2016) for the period since 1970s by 2015). So pls add: .. Paris Agreement (Falkner 2016; Lövbrand et al. 2017), but it is already evident that the aggregated existing emission-related voluntary contributions under this Agreement are not sufficient and may also result in a further increase of the climate science-policy gap (Farago 2016). Farago T., 2016: The anthropogenic climate change hazard: role of precedents and the increasing science-policy gap. Id?járás (ISSN 0324-6329), 120, 1, 1-40 http://real.mtak.hu/60726/1/Climate_Change.pdf (('Id?járás': OA peer-reviewed English-language sci. journal)) [Tibor Farago, Hungary]	Noted
7298	29	24	29	25	Make reference to the UNFCCC Synthesis Report. [Eleni Kaditi, Austria]	This Special Report only assesses peer-reviewed papers and grey literature
12245	29	24	29	25	More assessment could be done here. And more references to underlying literature should be given. [Jan Fuglestvedt, Norway]	This will be undertaken for the SOD as planned
26	29	24	29	29	Please refer to R Herrala and R.K. Goel (2016), Sharing the emission reduction burden in an uneven world, Energy Policy 94, 29-39, who argue for an enhanced system of global governance based on an explicit criteria for fairness and corresponding quantitative (but non-binding) emission benchmarks at national level (p. 31) [Risto Herrala, United States of America]	Noted
5101	29	24	29	29	The paragraph regarding the ability of voluntary mechanisms under the Paris Agreement to deliver on the 1.5oC goal seems misplaced. It isn't clear how this is related to the discussion of governance. [Tonya Rawe, United States of America]	Paragraph moved below where it fits better.
1829	29	25	29	27	This compliance mechanism was also considered by Farago (2016) together with a comparison with the enforcement instrument of Montreal Protocol and the more rigid mechanism of Kyoto Protocol: “a more cautious formula was included in the Paris Agreement obviously because of the universal nature of certain obligations: a mechanism for the facilitation of implementation of and promotion of compliance with the provisions of the PA and the relevant committee with only facilitative and non-punitive functions”. So, pls. add in line 27: 2016)) which universal adoption was only possible by consensus and which considerably differs from the more rigid and sophisticated enforcement mechanism of the Kyoto Protocol (Farago 2016). Farago T., 2016: The anthropogenic climate change hazard: role of precedents and the increasing science-policy gap. Id?járás (ISSN 0324-6329), 120, 1, 1-40 http://real.mtak.hu/60726/1/Climate_Change.pdf (('Id?járás': OA peer-reviewed English-language sci. journal)) [Tibor Farago, Hungary]	Noted
15292	29	26	29	26	copy edit: please insert hyphen in "expert-based" [Pauline Midgley, Germany]	Noted and action taken
15262	29	26	29	27	copy edit: delete unnecessary parentheses around Falkner 2016 [Pauline Midgley, Germany]	noted and action taken as suggested
16136	29	26	29	27	As the Kyoto experience showed, however, insisting on a mandatory structure led to nations promising only minimal change (indeed, some natinosl like Australia was allowed a rather sizeable increase) for fear of the punishment being invoked--and as a result, very little was committed to under that agreement. That would seem to be a natural tendency of a nation--or individual--don't overpromise if failing to achieve would be punished, especially when there is no mechanism for forcing more ambitous targets. It is actually for this reason that there is a case in the US courts--even though the Administration and Congress have been aware of the issue for half a century, their combined efforts have been far weaker than required. It seeks to have the US layout an adequate plan to get to its goal and then would presumably enforce the commitment. Had the participants at Kyoto be forced to get to a certain point AND have a mandatory mechanism work, perhaps we'd get somewhere, but for now, the Paris approach of encouraging stretch goals and not having punishments other than embarrassment for failure seems to be leading to the more ambitious and meaningful outcome as compared to the Kyoto effort. [Michael MacCracken, United States of America]	Noted and references will be assessed
1830	29	27			Besides UNISDR it would be important to mention here the 2030 Agenda (SDGs), as well, since it also covers climate change related provisions (para 31, SDG13). E.g.: Other international frameworks including the 2030 Agenda or the Sendai .. [Tibor Farago, Hungary]	Noted
12348	29	27	29	29	The authors should explain essential difference in purpose and scope of Sendai Framework in relation to UNFCCC. In contrast to UNFCCC, Sendai Framework has no distinction between anthropogenic and natural causes and broadly places responsibility with impacted countries. This is a fundmental difference for the governance topic addressed in section 1.4.2 [Bill Hare, Germany]	This is not the place to discuss this
6051	29	27	29	29	Assumption might not be enough! Could also note that there are efforts to link climate change adaptation and disaster risk reduction, including through emerging debates on loss and damage. Roberts et al. (2015) Resilience synergies in a post-2015 development agenda, Nature Climate Change - might be helpful. Also some recent papers by Reinhard Mechler. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted
9756	29	31	29	37	Like to see discussion if stabilisation at 1.5 degreees could be achieved with present-day governance, i.e. without good governance everywhere [Manfred Treber, Germany]	Noted
3376	29	32	29	32	CHANGE ".....climate action to limit global warming to 1.5 0 C". [Paul Doyle, Canada]	Noted and comment will be assessed
9296	29	32	29	34	The statement "A range of high and some middle income cities provide examples of how government and community response can simultaneously make meaningful contribution to adaptation and mitigation goals" is a key point that may be further expanded with emphasis from related reports, including "Kona, A., Melica, G., Koffi, B., Iancu, A., Zancanella, P., Calvete, S., Bertoldi, P., Janssens- Maenhout, G., Monforti-Ferrario, F., Covenant of Mayors: Greenhouse Gas Emissions Achievements and Projections, JRC Science for Policy Report 2016, EUR 28155 EN, 2016." [Siir KILKIS, Turkey]	Noted. This issue will be discussed in the City box that will be placed in chapter 5.
9853	29	32	29	34	This sentence needs a reference [Christopher Reyer, Germany]	Noted
13040	29	33	29	34	please add a reference that could demonstrate that the contribution of city to mitigation goal has been important; this contribution has been often overestimated [Caserini Stefano, Italy]	Noted. This issue will be discussed in the City box that will be placed in chapter 5.
1286	29	34	29	34	The word 'risk' is inappropriate and should be replaced with 'impact' or 'vulnerability' depending on the exact meaning intended. [Colin Raymond, United States of America]	Noted and action will be taken
16137	29	34	29	35	I don't understand--failure by any country will increase the risks for all, not just for that one country (well, at least with regard to failure of mitigation efforts). Climate change is a global issue. [Michael MacCracken, United States of America]	Noted
3377	29	35	29	37	Rework this sentence for punctuation and clarity [Paul Doyle, Canada]	Noted and action will be taken
15263	29	36	29	36	copy edit: "threat" should be "threats" [Pauline Midgley, Germany]	Noted
13613	29	37	29	38	why are these definitions here and not on p9? [Elvira Poloczanska, Germany]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13614	29	38	29	38	Why use economic language of 'costs' ? disbenefits or disadvantages might be better. See p5 line 36 : cost-benefit analyses are insufficient [Elvira Poloczanska, Germany]	OK, will consider comment
3378	29	39	29	39	CHANGE "on" to "in" [Paul Doyle, Canada]	Noted and action will be taken
15264	29	39	29	39	copy edit: "changes on modes of governance" should be "changes in modes of governance" [Pauline Midgley, Germany]	Noted and action will be taken
4832	29	39	29	40	Governance is only one way on which justice, ethics and equity concerns can be addressed - e.g. individual choices aside from governnace structures can address these concerns on some accounts. [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Noted
10233	29	39	29	46	clarify definition of governance. E.g. maritime governance, governing the commons form Ostrom, island governance… [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Noted and comment will be assessed
7299	29	40	29	40	Delete the text "adaptation-mitigation-sustainable development nexus". [Eleni Kaditi, Austria]	This term is being inserted and clarified in the whole report.
3379	29	43	29	43	CHANGE " the response to 1.5°C warming " to "limit the global warming to 1.5 0 C" given..... [Paul Doyle, Canada]	Noted
10187	29	43	29	46	Most of this section is well written in policy-neutral terms - but I think "Governance is critical to the response to 1.5°C warming" is too prescriptive [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Ok, noted.
3380	29	44	29	44	global levels that [Paul Doyle, Canada]	Noted
9258	29	46			Add: While jurisdiction over many dimensions of climate change adaptation and mitigation resides at the national level, municipal and state governmental actors are taking actions to address climate change (Romero-Lankao et al., 2018) . Romero-Lankao, P., Burch, S., Hughes, S., Auty, K., Aylett, A., Krellenberg, K., Nakano, R., Simon, D., and Ziervogel, G. (2018). Governance and policy. 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
4515	29	46			Add "in" before "small". [Radim Tolasz, Czech Republic]	Noted
13615	29	47	29	49	This sentence needs re-writing. There are different environmental ethics perspectives. For example, some perspectives recognise the intrinsic value of the natural world and its right to life , whilst other perspectives only consider its instrumental value to humans. [Elvira Poloczanska, Germany]	text was edited to reflect these concerns
21308	29	49			Section 1.4.3 - this section could link up with earlier reference in section 1.1 to Olsson et al - and some of this good material could go to section 1.1 (see my general comments above) [Jan Corfee-Morlot, France]	text was edited to reflect these concerns
1171	29	49			Transformation pathways' should feature in Box 1.1 [Petra Tschakert, Australia]	Agreed and noted. Changes will be made accordingly
19678	29	49			section on Transformation - vision of transformation must include greater equity, ending poverry and the universal realisation of human rigts. Also intergenerational equity. [Tara Shine, Ireland]	Agreed and noted. Changes will be made accordingly
1527	29	49	30	15	I love that you devote a subsection to transformation and transition. In mitigation, it really matters if one frames things in terms of these ideas -- it switches you over from an equilibrium economics to an evolutionary economics theoretical basis for policy design and evaluation. Michael Grubb wrote a book about this (Planetary Economics, Routledge, 2015) and so did I (Transforming Energy, Cambridge, 2015). I summarized many of the arguments in a peer-reviewed paper http://dx.doi.org/10.1016/j.erss.2017.05.023 . [Anthony Patt, Switzerland]	thanks and the references were reviewed
6052	29	49	30	16	Is it worth noting that use of pathway here is differnet from previously in chapter - linking with box 1.1? Or using a different term? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	the text was revised and standardized to reflect these concerns
2342	29	49	29	49	I would definitely extend various debates on transformation (which forms we know etc.) would be nice to extend this part. Patterson J, Schulz K, Vervoort J, van der Hel S, Widerberg O, Adler C, Hurlbert M, Anderton K, Sethi M, Barau A: Exploring the governance and politics of transformations towards sustainability. Environ. Innov. Soc. Transit. 2016, doi:10.1016/j.eist.2016.09.001; Evans GR: Transformation from "Carbon Valley" to a "Post-Carbon Society" in a climate change hot spot: the coalfields of the Hunter Valley, New South Wales, Australia. Ecol. Soc. 2008, 13:39; Rogelj J, Luderer G, Pietzcker RC, Kriegler E, Schaeffer M, Krey V, Riahi K: Energy system transformations for limiting end-of-century warming to below 1.5 °C. Nat. Clim. Change 2015, 5:519–527; O'Brien K: Global environmental change II: From adaptation to deliberate transformation. Prog. Hum. Geogr. 2012, 36:667–676; Pelling M: Adaptation to Climate Change: From Resilience to Transformation. Routledge; 2011; Pelling M, O'Brien K, Matyas D: Adaptation and transformation. Clim. Change 2015, 133:113–127; Tschakert P, van Oort B, St. Clair AL, LaMadrid A: Inequality and transformation analyses: a complementary lens for addressing vulnerability to climate change. Clim. Dev. 2013, 5:340–350 [Thaler Thomas, Austria]	Agreed and noted. Changes will be made accordingly
13616	29	50	29	50	Future generations of humans, or humans and other species ? [Elvira Poloczanska, Germany]	Both. Text was edited to reflect these issues
10188	29	51	29	60	Care needed to not advocate policy - maybe change "opportunity" to a neutral word. Also 1.5 could be achieved by economic collapse - so I think this section needs framing as example pathways, not must haves [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Agreed and noted. Changes will be made accordingly
13617	29	51	30	1	It's not clear what is meant by this sentence [Elvira Poloczanska, Germany]	the text was revised to make more clear
11679	29	51	30	4	This paragraph seems to be filled with vague, jargon-filled waffle...the writing should be more direct, proving real-world context and examples of what is meant, not wispy-washy aspirational statements that could be interpreted in many contrasting ways. [David Schoeman, Australia]	text was edited to reflect these concerns
12917	29	52	29	52	1.5°C -related? I don't uderstand the sentence. [Mustapha Meftah, France]	text was edited to reflect these concerns
12723	29	52	29	55	When listing the fundamental elements, additional to "low and zero carbon technologies", perhaps the adotion of carbon-sequestration "technologies" should also be added. As shown in Chapter 2, all 1.5 degree pathways (as projected by IAMS) depend to some extent on sequestration (afforestation, CCS, BECCS or DAC) [Vassilis Daioglou, Netherlands]	the text was revised and standardized to reflect these concerns

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1654	29	55	30	2	It should be acknowledged that certain types of single-equilibrium resilience consistent with disaster and engineering categorical variants of resilience may operate to perpetuate the status quo. Multi-equilibrium variants of community and urban resilience have not been well addressed by the IPCC. I would revise the sentence to read as follows, "The rate of change within systems can occur gradually or be punctuated by rapid change, particularly when linked with disruptive technological innovation or extreme events. Disaster and engineering resilience may operate to limit incremental and transformational change. " [Jesse Keenan, United States of America]	thanks. Text was revised in an attempt to incorporate these concerns
11019	30		33		The feasibility box is very good, but promises more than the other chapters are actually delivering [Oliver Geden, Germany]	this box was significantly revised to address this comment and other similar comments
21309	30		33		Box 1.3 : this is useful as a start on the framework (but comes up late in the chapter). On content - there is a question about how to use it to assess and rank options say from excellent to poor. A key question what interactions between the different dimensions are and how these link up to synergies or trade offs across the adaptation, mitigation, SD nexus. The framework and proposed indicators are presented as static and disconnected but in the real world they are dynamically linked. Some research has looked at how to do this eg Trade-offs and synergies in urban climate policies V Viguié, S Hallegatte - Nature Climate Change, 2012 [Jan Corfee-Morlot, France]	this box was significantly revised to address this comment and other similar comments
10422	30		33		Box 1.3 on pp 1-30 – 1-33 is really useful but [Jonathan Lynn, Switzerland]	this box was significantly revised to address this comment and other similar comments
19679	30		33		Box on feasability - would be good to conside the human rights and ethical aspects of feasbility as part of 3) the social and institutional dimensions (see line 3 page 31). The issues are merely referenced in the table on page 33. [Tara Shine, Ireland]	this box was significantly revised to address this comment and other similar comments
6606	30		32		Box 1.3: The term 'feasibility' used to describe an organising principle for the report implies that the future can be known with any degree of certainty, and that time is linear, thereby justifying a focus on content rather than on process - 'what' we do, rather than 'how' we do it. Complex systems and complexity literature argues that the world is essentially unknowable and unpredictable, subject to unintended consequences. From a complexity lens, then, no amount of reductive research to disentangle the various aspects of feasibility will provide an exact roadmap of sufficient enabling conditions, although this remains a useful exercise. Research and action in complexity is based on a different premise - one which prioritises working with perspectives and values, a focus on process, experimentation and innovation, to create the future. My concern is not with the analysis of the box, but rather with the descriptor 'feasibility'. Using 'enabling conditions' as an alternative term puts a greater emphasis on what can be done in the present to create feasibility. [Emily Tyler, South Africa]	this box was significantly revised to address this comment and other similar comments
3381	30	1	30	1	or its resilience OF WHAT??? [Paul Doyle, Canada]	Agreed and noted. Changes will be made accordingly
13618	30	1	30	2	This sentence does not fit here – it talks about vulnerability not environmental ethics. [Elvira Poloczanska, Germany]	Agreed and noted. Changes will be made accordingly
1172	30	3	30	15	What is 'incremental transformation'? Consider deleting the 2nd paragraph, doesn't seem to add anything. [Petra Tschakert, Australia]	text was edited to reflect these concerns
6053	30	6	30	8	Unclear sentence. What is promoting? Is it the drivers? If so should be "promote" not "promotes"? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	text was edited to reflect these concerns
10423	30	6	30	8	sentence difficult to read, especially “root, contextual and proximate drivers” and should be promote not promotes in line 7 [Jonathan Lynn, Switzerland]	text was edited to reflect these concerns
3382	30	7	30	7	CHANGE together "promotes" to "promote" [Paul Doyle, Canada]	noted
10369	30	7	30	7	should say "...when acting together promote increased…" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Noted
15265	30	7	30	7	copy edit: "promote" should be "promotes" [Pauline Midgley, Germany]	Noted
9260	30	8			Add: Pathways to urban transformation include integration of mitigation and adaptation, multi-time scale approach to disaster risk reduction and climate change adaptation, inclusion of full range of stakeholders and scientists, attention to the needs of the most disadvantage and vulnerable citizens (Rosenzweig et al., 2015) [Cynthia Rosenzweig, United States of America]	Noted
1655	30	10	30	10	I would change the word "equity" to "justice" to be more consistent with its usage in law and ethics. [Jesse Keenan, United States of America]	Noted
6054	30	10	30	13	Unclear sentence. Suggest checking grammar. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted and action taken
3383	30	12	30	12	CHANGE ..."and of use"....to "and will also be of use".... [Paul Doyle, Canada]	Noted
10370	30	12	30	12	should say"…potential transition pathways and are of use…" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Noted
15266	30	12	30	12	copy edit: "and of use by" presumably should be "and can be of use by" or "and are of use by" [Pauline Midgley, Germany]	Noted and action taken
20540	30	13	30	13	Extreme events are associated with windows of transformational change. This statement is intuitive but is not borne out by research, most notably following Hurricane Katrina, which demonstrated that following extreme events people desire to reestablish the fomer status quo as soon as possible (e.g. Kates. R.W. et al, 2006, Reconstruction of New Orleans after Hurricane Katrina: A research perspective. PNAS, 103: 40, 14653-14660, doi: 10.1073/pnas.0605726103) [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Noted and references will be assessed
7137	30	13	30	13	Comment - Extreme Weather Events can be interpreted in a variety of ways by those impacted. Suggestion: Extreme events are associated with windows of transformational change but can be interpreted in a variety of ways by impacted communities that can either help or hinder action. Reference: Capstick et al (2014) Public perception of cold weather events as evidence for and against climate change. , ; Carmichael, J; Huxster, J.K (2017). The great divide: Understanding the role of media and other drivers of the partisan divide in public concern over climate change in the USA, 2001–2014 Climatic Change 141 (4), 599. [Jamie Clarke, United Kingdom (of Great Britain and Northern Ireland)]	thanks and the references were reviewed
4923	30	14	30	15	I agree with this statement, but it is not particularly actionable as it is written and it's not clear where relevant information about historical analogues can be found. Recommend rephrasing to emphasize the importance of historical, archaeological, and anthropological research. Relevant case studies can be found in: Cooper, Jago and Payson Sheets (eds) (2012). Surviving Sudden Environmental Change: Answers from Archaeology. University Press of Colorado, Boulder, CO. [Marcy Rockman, United States of America]	Noted and references will be assessed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12816	30	18			This is a very useful box! It says on line 25 that it "assessed the notion of feasibility ...". Here again, careful attention should be paid to where you present an assessment and where you just outline or frame a context. If you carry out an assessment already in Chapter 1, it would need to be based on multiple lines of independent evidence, firmly rooted in the literature, and be delivered with the uncertainty language. [Thomas Stocker, Switzerland]	this box was significantly revised to address this comment and other similar comments
3132	30	18			Box 1.3 should be drastically shortened, and perhaps the shortened version should be moved to and integrated into the scenario discussion in chapter 2. After all, it is the scenarios that help determine the feasibility or not of 1.5 degree non-overshoot versus overshoot scenarios. This report should focus on comparing and contrasting all aspects of 1.5 degree non-overshoot versus 1.5 degree overshoot scenarios versus 2.0 degree non-overshoot scenarios. Generally, all the boxes thusfar in the report are a diversion and distraction from the main text. They make the report more difficult to read and digest. [Richard Rosen, Germany]	this box was significantly revised to address this comment and other similar comments
12351	30	18			While I fully understand the motivation for this box, I could not fully follow the logic of what has been presented. The multi-dimensional way the concept is presented, it feels like full feasibility can only be defined 'ex-post', which probably true but also a bit tautologic. The value of such a concept, however, would be in ex-ante assessments that need to rely reduction of dimensionality at the price of increased uncertainty. Uncertainties related to feasibility assessments are not sufficiently discussed here in my view. [Bill Hare, Germany]	this box was significantly revised to address this comment and other similar comments
3280	30	18			Box 1.3 could be shortened by making the text more concise. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
20187	30	18			Definition of/Framing of 'feasibility' in the context of limiting global... [Ton Wildenborg, Netherlands]	this box was significantly revised to address this comment and other similar comments
21049	30	18	30	18	the title of the box is measleading. It should be something like: Feasibility framing for limiting global temperature…. This box is really interesting but at teh end is too vague. It could therefore be shortened. [alessandra conversi, Italy]	this box was significantly revised to address this comment and other similar comments
16138	30	18	30	30	As a general comment on this box, is the goal really to sustain 1.5 C, or to peak at 1.5 C and decline from there (or choose 2 C). If actions are taken that will keep the world below 1.5 C, those actions will lead to a further cooling thereafter--that is, if we actually make a full transition away from fossil fuels (so net zero release of CO2, or even go to negative emissions to do it), it will actually later take ongoing emissions at a higher level than the minimum to sustain the temperature. For example, we might go to zero methane emissions to get there--would we then bring them back up to sustain 1.5 C. It seems to me the objective needs to be peaking at no more than 1.5 C (or 2 C) and then heading back to a level of warming that is optimally suited for the world (and to limit the rate of sea level rise it may be going back to the radiative forcing of zero compared to preindustrial or even below). So, I just do not like the idea of talking about a sustained 1.5 C world--there is damage enough now that we likely don't want even a 1 C world. Instead we'd like perhaps a 0.5 C or less world, per Hansen et al. So, in the text for this box, I think the focus needs to be on peaking at 1.5 C and explaining why we have to take actions to go lower--and certainly not take actions that tend to keep us as high as 1.5 C above preindustrial; the UNFCCC objective may be to go to steady state at a higher temperature, but this really would likely to be more harmful than those who created that objective understood. [Michael MacCracken, United States of America]	this box was significantly revised to address this comment and other similar comments
5698	30	18	32	30	The text is too long. Needs to be more concise and focused. [Hong Yang, Switzerland]	this box was significantly revised to address this comment and other similar comments
1173	30	18	32	32	The section (Box 1.3) on 'process of feasibility framing' should also include a brief discussion on the role of personal and collectively-held values in shaping notions of feasibility. This would strengthen emphasis upon 'social acceptability' as a factor underlying feasibility, which is currently lacking throughout the box. This is important for how we understand equity and justice within climate-resilient development pathways (section 5.7). At LAM3, we may want to discuss which of the empirical measures under each feasibility dimension is actually used in other chapters. [Petra Tschakert, Australia]	this box was significantly revised to address this comment and other similar comments
11680	30	18	32	32	This box is generally poorly written (there are far too many typos) and without sufficient focus (too much vague aspirational jargon and not enough focused, real-world application). [David Schoeman, Australia]	this box was significantly revised to address this comment and other similar comments
2367	30	18	31	55	Box 1.3 There are too many boxes throughout the report. Nothwithstanding this issue, this box is written in different "persons". For example 31 line 20 “One's entry point to the question of feasibility and the conditions in which one is interested will influence who they engage with the concept of feasibility and the associated operational indicators.” Could be better written as “The entry point to the question of feasibility and the conditions in which stakeholders are interested will influence who is engaged with the concept of feasibility and the associated operational indicators.” Overall this box is waffly and needs to be more concise. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
10189	30	18	32	32	The feasibility box is worthwhile. I think is is too definite in its views - uncertainties and caveats need to be added. Words like "seminal" and phrases such as "Key is to acknowledge", “It will be important to define indicators " etc. Are too teachy and dogmatic. We should be assessing the literature rather than telling people. [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
10964	30	18	32	32	It would be good to go just a few steps beyond a conceptual discussion. One issue is the diffrence in feasibility between overshoot and non-overshoot scenarios. With the latter we could crash into a geophysical barrier quite soon, [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
9965	30	18	32	32	Box 1.3 Nice die to disentangle feasibility in these 3 dimensions (that are realy 6 and quite close to those used in the livelihood approach). HOWEVER the relevant question for transition governance is how to assess the co-benefits and trade-offs between these dimensions. Thus the authors need to go forward in presenting options (based on scientific knowledge) for undertaking such an assessment and -if possible - present a balanced report of what has been learnt until now on this repect. [Carmenza Robledo Abad, Switzerland]	this box was significantly revised to address this comment and other similar comments
1013	30	18	32	32	Feasibility of 1.5 degree is the most important issue in this report. Box 1.3 on the notion of feasibility of 1.5 degree is a good guidance. That said, it would be better in this chapter to show briefly the outcome of the studies of the feasibility in the following chapters. Readers canonot know of the feasibility until they read all chapters. [Mitsutsune Yamaguchi, Japan]	this box was significantly revised to address this comment and other similar comments
12246	30	18	33	3	This box is very useful and important. Some sharpening and improvements in presentation is needed [Jan Fuglestvedt, Norway]	this box was significantly revised to address this comment and other similar comments

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5098	30	18	33	3	Box 1.3 discussing the concept of feasibility is extremely useful and would likely be better placed earlier in the overall framing chapter. It succinctly unpacks the multidimensionality that is discussed in other sections of chapter 1. The table provides concrete examples (in the sample empirical measures) of the dimensions being discussed. [Tonya Rawe, United States of America]	this box was significantly revised to address this comment and other similar comments
15021	30	18	33	4	Box 1.3 seems important to framing the report's discussion around feasibility for limiting global temp to 1.5C. Should this be part of a main chapter near the start rather than planted as a box? [Farhan Akhtar, United States of America]	this box was significantly revised to address this comment and other similar comments
4516	30	23			Leave out the word "Climate" to be consistent with the whole Report. [Radim Tolasz, Czech Republic]	this box was significantly revised to address this comment and other similar comments
6055	30	23	30	30	This paragraph is really helpful "signposting" for the reader, might be useful to add more like this to other sections. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
12247	30	24	30	25	these two references are not needed here; this is a very general statement. [Jan Fuglestvedt, Norway]	this box was significantly revised to address this comment and other similar comments
21050	30	28	30	29	the box does not directly address…. Could you explain why here? [alessandra conversi, Italy]	this box was significantly revised to address this comment and other similar comments
5583	30	29			refer to parts of the report, where these aspects are addressed [Astrid Kiendler-Scharr, Germany]	this box was significantly revised to address this comment and other similar comments
3384	30	29	30	29	ADD ....warming "to" 1.5°C [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
6056	30	34	30	34	This approach - which approach? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
15268	30	34	30	35	copy edit: change "requirements of 1.5°C world" to "requirements of a 1.5°C world" [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments
15267	30	36	30	36	copy edit: delete unnecessary parentheses around Robinson 1982 [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments
522	30	40	30	43	A large literature exists on technical feasibility…(IPCC 2013b, 2014c). Those references are over three years old. The most detailed and recent feasibility study of eliminating emissions country-by-country for 139 countries of the world is M.Z., M.A. Delucchi, Z.A.F. Bauer, S.C. Goodman, W.E. Chapman, M.A. Cameron, Alphabetical: C. Bozonnat, L. Chobadi, H.A. Clonts, P. Enevoldsen, J.R. Erwin, S.N. Fobi, O.K. Goldstrom, E.M. Hennessy, J. Liu, J. Lo, C.B. Meyer, S.B. Morris, K.R. Moy, P.L. O'Neill, I. Petkov, S. Redfern, R. Schucker, M.A. Sontag, J. Wang, E. Weiner, A.S. Yachanin, 100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for 139 countries of the world, Joule, 1, doi:10.1016/j.joule.2017.07.005, 2017, http://web.stanford.edu/group/efmh/jacobson/Articles/I/WWS-50-USState-plans.html. Please include this reference. [Mark Jacobson, United States of America]	this box was significantly revised to address this comment and other similar comments
15228	30	42	30	42	Citation of IPCC 2013b but there is only one IPCC 2013 citation given in the list of references on p48, to the WGI AR5 SPM; please check/correct [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments
3385	30	50	30	50	CHANGE..... "inform on" to "clarify".... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
893	30	50	30	50	to inform on: To my ear, this sounds like espionage. Perhaps "to provide information about"…. [Sarah Gille, United States of America]	this box was significantly revised to address this comment and other similar comments
17846	30	54	32	30	Box 1.3 on Feasibility is lacking literature assessment, or literature to support the discussions within the Box. [Wilfran Moufouma Okia, France]	this box was significantly revised to address this comment and other similar comments
13619	31	2	31	3	How is 'incremental transformation' being defined here? Compare to AR5 WGII e.g. see p181, 198, 903, 1106 doesn't seem to be the same [Elvira Poloczanska, Germany]	this box was significantly revised to address this comment and other similar comments
1074	31	9	31	11	People will want a yes or no answer if we can get to 1.5c. Will be important to point them to this sentence. Suggest putting it in bold or a box: It is not a matter of answering by 'yes' or 'o' regarding the feasibility of limiting warming to 1.5c; it is rather a frame to organize the different types of enabling conditions for transformations compatible with a 1.5c world. [Martini Catherine, United States of America]	this box was significantly revised to address this comment and other similar comments
12960	31	9	31	14	This box should reflect that "feasibility"of staying in 1.5 degree limit very much depends on where one comes from. For many SIDS and Arctic communities, this is not a question of feasibility but of necessity as they are already witnessing many impacts. This also links with L&D, and to what extent are we ready to dicuss the 'feasibility' of increased Loss and Damage. [Johanna Nalau, Australia]	this box was significantly revised to address this comment and other similar comments
12248	31	11	31	11	I suggest changing "speak to" --> "build on". In my view, we want to commuicate accross discplines, while we build on input from the dedisicplines on different concepts/topics. [Jan Fuglestvedt, Norway]	this box was significantly revised to address this comment and other similar comments
3386	31	12	31	12	CHANGE ..."engineering/economists".....to ...."engineering/economic"..... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
6451	31	16	31	18	Sentence should be reworded for clarity. [Jonny Williams, New Zealand]	this box was significantly revised to address this comment and other similar comments
7138	31	17	31	18	Comment: The promise of technological solutions can result in a rebound effects where populations interpret this solution as meaning there is no need for individual action. Suggestion: insert sentence " Key is to acknowledge a comprehensive set of enabling conditions to limiting temperature increase to 1.5°C above pre-industrial levels, and to understand how different feasibility dimensions are related and how they impact on one another for example there is evidence that learning about certain negative emission tehchnoloigical strategies indirectly reduces support for mitigation policies by reducing the perceived threat of climate change" Reference: Campbell-Arvai, V., Hart, P.S., Raimi, K.T. et al. Climatic Change (2017) 143: 321. https://doi.org/10.1007/s10584-017-2005-, Meijers M. H. C., and Rutjens B. T. (2014), Affirming belief in scientific progress reduces environmentally friendly behaviour, Eur. J. Soc. Psychol., 44; pages 487–495, doi: 10.1002/ejsp.2009 [Jamie Clarke, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
15269	31	20	31	20	To improve readability, I suggest changing "One´s entry point " and "in which one is interested" to "An individual´s entry point " and "in which they are interested" [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments
4888	31	20	31	21	Feasibility is an important issue, and it is well captured in this box that feasibility has different dimensions. However, here you introduce the idea of "the concept of feasibility", which is questionable. There is no need to classify feasibility as a "concept", and this does not seem to add value here, especially when considering that the assessment is already overly full with rather theoretical and academic notions. This should be rewritten, for example "the concept of feasibility" could simply be replaced by "the aim of feasibility" or "the core dimensions of feasibility". [Sigrid Kusch, Germany]	this box was significantly revised to address this comment and other similar comments
10424	31	20	31	21	sentence does not read well. How about "An individual's entry point to the question of feasibility and the conditions that interest them will influence who they engage with the concept of feasibility and related questions."? (Still not very clear) [Jonathan Lynn, Switzerland]	this box was significantly revised to address this comment and other similar comments
3387	31	26	31	26	DELETE ....."in what to do"..... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
15270	31	27	31	27	copy edit: change "to within" to "within" [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments

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3388	31	33	31	33	CHANGE ..."their" ...to .."its"... and ADD ...."within them"? [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
10425	31	33	31	33	"…have embedded within system level functions that could…" doesn't read. Perhaps "… have embedded within them system-level functions that could…" [Jonathan Lynn, Switzerland]	this box was significantly revised to address this comment and other similar comments
1287	31	35	31	37	It should be noted, however, that economies of scale are likely to decrease per-unit costs of larger installations, relative to the present-day. [Colin Raymond, United States of America]	this box was significantly revised to address this comment and other similar comments
15022	31	35	31	37	more rapid deployment of technology and larger installations… implies increased costs and reductions in social acceptability… -- this is not necessary true and appears to be a sweeping blanket statement without any references. Tech deployment can have positive impacts as well. [Farhan Akhtar, United States of America]	this box was significantly revised to address this comment and other similar comments
3281	31	41			Change 'another' to 'other' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
2090	31	41	31	41	"are other important documents" NOT another! *** too many typos! Has it been proof-read? I am not pointing out more! [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
3389	31	41	31	41	CHANGE..."another"....to ..."other".... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
894	31	41	31	41	are another important elements --> "are other important elements" [Sarah Gille, United States of America]	this box was significantly revised to address this comment and other similar comments
15271	31	41	31	41	copy edit: change "are another important" to "are other important" [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments
3390	31	48	31	48	CHANGE ...."decade or two".....to ....."two decades"..... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
12349	31	49	31	51	According to Ch 02 near-term action is decisive to achieve 1.5. Either provide an concrete example or refrain from generalized statements contradicting key findings of the report [Bill Hare, Germany]	this box was significantly revised to address this comment and other similar comments
13041	31	49	31	51	an example of a case in which action that promote a near-term trajectory impact negatively a longer term feasibility could be very useful [Caserini Stefano, Italy]	this box was significantly revised to address this comment and other similar comments
3391	31	52	31	52	CHANGE ....longer "geophysical" feasible... to..... longer "geophysically" feasible... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
15272	31	52	31	52	copy edit: "geophysical feasible" should be "geophysically feasible" [Pauline Midgley, Germany]	this box was significantly revised to address this comment and other similar comments
3392	31	53	31	53	CHANGE...."be no longer"...to..."no longer be",,,,, [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
12350	32	5	32	13	This is purely speculative. No references are given. It is not clear, why this example was chosen. Please delete [Bill Hare, Germany]	this box was significantly revised to address this comment and other similar comments
10654	32	7	32	12	Others have called into question the ability of BECCS to provide sufficient mitigation in the near-term, both in terms of whether BECCS is carbon neutral and whether it can be scaled quickly enough. (This is discussed in another section of the report, but should be mentioned here too). [Kristin Campbell, United States of America]	this box was significantly revised to address this comment and other similar comments
5906	32	7	32	9	It says that it is possible to deploy BECCS quickly in Europe. I suggest including North America in addition to Europe. North America has similar possibilities as Europe for a fast deployment. [Aage Stangeland, Norway]	this box was significantly revised to address this comment and other similar comments
4271	32	7	32	9	I strongly recommend including at this point of the Document some information based on recent research about the adverse effects of residential biomass combustion on the local levels of air pollutants currently regulated by air quality standards, such as particulate matter (PM), CO and NOx. After the sentence "In Europe…" I suggest including the next one: It should also be noted that residential wood combustion is considered the largest source of organic PM that includes well-known human carcinogens such as Benzo(a)pyrene (BaP). For this reason, emissions generated by the use of biomass as residential fuel can contribute considerably to adverse effects on human health. Biomass combustion in private homes has risen across the EU-28 in most countries due to a number of factors that include the environmentally friendly perception of biomass and the implementation of local policies that stimulate the installation of biomass stoves in newly built or refurbished homes (EEA, 2016 and references therein). A recently published paper has demonstrated that the use of biomass resulting from the olive oil production for residential heating and industry must be considered the most important aerosol source during the winter months, leading to exceedances of the PM10 daily limit value of 50 µg/m3 (Sánchez de la Campa et al., 2018). These results can be extrapolated to other olive oil producing areas in the Mediterranean basin. EEA, 2016. Air Quality in Europe - 2016 report. EEA Report , Nº 28/2016, doi: 10.2800/413142. Sánchez de la Campa, A.M., Salvador, P., Fernández-Camacho, R., Artíñano, B., Coz, E., Márquez, G., Sánchez-Rodas, D., de la Rosa, J., 2017. Characterization of biomass burning from olive grove areas: A major source of organic aerosol in PM10 of Southwest Europe. Atmospheric Research 199 (2018) 1–13. http://dx.doi.org/10.1016/j.atmosres.2017.07.032. Available online 06 september 2017. [Pedro Salvador, Spain]	this box was significantly revised to address this comment and other similar comments
3393	32	8	32	8	CHANGE all after "but" to "if there is limited biomass available regionally, this would limit the"..... [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
2507	32	11	32	13	This appears to be policy prescriptive ("need to be recognized") [Robert Koppu, United States of America]	this box was significantly revised to address this comment and other similar comments
9204	32	15	32	16	I would love to see SR15 and AR6 framed around feasibility ("organising principle"), but I am quite unsure how this plays out. For example, do the authors see that Chapter 2 is organised around feasibility? I love this box, but I am unsure how it will play out (I know many in Ch2 may disagree wwith it?) [Glen Peters, Norway]	this box was significantly revised to address this comment and other similar comments
10965	32	17	32	17	I'd be cautious about describing this as an organizing principle. Wasn't in the UNFCC invite [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
2702	32	17	32	22	I would not support this delineation of how the different chapters deal with feasibility. Ideally, we need to have an integrated discussion of feasibility to take decisions - this is certainly what is needed in the real world. Chapter 3 does not only deal with environmental feasibility, and Chapter 5, I think, should aim for the most integrated discussion possible. [Penny Urquhart, South Africa]	this box was significantly revised to address this comment and other similar comments
7023	32	18	33	3	Chapters 2-5 do not exactly agree with the 3 dimensions in Box 1.3, but mix e.g. in Ch 2 Geophysical and Technological, and e.g. in Ch 4 almost everything. Could these different associations be motivated? [Érika Mata, Sweden]	this box was significantly revised to address this comment and other similar comments

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1831	33				Table 1, header of the 3rd column: it would be more correct to name it as “Sample of empirical measures” ((explanation: in Box 3.1 “The empirical measures provided are but a sample of variables that could be considered” therefore those are examples of the relevant operational indicators, i.e. it is not a ‘closed’ list)) [Tibor Farago, Hungary]	this box was significantly revised to address this comment and other similar comments
4517	33				Box 1.3, Tab 1 - Leave out the first column and rename second one as "Dimensions". [Radim Tolasz, Czech Republic]	this box was significantly revised to address this comment and other similar comments
5584	33				Box 1.3, Table 1: Unify the way of presenting empirical measures. How can a question provide an empirical measure? Are the two measures in the Geophysics “Is there enough geological storage capacity” and “Physical feasible – C geological storage capacity (Is there opportunity in for geophysical capture?)” distinct from each other? [Astrid Kiendler-Scharr, Germany]	this box was significantly revised to address this comment and other similar comments
10535	33		33		Box.1.3. Table 1: Dimensions of… The fonts are very small, hard to read. [Linda Yanti Sulistiawati, Indonesia]	this box was significantly revised to address this comment and other similar comments
15023	33		33		Box 1.3, table 1: under "Technological" -- "what are the needed investment on R&D?" -- recommend deleting. This is an open ended question and the authors cannot quantify a needed investment amount in R&D in order to reach 1.5C. Any literature on the topic would have to make unrealistic assumptions. There is always more to invest in R&D, and it's not at all simple to match R&D investment to tech deployment and emissions reductions. Policies and institutions are far more important than R&D, and with falling technology costs the technology is available now to reach 2 or 1.5C goals. [Farhan Akhtar, United States of America]	this box was significantly revised to address this comment and other similar comments
6947	33	1	33	1	The texts in the table should be more legible. [Yuki Ishimoto, Norway]	this box was significantly revised to address this comment and other similar comments
3394	33	1	33	1	Box 1.3 Table 1. Some typos within and proof reading needed. [Paul Doyle, Canada]	this box was significantly revised to address this comment and other similar comments
14205	33	1	33	1	Box 1.3 Table 1: dimensions of feasibility: Under ‘technological’ nuclear power is being anti-deployed in Japan, Germany and the United States. This is leading to even more difficulty in reducing CO2 emissions. [Jason Donev, Canada]	this box was significantly revised to address this comment and other similar comments
15316	33	1	33	1	In table 1.3. , under "technological", intellectual property should be included. Similarly "economic/market prospect" of the technology should be referred. It will have a strong impact in the success and the financial frame of the technology (need of public funding, support via policy ...) [Francisco Javier Hurtado Albir, Germany]	this box was significantly revised to address this comment and other similar comments
6659	33	1	33	3	Table 1: in Dimension "Technological and Economic" there should be a hint to lock-in into certain technologies [Astrid Schulz, Germany]	this box was significantly revised to address this comment and other similar comments
3633	33	1	33	3	Several errors in Box 1.3 table 1: Is there opportunity in{delete} for geophysical capture? Risks associated to{should be with} irreversible changes. What are the needed investment{s} on{in} R&D [Robert Shapiro, United States of America]	this box was significantly revised to address this comment and other similar comments
7993	33	1	33	3	Several errors in Box 1.3 table 1: Is there opportunity in{delete} for geophysical capture? Risks associated to{should be with} irreversible changes. What are the needed investment{s} on{in} R&D [Robert Shapiro, United States of America]	this box was significantly revised to address this comment and other similar comments
11445	33	1	33	3	Cost and innovation curves could be included in Table 1 given their relationship to technology adoption rates [Stewart Lockie, Australia]	this box was significantly revised to address this comment and other similar comments
10966	33	1	33	3	Like the table! [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
6057	33	1	33	4	I like this table a lot, but I think some of the indicators need rephrasing - may not stand well on their own e.g. geological storage capacity - does that refer to carbon burial/CCS? Also "proportion of the change required" - what does that refer to? Could be more clear. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
10190	33	1	33	4	This table is a nice idea but entries cannot be understood out of context "eg. What does "rate of land-use change refer to?" planting trees fast enough to capture carbon - halting deforestation? I* think it would be better as concrete examples [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
12918	33	1	33	5	In Table 1, a carbon tax for countries with high level of CO2 emission is a solution? [Mustapha Meftah, France]	this box was significantly revised to address this comment and other similar comments
17295	33	1	33	5	nice figure concept, could be a key one. It would be good to see much more options in it. [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	this box was significantly revised to address this comment and other similar comments
10191	33	5	36	8	I liked this section and the two figures [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thanks
12352	33	6			Why is a discussion of trade-offs and synergies included here, given that it is one of the core topics of Chapter 04 and 05 [Bill Hare, Germany]	Chapter 1 is a framing chapter: all concepts that come up later should be introduced in chapter 1.
1174	33	6	35	23	Synergies between adaptation, mitigation and sustainable development is covered in much more detail in section 5.6. Introduce these linkages conceptually but refer to 5.6 for an assessment of the literature. [Petra Tschakert, Australia]	New text links to Chapter 5, as suggested.
19682	33	6	35	23	The risks posed by climate reponses compatible with a 1.5 pathway to human rights are compared to the risk posed by climate impacts in a paper by the Mary Robinson Foundation. This would be a useful inoput to this section. See Zero Carbon Zero Poverty the Climate JustiCe way Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015. Online at http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	This section does not have space to include human rights, which are addressed elsewhere (1.4.1)
19683	33	6	35	23	The report in the box above also addreses synergies between climate action and sustainable development / poverty reduction. [Tara Shine, Ireland]	Noted.
2777	33	6	36	9	Section 1.4.4 discussion related to tradeoffs between climate change and SDGs glosses over the major differences in the timeframes. All of the SDGs have shorter time frames, often one ot two decades, than climate change. Delayed action on climate change has larger consequences for climate and other SDGs than delayed action on SDGs. That addresses Bjorn Lomborg's argument that more resources should be devoted to reducing poverty, preventing disease, educating the illiterate and feeding the hungry (achieving SDGs) than to addressing climate change. [Erik Haites, Canada]	Good point: text added.
2778	33	6	36	9	Section 1.4.4 is analytically weak, essentially a litany of examples. For climate the tradeoffs are mitigation, adaptation and residual damages (not mentioned in the section). Sustainable development is not defined -- tradeoffs assume weak sustainability (substitutability of resources). The examples cited are almost all partial effects (specific mitigation or adaptation measures and some aspects of sustainable development) rather than comprehensive effects (mitigation and adaptation and residual damages with all aspects of sustainable development), although there probably are no studies of comprehensive trade-offs. [Erik Haites, Canada]	Section rewritten following reviewer notes and input from Chapter 5.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5103	33	6	35	23	This subsection (1.4.4) could be organized a bit more clearly. Issues of trade offs (or examples) are highighted in the first para (pg 33 lines 6-23) and again toward the end of the section (pg 35, lines 8-11). These could be placed together with the initial paragraph providing context -- including the SDGs and Sendai. One or two examples could be elaborated. For instance, agriculture and food security are used as examples where an adaptive response may result in higher emissions (pg 33 lines 10-13) and where a mitigation response may negatively impact food security (pg 35 lines 8-9). These could be coupled to provide a richer discussion of trade offs and the links with SDGs. The paragraph (pg 33 lines 25-30) on urban indicates that urban areas exemplify synergies -- but there are no examples. The reference to CDR and SRM is dropped in with little discussion, as is the mention of Sendai. The section could begin (as stated) with the broader context (focusing primarily on SDGs and the potential for trade offs and synergies), with clear examples (e.g. agriculture to capture a rural example, followed by an urban example -- in both cases, perhaps making reference to examples included in the figure like agroecology and water/energy conservation). Finally, the notions of ethics and equity (in the title of section 1.4) have dropped out of the discussion to some extent. They are very relevant considerations for the section 1.4.4 discussion of trade offs (icluding intergenerational equity). LIkewise, while governance is a subsection in section 1.4, the role of governance in helping to navigate trade offs in a manner that upholds equity and ethics is an important one to weave into this subsection. [Tonya Rawe, United States of America]	Section rewritten following reviewer notes and input from Chapter 5.
9966	33	6	35	9	Section 1.4.4 Trade-offs and synergies of adaptation, mitigation and sustainable development. This is an important section for the framing of the whole report and it is good to see that adaptation and mitigation are not considered as mutually excluding. However, the section is extremly bias and the examples sugest interactions that can be or not. The AR5 WG III highligts repeteadly the importance of understanding the context when assessing the co-benefits and trade-offs between climate action and sustainable development. Studies done after the AR5 and focussing on the need to understand these interactions have demonstrated that there is still a big knowledge gap and that impacts of mitigation activities are very often attributed in an arbitrary way. Thus it is extremly important that this report turns the focus towards the analysis of the relationship context - climate action, because it is in this interaction where a given activity has synergies or trade-offs and not merely as a intrinsic characteristic of the climate action. For an example of rigorous research done on the impacts on sustainable development of a group of mitigation activities you can see Robledo Abad, C., Althaus, H.-J., Berndes, G., Bolwig, S., Corbera, E., Creutzig, F., Garcia-Ulloa, J., Geddes, A., Gregg, J.S., Haberl, H., Hanger, S., Harper, R.J., Hunsberger, C., Larsen, R.K., Lauk, C., Leitner, S., Lilliestam, J., Lotze-Campen, H., Muys, B., Nordborg, M., Ölund, M., Orlowsky, B., Popp, A., Portugal-Pereira, J., Reinhard, J., Scheiffle, L., Smith, P (2017). Bioenergy production and sustainable development: science base for policy making remains limited. GCB Bioenergy 9, 541–556. (DOI: 10.1111/gcbb.12338). Available at: http://onlinelibrary.wiley.com/doi/10.1111/gcbb.12338/full [Carmenza Robledo Abad, Switzerland]	Section rewritten to remove biofuel example, and focus on well-researched examples, in collaboration with chapter 5.
13687	33	7	33	9	Trade-offs such as the current biodiversity crisis due to combined use of agrochemicals and excessive landuse for bioenergy should also be mentioned. [Elvira Poloczanska, Germany]	Section is too short to mention all examples, unfortunately, but rather introduces concepts which are expanded upon in Chapter 5.
6060	33	8	33	10	I don't really understand the reference to pathways here. All in all this sentence is a bit confusing. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rephrased.
14206	33	8	33	11	A specific definition distinguishing between mitigation and adaptation would be helpful. [Jason Donev, Canada]	Section added to define responses (Section 1.4.2).
7720	33	8	33	8	Put coma after “adaptation” [Hilary Inyang, Nigeria]	Sentence rephrased.
6059	33	8	33	8	Are mitigation and adaptation climate responses? Or responses to climate change? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rephrased.
14980	33	8	35	23	The relative economic impacts from a faster rate of decarbonization appears to be missing in this section. Pursuing efforts to limit warming to 1.5 degrees will have implications on development as well as the economies of communtiies dependant on fossil fuels which have locked in infrasturcture. [Farhan Akhtar, United States of America]	Section is too short to mention all issues, unfortunately, but rather introduces concepts which are expanded upon in later chapters.
2294	33	9	33	10	Is it "1.5 deg C versus 2 deg C" as stated in the FOD, or "1.5 deg C versus well below 2 deg C" using the wording of Article 2 of the Paris Agreement? Is it clear what the Paris Agreement means by "well below 2 deg C"? 1.8 deg C? [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Definition of 1.5C is in Section 1.2.
1288	33	9	33	9	The word 'affects' should be 'effects'. [Colin Raymond, United States of America]	Sentence rephrased.
6058	33	11	33	13	I don't quite get this - the adaptive capacity of irrigation techniques can build resilience? What does that mean? Perhaps remove the first part, so it's just - irrigation techniques can build resilience (through increasing adaptive capacity), but can require greater carbon emissions. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten to avoid sentence.
20188	33	12			…resilience to weather hazards or other threats but also….. [Ton Wildenborg, Netherlands]	Section rewritten to avoid sentence.
17847	33	13	33	13	is not talking about definitions, is this the correct reference being used here? [Wilfran Moufouma Okia, France]	Different citation used in rewrite.
13042	33	13	33	15	Delete the sentence "from the mitigation ….ipcc2014e", not necessary and already written several times [Caserini Stefano, Italy]	Section rewritten to avoid sentence.
12250	33	13	33	19	This is well known and rather obvious, so I suggest shortening or deleting this. [Jan Fuglestvedt, Norway]	Section rewritten to avoid sentence.
4426	33	15		18	What degree do the extreme measures including CDR and SRM change the temperature? [Jingyong Zhang, China]	Section rewritten and CDR and SRM descriptions added in different section.
3625	33	15	33	16	The description of CDR and SRM as "extreme" measures is a subjective and loaded term. The authors should opt for a more objective terminology [Rob Bellamy, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten and CDR and SRM descriptions added in different section.
2463	33	16	33	17	highlight the fact that technology alone inadequate in and of itself--adaptation/behavioral change just as critical [Lisa Lucero, United States of America]	We add sentence on behavioural changes in energy efficiency as an example from Chapter 5.
7934	33	16	33	17	Is CDR referring to direct air capture of CO2? Could a paragraph on CCS be added to this section? Carbon dioxide Capture and Storage (CCS) is a demonstrated technology and the only way we can currently achieve large scale negative emissions (coupled with biomass) as reported in AR5. Could CCS be mentioned in this section, but not as an 'extreme' resort since it is already proven from a technology perspective and CO2 is already being stored, just not on a large enough scale to achieve climate targets (GCCSI 'global status of CCS' 2016). [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten and CDR and SRM descriptions added in different section.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12919	33	17	33	18	Solar radiation management and impact on local climate. The problem is local and global. However, the solar radiation management is global? Effects of UV solar spectral irradiance, energetics particles, … on local climate (AO, NAO, polar routes, tropical routes, Brewer-Dobson circulation, ...) and relations with solar radiation Management? [Mustapha Meftah, France]	Section rewritten and CDR and SRM descriptions added in different section.
16139	33	18	33	18	Please capitalize "Earth's" albedo--we are talking about the planet and not the dirt on land surfaces. No one would have text that talked about "venus's albedo"--so capitalize the planet's name, always. [Michael MacCracken, United States of America]	In rewrite, Earth removed from text here.
15273	33	18	33	18	copy edit: for consistency, change "earth's albedo" to "Earth's albedo" [Pauline Midgley, Germany]	In rewrite, Earth removed from text here.
19680	33	19		21	Applying a rights based approach to assessing the impacts of mitigation measures can help to identify risks and avoid actions that undermine human rights. E.g. assessingt the possible impacts of biofuels through a human rights appproach could have anticipated and mitigated impacts on the right to food. See the work of the UN Special Rapporteur on the Right to Food. [Tara Shine, Ireland]	Rights are not part of the approved outline, but are discussed as part of Ethics and Equity section (1.4.1).
3395	33	19	33	19	CHANGE "None-the-less" to "Nonetheless" [Paul Doyle, Canada]	Section rewritten.
20373	33	19	33	19	Nonetheless [Olivier Boucher, France]	Section rewritten.
3626	33	21	33	23	The authors write that ""Solar radiation management strategies which press against socially acceptable and physical limits, provide a clear example of the constraints and capacities of governance with respect to decision-making equity, and integrating levels of uncertainty into the decision-making process" yet this 'example' is not explicated. The authors should refer to empirical research that shows the challenges of SRM posed to governance and how its uncertainties can and have been accounted for in assessments and decision making (e.g. Bellamy, R., Chilvers, J., Vaughan, N. and Lenton, T. (2013): 'Opening up' geoengineering appraisal: Multi–Criteria Mapping of options for tackling climate change. Global Environmental Change, 23, 926 – 937) [Rob Bellamy, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten and CDR and SRM descriptions added in different section.
4518	33	21	33	23	Leave out the sentence or add reference to chapter 4.3.7. [Radim Tolasz, Czech Republic]	Section rewritten.
6061	33	21	33	23	Unclear sentence. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten.
20462	33	21	33	23	I do not understand what if anything this sentence means [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten.
9259	33	25			Add: Evidence shows that broad scale holistic analysis and proactive planning can strengthen synergies, improve cost effectiveness, avoid conflicts, and help manage trade-offs (Grafakos et al., 2018) Grafakos, S., Pacteau, C., Delgado, M., Landauer, M., Lucon, O., and Driscoll, P. (2018). Integrating mitigation and adaptation: Opportunities and challenges. 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. [Cynthia Rosenzweig, United States of America]	Noted: section rewritten, but not all points were able to added due to space limitations.
19681	33	25			the trade offs asscoaited with Adapation could be further explored. [Tara Shine, Ireland]	Noted: section rewritten, but not all points were able to added due to space limitations.
4427	33	25		30	Could you give an example or more details for "urban areas exemplify..... can be enhanced" [Jingyong Zhang, China]	Sentence rewritten.
13093	33	25	33	27	With respect to: lines 25-27 'Urban areas explemplify how syntergies between mitigation and adaption can be enhanched.." There is a growing body of scholarship that relates to innovation that is agnostic about geography - i.e. not all hubs of innovation are necessarily urban. An example of a pilot-stage innovative transition is on Bruny Island Tasmania - a remote island that is testing a smart grid technology; with 3 universities, an electricity utility and software developer. I am working on this remote, innovative pilot as part of my PhD. There is a misconception that "urban" because of increased population is somehow more innovative. [Veryan Hann, Australia]	Noted.
2703	33	25	33	30	Paragraph unclear, needs reformulation. [Penny Urquhart, South Africa]	Section rewritten.
10234	33	25	33	30	clarify urban areas, e.g. urban islands… [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rewritten.
11681	33	27	33	30	Why is this text quoted? It is not so profound as to evade re-writing in a more concise way. [David Schoeman, Australia]	Sentence rewritten.
6062	33	27	33	30	I don't find this quote very helpful. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rewritten.
12249	33	27	33	30	Why using inverted commas here ? 'Based on….taken'. [Jan Fuglestvedt, Norway]	Sentence rewritten.
12068	34				Figure 1.5 caption needs to explain what is shown in the Figure. The current caption is confusing as it doesn't exlpain the figure content. [Silvia Serrao-Neumann, Australia]	Figure removed.
1104	34		34		Figure 1.5. Arguably, sustainable energy could be moved under the line if one takes into account that many forms of renewables have vulnerability issues (biofuels, hydropower). Similar to air conditioning being on the left of the y-axis. [Rob Swart, Netherlands]	Figure removed.
9835	34		34		I believe Figure 1.5 does not provide beneficial information, and should be deleted or be modified greatly. [Keigo Akimoto, Japan]	Figure removed.
7301	34		34		The date reported in Footnote 4 should be corrected and instead of "2012", the year "2015" should be reported. [Eleni Kaditi, Austria]	Footnote removed.
1547	34	1	34	13	Color code for the background area in the figure is not clear : would it be possible to make it more intuitive (e.g. red is dangerous/unsafe, green is safe/vertuous) ? [Noé Lecocq, Belgium]	Figure removed.
1548	34	1	34	13	This figue is important. It should be enhanced with many examples : bicycles contributes to mitigation and adaptation, electric cars contribute to mitigation (if they use low carbon electricity), but might be less resilient to climate disruption of the electric system, hydro-power falls in the same category of high mitigation but potentially low adaptation, etc. It should be emphasized that behavior and demand-side reductions are generally good both for mitigation and adaptation. [Noé Lecocq, Belgium]	Figure removed.
6063	34	1	34	13	Colours are a bit confusing. Perhaps can label the axes to show that there are positive or negative options for mitigation, and positive or negative options for adaptation. Is there a good example of a mitigation option which might be bad for adaptation? Maybe bioenergy in a region where those crops won't grow well any more? Or building energy infrastructure in areas hit by sea level rise? Also why is industrial process improvement not contributing to adaptation? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
13287	34	1	34	13	Figure 1.5: Colours used in the figure don't have inherent meaning to the concepts they represent. Readers will have to read and remember colour mappings, or more likely, simply rely on axis labels. The colour may be distracting to the main message of the figure. Hence suggest simplifying by removing colour and providing more descriptive axis labels. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13288	34	1	34	13	Figure 1.5: Labels for the adaptation and mitigation options are typically located close to axes - and therefore may intuitively be associated as axis labels rather than the 'spaces' within the plot. To improve speed of comprehension, their distinction could be made clearer, for example using a grid, or using 'data' points alongside the option labels. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
12778	34	1	34	13	The figure 1.5 is rather poor in terms of information content and terms used are not at the same level (eg "water and energy" are not at the same conceptual level as "air conditioning" (which should be generalized to "cooling"). It could be paved by more (and more important) measures. On adaptation issues, early warnings and improved weather (and impacts) forecasting is very important to mention. Electricity demand/supply system network design is also a good example that accounts for both adaptation and mitigation. [Robert Vautard, France]	Figure removed.
12920	34	1	34	3	Improve Figure 1.5? [Mustapha Meftah, France]	Figure removed.
11446	34	2			Several of the options in Figure 1.5 are poorly expressed. For example, energy system resilience is a policy goal, not a policy option. The same is true of sustainable energy. Energy conservation, on the other hand, is an option but it can be pursued in ways that do not necessarily enhance adaptation; for example, though energy efficiency measures as the figure itself notes. If conservation is pursued through passive solar building design, however (improving thermal comfort AND reducing consuption), then the synergy is achieved. I recommend replacing aspirational goals in this figure (i.e. resilience, sustainability) with clear examples of the options available such as passsive solar design, re-forestation, urban greening, agro-forestry, water sensitive urban design, etc. [Stewart Lockie, Australia]	Figure removed.
13094	34	2	34	2	Figure 1.5. Suggested recommendation: the colour scheme on this diagram is unaesthetic - it would be advised to change this. For example, It could use simpler colours- similar to the rest of the IPCC 'palette' and could have a clearer delineation of colours so that it communicates more directly on first inspection. [Veryan Hann, Australia]	Figure removed.
11682	34	2	34	2	This figure needs development...the space to the left of the y-axis and below the x-axis seems entirely wasted. [David Schoeman, Australia]	Figure removed.
16497	34	3	34	13	I am not sure that this figure is neither very helpful or necessary? It may rather create confusion for the readers and appears very simplistic and lineaer, hence, eliminates the complexity that the authors are trying to achive throughout the text. I would discharge it. [Sonja Ayeb-Karlsson, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
17455	34	5			B [Tom Gabriel Johansen, Norway]	Figure removed.
17495	34	5			B [Angela Morelli, Norway]	Figure removed.
3396	34	5	34	13	Caption needs to be reworked for clarity. [Paul Doyle, Canada]	Figure removed.
20374	34	5	34	13	I assume AC is on the negative side of mitigation. Are there mitigation actions that are on the negative side of adaptation? [Olivier Boucher, France]	Figure removed.
7300	34	5	34	7	The coloring lebel used in Figure 1.5 does not reflect those used in the text below the Figure. Revise accordingly. [Eleni Kaditi, Austria]	Figure removed.
12921	34	7	34	7	Delete one parenthesis (Landauer et al.)). [Mustapha Meftah, France]	Figure removed.
15274	34	7	34	7	copy edit: delete the unnecesary parentheses around (Landauer et al. 2015)) [Pauline Midgley, Germany]	Figure removed.
6064	34	7	34	7	I don't think it's necessary to say "quoted in Landauer et al" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
6065	34	7	34	7	Is this an example? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
9929	34	7	34	7	There is an extra closing prentheses in (Landauer et al. 2015) [Olga Alcaraz, Spain]	Figure removed.
13620	34	8	34	9	Unclear and ambiguous sentence [Elvira Poloczanska, Germany]	Figure removed.
13621	34	12	34	13	how does the ability to adapt to CC require greater carbon emissions ? [Elvira Poloczanska, Germany]	Figure removed.
13688	34	15	34	15	this sentence is too vague, refer to WGII SPM messages [Elvira Poloczanska, Germany]	Figure removed.
13689	34	15	34	16	use the phrasing from chapter 2 rather than extreme measures (this is subjective) [Elvira Poloczanska, Germany]	Sentence rephrased.
13622	34	16	34	16	if climate change is already happening it can't be avoided only minimised [Elvira Poloczanska, Germany]	Sentence rephrased.
4254	34	16	34	22	The UN sustainable Development Goals are introduced in Chapter 1, page 1-8, lines 41-55. A different introduction is provided in Chapter 1, page 1-34, lines 16-22. This last paragraph would be better located in page 1-8. [Francisco Molero, Spain]	Section rewritten, box added.
10235	34	16	34	22	what is omitted is inclusivity - making it inclusive, acessible to all [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Sentence rephrased.
11447	34	17			It is more accurate to say that embedded within the 2030 Agenda are 17 Sustainable Development Goals. They are not two names for the same thing. [Stewart Lockie, Australia]	Sentence rephrased.
7302	34	18	34	18	Delete the text "which provide a framework for addressing the 1.5oC target". [Eleni Kaditi, Austria]	Sentence rephrased.
1832	34	18	34	19	"The SDGs include specific goals for .." à The SDGs include specific goals together with some targets for climate change (Goal 13), and such climate-related issues, as poverty eradication (Goal 1, Target 1.5), food security (Goal 2, Target 2.4), access to affordable .. ((explanation: actually, the targets are more or less specifically concrete under the generally formulated 'Goals'; those targets under Goal 1 and Goal 2 explicitly refer to significant climate related obligations)) [Tibor Farago, Hungary]	Sentence rephrased.
5105	34	20	34	21	The reference to SDGs that address equality/equity could include SDG 10 as well. The elaboration of the gender goal is awkward, as the goal is generally about gender equality and women's empowerment, while targets cut across numerous areas (not specifically education, work, and income, per se). It's likely clearer to simply refer to SDG 5, gender equality adn women's & girls' empowerment and to add SDG 10 (inequality within and between countries) which also has tremendous relevance for climate action (particularly in light of the earlier discussion of power dynamics shaping who controls and benefits from the climate action agenda. [Tonya Rawe, United States of America]	Sentence rephrased.
13623	34	25	34	26	urban areas are balancing between adaptation and mitigation - 'balancing' is not an appropriate metaphor [Elvira Poloczanska, Germany]	Sentence rephrased.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1833	35	2			The 2030 Agenda itself refers to that important link between climate change and sustainable development (para. 14): “Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development.” So, it would be correct to add such a reference here. E.g.: .. (Denton et al. 2014). The 2030 Agenda (UN 2015) also confirms that the adverse impacts of the climate change “undermine the ability of all countries to achieve sustainable development.” [Tibor Farago, Hungary]	Sentence rephrased.
17322	35	2			The source of citation is already mentioned in the beginning of the paragraph. [Young-Hwan Ahn, Republic of Korea]	Sentence rephrased.
2608	35	4	35	23	what governance mechanisms would be needed to actively implement these synergies? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Governance structures and policies are introduced in other sections, and discussed in detail in Chapter 5.
6607	35	8	35	11	As it is currently worded this sentence implies that it is only the financial burden sharing pathway which determines whether strong mitigation action will reduce the likelihood of poverty eradication. This is not the case - the causality of poverty eradication is multiple, complex, and the future unpredictable. The availability of finance is an insufficient condition for poverty alleviation. With regard to the land-based mitigation example, the type of land-based approach is not considered. 'Intensive land-based' is an insufficient descriptor. Perhaps the qualifiers 'intensive' and 'strong' in the sentence are the cause of the problem, and need reconsidering. [Emily Tyler, South Africa]	Sentence rephrased.
1289	35	11	35	11	A sentence should be added emphasizing that each SDG has an opportunity cost as well as a (as-yet-uncertain) range of pathways for which it is most appropriate. [Colin Raymond, United States of America]	Noted. There is too little space to discuss all the important points, unfortunately.
4166	35	13		23	It isn't just about converting to ssutainable energies but ensuring sustainable practices and policies for the use of all natural resources. Additionally, in order to ensure energy security, more transparency surrounding all environmental impacts of energy production need to be brought forward. Impacts on water, air and even land use will directly affect the world's ability to meet the SDGs and also play a role in adaptation and mitigation with respect to climate change. [Michelle Leslie, Canada]	Noted. There is too little space to discuss all the important points, unfortunately.
13289	35	13	35	15	The text here (which refers to Figure 1.6) does not intuitively align with the example shown in Figure 1.6. Text refers to positive synergies between sustainable energy and energy security and ecosystems; but example does not show these synergies (at least not directly) and hence has the potential be confusing. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
11448	35	14			As above, it is possible to be more specific and more meaningful here. More sustainable energy will of course enhance energy security because insecure supplies are by definition not sustainable. I think what is meant is that my converting to renewable energy sources and reducing, where possible, energy demand, energy security and ecosystem services can both be enhanced. [Stewart Lockie, Australia]	Noted. There is too little space to discuss all the important points, unfortunately.
12961	35	14	35	15	Figure 1.6. needs to explain in the text what is included in "land based mitigation option". At the moment the figure can be difficult to interpret as the linkages are not explicit in the text: what does a strong "land based mitigation option" look like and why there are no synergies between other SDGs than only a few? I would suggest to pick a more specific example, and then re-do the blue and red lines so that it's clear what synergies and trade-offs are considered (as there are likely to be more than what is currently in Figure 1.6) and associated text on page 35. [Johanna Nalau, Australia]	Figure removed.
13624	35	16	35	21	Repetition, see p8-9 [Elvira Poloczanska, Germany]	Section rewritten.
11683	35	19	35	19	a serious report. On the other hand, it is understandable that some material in the framing chapter will not be fully developed until the rest of the chapters are finalised. [David Schoeman, Australia]	Section rewritten as suggested.
6066	35	22	35	23	This seems really key for this section. Can the whole of 1.4.4 be orientated a bit more around that issue. We already know that there are trade offs between adaptation, mitigation, and sustainble development, but what does a 1.5C target mean for these trade offs. More mitigation means less adaptation is required, but how much less? and how does that compare with the potential added challenge of developing with clean energy? (and possible implications of negative emissions technologies? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Section rewritten to include points.
12069	36				Figure 1.6 doesn't make sense. The 'example' mentioned is non-existent as it refers to a generic land based mitigation option. The indicated trade-offs are confusing as they can be interpreted also as synergies. E.g. how can climate action be considered a trade-off of 'end hunger'? [Silvia Serrao-Neumann, Australia]	Figure removed.
1834	36				Figure 1.6: It is a misleading figure, because (i) oversimplifies those interrelations which are indicated there in blue and red (e.g. ‘affordable and clean energy’ and ‘climate action’ can also have some negative interactive aspects: see e.g. Chapter 5 subsection 5.4.2.2); ‘climate action’ and e.g. wastewater-related actions can also have mutually positive effects; (ii) actually, all other Goals around this circle have also certain interrelations with the climate action. The 2 paragraphs on this topic on page 35 include excellent examples from the literature, but as explained above, I propose not to use this figure. [Tibor Farago, Hungary]	Figure removed.
5585	36				: in the legend to figure 1.6. it is unclear what “land-based mitigation strategy” refers to [Astrid Kiendler-Scharr, Germany]	Figure removed.
3628	36		36		Figure 1.6 gives a somewhat narrow interpretation of how climate action might interact with the other SDGs. Even for the example of a land-based mitigation strategy they give, many more interactions exist than those that they show. The authors should refer to work that shows how other SDGs are intimately interconnected and interdependent (e.g. Nunes, R., Lee, K. and O'Riordan, T. (2016): The importance of an integrating framework for achieving the Sustainable Development Goals: the example of health and well-being. BMJ Global Health, DOI: 10.1136/bmjgh-2016-000068 [Rob Bellamy, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
9836	36		36		The synergies and trade-offs among climate change action and sustainable development goals are very important. However, they will be very complex among nations/regions etc. For example, this figure shows the synergy relationship between climate action and affordable and clean energy. But in fact, there can be trade-offs between the two. While I undestand the importance of this type of figure, it is better to delete this due to confusion or to modify this greatly, [Keigo Akimoto, Japan]	Figure removed.
20670	36		36		Fig. 1.6 Can you add notes of how and when this analysis will be done, or a link to Ch. 5. There are synergies and trade-offs for all SDG's, including SDG7, so having a way to distinguish that would be useful. [Debora Ley, Guatemala]	Figure removed.
13095	36	1	36	1	Brilliant, clear diagram. [Veryan Hann, Australia]	Figure removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9959	36	1	36	1	Figure 1.6: Although I like the idea of the graphic, it is completely misleading, and in the case of the example it also contradicts what is written in Chapter 11 AR5 WG III on AFOLU. The point is that positive interactions (called synergies here and co-benefits elsewhere) and trade-offs happen rather at the level of specific activities. For example, even if stopping deforestation (a land- based mitigation option) can create a trade-off to Zero hunger (can not has), another land-based activity called sustainable intensification will have a synergy or co-benefit on zero hunger. I don't want to critisize the example but the level where the assessment is proposed and the approach used. It shouldn't be at the level of type of mitigation option (e.g. land based) but at the level of an specific action. And even at this level, synergies or trade-offs are highly dependent of the context. We stated that clearly in the AR5 (!!) Thus, you need to explore better what we know about how to assess the relation context - mitigation options instead of fixing synergies and trade-offs to sectors or types of options. [Carmenza Robledo Abad, Switzerland]	Figure removed.
6288	36	1	36	2	Figure 1.6. Why do the red and blue lines not follow the curved grey gridlines? Additionally the links seem sumjective and many others could be added. [Nathanael Melia, New Zealand]	Figure removed.
6068	36	1	36	2	What is the "land based mitigation option" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
6070	36	1	36	2	Suggest changing "land" to "life on land" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
2368	36	1	36	8	Figure 1.6. This figure is either incomplete or if it isn't it is meaningless. Also it is not a framework, just a pretty picture. [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
3397	36	1	36	8	Fig. 1.6 is Very Confusing. It needs further work/explanation for understanding. [Paul Doyle, Canada]	Figure removed.
1175	36	1	36	8	Fig 1.6: there seems to be some conflating of measures with pathways. Best to consult with other chapters (esp. 2) on the distinct meanings of measures, portfolios, and pathways. The illustration is nice but may need to be replicated for impacts at different scales and interacting measures/portfolios/pathways. [Petra Tschakert, Australia]	Figure removed.
13290	36	1	36	8	Figure 1.6: Not immediately clear that the figure shows an example for a land based mitigation option. Label for this in figure is in small font, and reference to this in the caption is embedded a few sentences in. For ease of comprehension it would be beneficial to state the examplecontext in a heading/sub-heading at the top of the figure, or make the figure label for this more prominent. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
5699	36	1	36	9	The meaning of positive interactions and negative interactions in the illustration in Figure 1.6 is not clear. Why is the Land and Climate action interaction negative (in red)? [Hong Yang, Switzerland]	Figure removed.
20080	36	1	36	9	Fig. 1.6: This figure is underestimating the benefits of mitigating climate change. Other synergies with climate action could be displayed (maybe with a lighter blue to highlight that they are weaker than the presently highlighted ones, but nonetheless tangible): a) Good health and well being (from reduced impacts of heatwaves, floodings, and droughts on health); b) clean water and sanitation: in case of intense flooding, clean water availability becomes an issue (e.g. see impacts of floodings in Asia and following hurrican Harvey); c) Reduced inequalities: Chapter 1 highlights in its SPM that increased global warming leads to more inequalities, hence climate action should reduce inequalities; d) End hunger: As highlighted in one of my comments, ambitious mitigation may indeed entail risks for food prices, on the other unabated global warming also includes high risks for global hunger given impacts of droughts, heatwaves and flooding on food production; e) Responsible consumption and production seems to have several synergies with climate action. [Sonia Seneviratne, Switzerland]	Figure removed.
6608	36	1	36	9	I find this framework simplistic and misleading. It is impossible, outside of a particular and well described context, to determine the syngergies and trade-offs of a climate action on SDGs. Both the climate action and the context have to be thickly described, acknowledging the perspective of the describer, to be meaningful. The best one can say at the high level is that it appears that a land based mitigation option might impact x, y positively and z negatively but that further understanding of the situation from the perspective of those involved is required. There is a problematic implicit assumption of a top down, all-knowing, neutral observer. The climate-development interactions are created, bottom up, by complex and dynamic interactions. How the climate action is done is as important to what emerges as what is done itself. This emphasis on process and guidance for how action is done is missing from the Chapter as a whole (there is much more towards the end of Chapter Five). The figure is further problematic because climate action (an action, not a goal) is put on a level with the SDG goals. A term like 'low carbon' of '1.5 degrees' would fit better here. [Emily Tyler, South Africa]	Figure removed.
10236	36	2	36	8	could add inclusivity to figure 1.6 [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
17456	36	3			B [Tom Gabriel Johansen, Norway]	Figure removed.
9539	36	3			Fig 1.6 : Please use bigger point characters for "Example for land based mitigation option" [Shuzo Nishioka, Japan]	Figure removed.
17496	36	3			B [Angela Morelli, Norway]	Figure removed.
9565	36	3			Fig 1.6 : Please use bigger point characters for "Example for land based mitigation option" [Shuzo Nishioka, Japan]	Figure removed.
9297	36	3	36	3	The blue lines in "Figure 1.6: A framework for evaluating the impact of different climate response pathways on the multiple dimensions" may be expanded to include the positive interactions (synergies) between the point "climate action" and "sustainable cities and communities." This linkage is currently not represented in the set of linkages. [Siir KILKIS, Turkey]	Synergies in general are captured in figure 1.6 (new numbering), but calling out a specific link between climate action and SDG.11 would be beyond the scope of this chapter.
9854	36	3	36	3	Could the main direction of the interaction be added by adding an arrow to the colored lines? Or are they all bi-direction (which could be indicated using bidirectional arrows) [Christopher Reyer, Germany]	Figure removed.
6067	36	3	36	3	Please clarify what is meant by "climate response pathways" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
12724	36	3	36	3	The synergy between "climate action" and "affordable and clean energy" is questionable, particularily related to the "affordable" argument. Climate action implies posing limits on many cheap and accessible fossil fuels as (well as the use of charcoal in poor households which has led to significant deforestation) and the likely application of severe carbon taxes (according to all IAM projections). This leads to overall higher energy costs, lack of access to cheap fuels and possibly the pricing out of certain energy services. [Vassilis Daioglou, Netherlands]	Figure removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6069	36	3	36	3	Suggest to avoid using "dimensions" again because there are already differnet uses of "dimensions" in this chapter. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Figure removed.
5104	36	3	36	3	Figure 1.6 does not lend much value to the discussion of trade offs. While I see that the negative impact of climate action to ending hunger relates back to the reference to large scale mitigation action in the land sector, we also know that if we want to end hunger, we must tackle climate change (given impacts of climate change on all aspects of food security -- IPCC AR5). The trade off vs. synergy question there is in HOW we tackle climate change. (And this example lends itself back to the discussion of feasibility -- economic, political, technical, environmental, and particularly social). The trade offs and synergies between SDG goals & climate action are more complex than the infographic allows. [Tonya Rawe, United States of America]	Figure removed.
11684	36	5	36	5	Estimated How? [David Schoeman, Australia]	Figure removed.
20375	36	6	36	19	I have yet to read Chapters 2/3/4, but from the description made here, it looks like more emphasis is put on the limits and negative aspects of SRM than the positive aspects. Note that ocean acidification is not an impact of SRM despite what is written on lines 12 and 14. . [Olivier Boucher, France]	Please refer to the SRM cross chapter Box
10192	36	11			The SRM section is a useful pointer, I think it could be shortened and assessment of its water cycle effects deferred to other chapters as more nuanced than stated here e.g. "there are serious shortcomings when considering effects on the water cycle and on regional scale". In fact there are positive and negatives and it depends if you look at P or P-E, so I would just leave out [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	The assessment of water cycle effects has been removed for this section as suggested
3282	36	11			The section SRM seems out of place, relative to the general discussion in the remainder of the chapter. Also, it is too short and detail-free to add meaningfully to the chapter. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	We now have a new sub-section called: "Classifying response options", which includes, Mitigation, Adaptation, and Remedial Measures. SRM is discussed under "Remedial Measures". The SRM text is invariably short, as it is not explicitly stated in the approved outline. Nonetheless, it is an important that this report needs to address, and this is carried out in a cross-chapter box.
19684	36	11			Can the authors clarify why solar radiation is used as an example over other possible mitigation responses? [Tara Shine, Ireland]	SRM is not a mitigation option, as defined in the report. We have a discussion on CDR as a mitigation response.
17296	36	11	36	11	this section comes as a surprise and I don't fully understand what it is doing here in isolation from CDR. It goes straight into the details without linking it to the rest of the chapter. [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	We now have a new sub-section called: "Classifying response options", which includes, Mitigation, Adaptation, and Remedial Measures. SRM is discussed under "Remedial Measures", and CDR under "Mitigation". This now provides more context as requested.
10967	36	11	36	11	This section drops in without explanation or context. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	We now have a new sub-section called: "Classifying response options", which includes, Mitigation, Adaptation, and Remedial Measures. SRM is discussed under "Remedial Measures". This now provides more context as requested.
12817	36	11			In section 1.4.5 I miss a clear and early mention of new and additional climate change commitments that come with SRM, the termination problem, and serious governmance issues. As currently written, SRM is presented almost as an academic exercise without any critical thinking that goes beyond the physical considerations. I personally think that IPCC has a moral and ethical responsibility to state the fact that SRM constitutes a serious additional anthropogenic interference with the climate system, with unknown risks and unintended side effects. It is hence subject to Article 2 of the UNFCCC, just as the emissions of GHG are in the first place. It is suggested that the authors provide a much more critical and morally and ethically responsible context of SRM and CDR at the start of this Special Report. Currently this is only mentioned in passing at the end of 1.4.5, page 1-37, line 19. [Thomas Stocker, Switzerland]	The risks and un-intended side effects of SRM have been assessed in this report in the cross chapter box.
1835	36	11			1.4.5 The IPCC was invited to deal with “impacts of global warming of 1.5 °C .. and related ghg emission pathways.” SRM never was considered as option during negotiations. Thus, less emphasis should be put on it here and in Ch.3 with a more careful short text and an indication that it is mainly a theoretical idea. We should learn from the “ozone vs climate” problem (ozone-friendly substances with high GWP). I propose the following beginning: Solar Radiation Management (SRM), also .. 2013). Consistent with previous IPCC reports (IPCC 2012b), SRM does not fall within the usual definition of adaptation or mitigation. Therefore, SRM is not investigated as a mitigation option in Ch. 2 of this report, which makes use of IAMs, amongst other tools, to investigate different mitigation pathways to achieve the 1.5 °C target. SRM is nonetheless sometimes theoretically considered as a means to address climate impacts (Crutzen 2006), but the associated risks and impacts need to be carefully reviewed. [Tibor Farago, Hungary]	We agree. SRM is no longer a sub-heading on it's own, but is discussed under "Remedial Measures". The Ch 3 text has been moved to the cross chapter box, and the Ch 1 text has been made more concise as suggested.
12779	36	11	36	11	I do not see the underlying logic of a specific section on solar radiation management and not other geoengineering techniques. As it is now it is standalone. [Robert Vautard, France]	We also discuss CDR
9540	36	11	37	19	This is a very good example for discussing technological feasebility in relation to box 1.3 including Table 1. Make this part another box after box 1.3 to highlight discussion [Shuzo Nishioka, Japan]	Noted
9566	36	11	37	19	This is a very good example for discussing technological feasebility in relation to box 1.3 including Table 1. Make this part another box after box 1.3 to highlight discussion [Shuzo Nishioka, Japan]	Noted
2933	36	11	37	19	Section 1,4.5: This box contains many errors. While I understand the cautionary approach of not including SRM, the box needs to reflect the literature accurately; IPCC is supposed to be an accurate assessment of the body of work available in the literature. At present it is an inaccurate and unrepresentative assessment. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	The SRM box has now been extensively revised
9855	36	11	37	19	The SRM section seemed somehow "out of flow"and unexpected in the strcuture from the rest of the text and I was wondering whether it is currently at the right place [Christopher Reyer, Germany]	We now have a new sub-section called: "Classifying response options", which includes, Mitigation, Adaptation, and Remedial Measures. SRM is discussed under "Remedial Measures", and CDR under "Mitigation". This now provides more context as requested.
2947	36	11	37	19	Section 1,4.5: This box contains many errors. While I understand the cautionary approach of not including SRM, the box needs to reflect the literature accurately; IPCC is supposed to be an accurate assessment of the body of work available in the literature. At present it is an inaccurate and unrepresentative assessment. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	The SRM box has now been extensively revised
2948	36	11	37	19	a) Sunlight reduction methods is definitely not in common use in the geoengineering community and should be deleted. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2949	36	11	37	19	b) The objective of SRM is not to reduce the amount of sunlight at the surface, but to increase the amount of sunlight reflected from the Earth. While this may seem like a technical splitting of hairs it is important – absorbing aerosols such as black carbon reduce the amount of sunlight at the Earth's surface but cause a warming of climate. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
15676	36	11	36	24	The inclusion of SRM in this report was not part of the outline discussed at the SR15 Scoping Meeting. In fact, this was specifically questionned and proposals referred to this were deleted. Now, the report does not explore existing and doable options to real mitigation, particularly supporting peasant and agreocological agriculture, but it include purely theoretical, speculative high risk option such as SRM. The inclusion of SRM under 1.4 on "1.5°C in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, with consideration for ethics and equity" is starkly misplaced in this section and deviates from the logic of the other sub-sections. There is no justification in singling out SRM as a technology/approach to achieve 1.5C in a section that tackles the context and fundamental considerations that need to be taken into account towards attaining the goal and totally inappropriate in a framing chapter. The entire 1.4.5 sub-section should be DELETED. This deletion will not at all affect the logical flow and substance of this section. [Elenita Daño, Philippines]	Yes, this is correct, SRM was not part of the approved outline. However, after significant discussions, it was became obvious that the report cannot simply ignore the topic of SRM with respect to the 1.5 goal. We therefore disagree that the entire section should be deleted
15429	36	11	36	24	The inclusion of SRM in this report was not part of the outline discussed at the SR15 Scoping Meeting. In fact, this was specifically questionned and proposals referred to this were deleted. Now, the report does not explore existing and doable options to real mitigation, particularly supporting peasant and agreocological agriculture, but it include purely theoretical, speculative high risk option such as SRM. The inclusion of SRM under 1.4 on "1.5°C in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, with consideration for ethics and equity" is starkly misplaced in this section and deviates from the logic of the other sub-sections. There is no justification in singling out SRM as a technology/approach to achieve 1.5C in a section that tackles the context and fundamental considerations that need to be taken into account towards attaining the goal and totally inappropriate in a framing chapter. The entire 1.4.5 sub-section should be DELETED. This deletion will not at all affect the logical flow and substance of this section. [Elenita Daño, Philippines]	Yes, this is correct, SRM was not part of the approved outline. However, after significant discussions, it was became obvious that the report cannot simply ignore the topic of SRM with respect to the 1.5 goal. We therefore disagree that the entire section should be deleted
2950	36	11	37	19	c) SAI does not stand for Sulphate Aerosol Injection but Stratospheric Aerosol Injection. Again this is important as there have been a number of different candidate particles suggested (e.g. TiO2 etc) that might be more effective than sulphate aerosol and have less of the side effects on ozone damage. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
2951	36	11	37	19	d) Most of the research that has been carried out from a climate modelling perspective is on SAI and marine cloud brightening (MCB) via injection of aerosols into marine boundary layer cloud thereby increasing the albedo of the planet. The research in these areas has been much more extensive owing to the feasibility and effectiveness being relatively high. It is odd to single out land surface albedo modification as a second method. I would strongly recommend changing to focus on SAI and MCB, with a note that the impacts of other mechanisms such as albedo modification would likely have only a marginal impact on global temperature. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	We have now included text on MCB. The text on surface albedo modification has been shortened
2952	36	11	37	19	e) Key references are missing. I would recommend inclusion of the the Royal Society and EUTRACE reports as a minimum. The authors should at least read some of the conclusions of these reports as the current balance is very skewed and is not reflective of the body of research in the literature. I've included links to where the Royal Society and EUTRACE reports can be included below [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	The Royal Society report is now referenced.
2953	36	11	37	19	https://royalsociety.org/topics-policy/publications/2009/geoengineering-climate/ [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2954	36	11	37	19	http://eutrace.org/ [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2956	36	11	37	19	Kravitz, B., et al. (2013), Climate model response from the Geoengineering Model Intercomparison Project (GeoMIP), J. Geophys. Res. Atmos., 118, 1-13, doi:10.1002/jgrd.50646. [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	Noted
10195	36	11	37	19	I might have two shorter sections on CDR and SRM. [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	We now have these sections.
12251	36	11	37	19	This section is needed, but i think the authors should make the current status of SRM technlogies clear; i.e. not tested etc. [Jan Fuglestvedt, Norway]	We now explicitly state this
5106	36	11	37	19	It's not clear why SRM is the example of an extreme mitigation measure chosen for deeper consideration. There are others that (some may not consider to be extreme) which have garnered far more attention for it's "potential" and generated far more concern and questions regarding feasibility (along all the dimensions discussed in box 1.3) and negative impacts. Was BECCS not considered because of the 2019 SR on climate & land? [Tonya Rawe, United States of America]	We do not classify SRM as mitigation. More context has now been provided, including a section on CDR.
20189	36	11	37	4	A discussion of the TRL of 'Solar Radiation Management' would be informative. [Ton Wildenborg, Netherlands]	This is in the cross chapter box on SRM
2955	36	11	37	19	f) To say that there are serious shortcomings in terms of the water cycle is subjective, and non-scientific. What does serious mean? IPCC has taken great care in determining statistical meaning for words such as 'likely', and to regress to subjective language is a step backwards. I would suggest that something more generic be included such as "While SAI and MCB might provide potential reductions in the global mean temperature, it is important to realise that they cannot be used to simply neutralise/cancel out all the impacts of global warming. This is because, fundamentally, they act in a different region of the electromagnetic spectrum and perturb the solar energy budget rather than the terrestrial energy budget that is perturbed by greenhouse gases (e.g. Kravtiz et al., 2013)." [Jim Haywood, United Kingdom (of Great Britain and Northern Ireland)]	This text has been removed.
13433	36	13			I suggest cutting "also referred to as 'sunlight reduction methods'", as this is not much used. You might want to consider using "also referred to as 'albedo modification'" instead, following the NAS (2015) terminology. [Helene Muri, Norway]	Accepted - text revised
1573	36	13	36	13	Delete ""also referred to as 'sunlight reduction methods'" This was a suggestion by Ken Caldeira that never caught on, and nobody used that any more. [Alan Robock, United States of America]	Accepted - text revised
1574	36	13	36	13	Change "involves" to "would involve" [There is no such thing as SRM - it is only suggested schemes - so it is incorrect to imply that it exists for is possible. [Alan Robock, United States of America]	Accepted - text revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4833	36	13	36	13	Solar radiation management is not commonly referred to as 'sunlight reduction methods'. This was a proposal by one scientist in particular, and it is not accepted terminology. [Catriona McKinnon, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
7935	36	13	36	18	Particulates from volcanic eruptions play a major role in the cooling effect. When these aerosols come back down to the lower levels of the atmosphere, what will the impacts be on the ecosystem? Could acid rain result? [Ceri Vincent, United Kingdom (of Great Britain and Northern Ireland)]	Impacts are discussed in the SRM cross chapter Box
7721	36	13	36	24	This section 1.4.5 deals with solar radiation management (SRM) as a global warming mitigation measure. Comments should be in included about its potential impacts with respect to various latitudes of the earth, some of which already have incoming sunlight intensities [Hilary Inyang, Nigeria]	We do NOT discuss SRM as a mitigation measure. In fact, we state the exact opposite.
13434	36	13	37	19	Introducing marine cloud brightening (MCB) here, in addition to SAI would be timely, considering the MCB literature is also assed in Chapter 4. [Helene Muri, Norway]	We have now included text on MCB
11855	36	13	37	4	This initial paragraph on SRM should also mention the potential for geopolitical conflict over decisions about whether to deploy SRM [David Morrow, United States of America]	Governance aspects are discussed in the cross chapter box
16140	36	15	36	15	This is technically incorrect and inconsistent with IPCC. This should say reducing the amount of solar radiation absorbed in the surface-troposphere system (so not reaching the Earth's surface). And, actually, in that one might want to allow for subsequent transfer by IR radiation from the stratosphere, this could say reducing the amount of energy absorbed by the surface-troposphere system. [Michael MacCracken, United States of America]	We now refer to increasing the amount of solar radiation reflected, based on several other reviewer comments
4372	36	15	36	16	An odd set of references; why not Crutzen (2006) or a review (such as Irvine et al 2016) or a national assessment (such as the US National Academy report on albedo modification in 2015)? Note that we have also written a review specifically in the context of 1.5C that may be useful (and should be published prior to the cut-off date): 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. [Douglas MacMartin, United States of America]	References updated
11856	36	16	36	17	It is probably better to characterize SAI as "stratospheric aerosol injection," as is now commonly done and is done in Box 4.13, since the literature has moved on to consider other kinds of aerosols besides sulfates. [David Morrow, United States of America]	Accepted - text revised
13432	36	16	36	17	SAI is defined as "Stratospheric Aerosol Injections" elsewhere in the report and in the literature and I suggest you also stick to this in Chapter 1. "Sulphate Aerosol Injection" is usually expressed as Stratospheric Sulphur injections, "SSI". [Helene Muri, Norway]	Accepted - text revised
12922	36	16	36	17	Artificial emission of aerosols into the stratosphere (sulfate aerosol injections). It is dangerous? Links with the chemistry of the atmosphere? Impact with UV solar irradiance and complex interactions between different atmospheric layers (from the upper atmosphere to the ocean)! [Mustapha Meftah, France]	Impacts are discussed in the SRM cross chapter Box
9757	36	16	36	18	Would it be possible to add some comments on the performance of SAI, e.g. negative effects ...? [Manfred Treber, Germany]	Impacts are discussed in the SRM cross chapter Box
1575	36	17	36	17	Change "Injections" to "Injection" [Alan Robock, United States of America]	Accepted - text revised
16141	36	17	36	18	Singular and plural look mixed up here. There is only one global average temperature; there are multiple effects of volcanic eruptions. [Michael MacCracken, United States of America]	Accepted - text revised
16142	36	18	36	18	I think it important to also be mentioning the brightening-of-clouds approach and even promoting the increased loss of IR radiation from the surface-troposphere system via thinning cirrus as a good bit more plausible than altering land surface albedo. [Michael MacCracken, United States of America]	We have now included text on MCB. The text on surface albedo modification has been shortened
4373	36	18	36	18	The second most common approach considered after SAI would be MCB, which seems worth a mention. See chapter 4.3.7 and box 4.13 [Douglas MacMartin, United States of America]	We have now included text on MCB. The text on surface albedo modification has been shortened
1576	36	18	36	18	Change "involves" to "would involve thinning cirrus clouds to allow more energy to escape to space (e.g., Mitchell and Finnegan (2009), brightening the ocean with foam (Gabriel et al., 2017), or" Gabriel, Corey J., Alan Robock, Lili Xia, Brian Zambri, and Ben Kravitz, 2017: The G4Foam experiment: Global climate impacts of regional ocean albedo modification. Atmos. Chem. Phys., 17, 595-613, doi:10.5194/acp-17-595-2017. Mitchell, D. L. and W. Finnegan (2009), Modification of cirrus clouds to reduce global warming, Environ. Res. Lett., 4, 045102, doi:10.1088/1748-9326/4/4/045102. [Alan Robock, United States of America]	We cannot list all SRM methods in the introduction due to space constraints. We decided to only explain the two main methods here, i.e, SAI and MCB.
11857	36	18	36	20	The first paragraph should definitely mention marine cloud brightening as an alternative means of implementing SRM. See the citations referenced in Box 4.13 [David Morrow, United States of America]	We have now included text on MCB.
15317	36	19	36	19	Modify in this sense " … via changes in the albedo of agricultural land (high-albedo crops) or urban areas (reflective roofing material)" [Francisco Javier Hurtado Albir, Germany]	Accepted - text revised
21098	36	20	36	21	This sentence is unclear : "a smaller spatial footprint" ? How is that spatial footprint defined ? Is it the area that is subject to a change in albedo? Is that relevant for SAI, or would the "area impacted" be a more relevant indicator (what is the spatial footprint of SAI?). "Because the forcing is more restricted in space" : under wich condition ? For the same local result, global result, or simply without any attempt at comparing the required surface on some comon basis in term of impact? The following sentence do clarify, but this one should I think that this one should be reworded. [Philippe Marbaix, Belgium]	Sentence has been removed
803	36	24	36	24	Is "see also Section 3.7.2.1" correct? It mentions BECCS in that section. [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Noted
15677	37	1	37	19	If section 1.4.5 will be kept, the only way to make it consistent with the logic of the section is to present the impacts of SRM on sustainable development, poverty eradication, ethics and equity. [Elenita Daño, Philippines]	Impacts of SRM on SD etc is covered in the cross chapter box
15430	37	1	37	19	If section 1.4.5 will be kept, the only way to make it consistent with the logic of the section is to present the impacts of SRM on sustainable development, poverty eradication, ethics and equity. [Elenita Daño, Philippines]	Impacts of SRM on SD etc is covered in the cross chapter box

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4374	37	3	37	3	Rather than "serious shortcomings" it would be more appropriate to be more cautious and state “additional issues that need to be considered”. The effects on hydrological cycle over land may not be severe in a limited deployment scenario (e.g. 2.5 to 1.5C), we simply don’t know yet, so the model evidence does not support the current language; see e.g. MacMartin Ricke and Keith reference in comment #3. (Note that there are serious problems with the summary in chapter 3.) [Douglas MacMartin, United States of America]	This sentence has been removed.
20463	37	3	37	3	Applying this comment to all possible or conceivable forms and degrees of SRM, as "there are" does, goes too far. It has not been shown that all forms of SRM have serious shortcomings in these regards. Perhaps better phrased as "some, and possibly all, forms of SRM may have serious..." [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	This sentence has been removed.
20464	37	6	37	9	It is clearly true that not treating SRM as adaptation or mitigation is consistent with previous IPCC practice. However not considering the possibility of using SRM as part of a strategy for achieving the 1.5C target simply because to do so would be inconsistent with previous IPCC reports represents a fundamental flaw in this report. It makes it an incomplete guide to policymakers seeking the means to achieve the 1.5C goal. It also unbalances the subsequent treatment of SRM in the report, in that its possible benefits are basically not discussed, but its potential negative impacts and governance requirements are. Those aspects of SRM clearly merit discussion. But if that discussion is not in the context of also looking at the possibilities of SRM as part of a 1.5C strategy its context becomes unduly negative: it will lead the reader to treat SRM basically as a source of risk in itself without assessing the reduction of climate risks that it may be able to bring about. I consider this a fundamental problem with the report as currently structured. [Oliver Morton, United Kingdom (of Great Britain and Northern Ireland)]	SRM is not part of the approved outline of the report, but nonetheless needs to be discussed. The potential benefits are outlined, as we do state that SRM could potentially be used to reduce near term impacts of unmitigated warming. The fact is that the impacts and unintended consequences of SRM are very important, and cannot be overlooked. We agree that the report focuses more on the negative aspects, this simply reflects the fact that most of the literature on SRM is about it's potential negative consequences.
9205	37	6	37	9	Personally, I find this absurd. And if it does not fit in with previous IPCC reports, who cares. This is a new report, and we can change, no? For example, to say that SRM can not be treated as a mitigation option is ridiculous. Clearly, the goal is to mitigate climate change, and if SRM can shave of 0.1C or 1C or whatever, then surely that meets that goal? And, SRM will be traded off with other options, if we do some SRM, it may be that we do less CDR or less conventional mitiation. So, in principle, SRM must be in Chapter 2 (not cuold be, but must be). It may be that there is no literature, fine, but that is a different issue... [Glen Peters, Norway]	We respectfully disagree. SRM does not classify as a mitigation option, and this is consistent with the literature. Mitigation involves the reduction of greenhouse gases. CDR is mitigation, SRM is not.
13690	37	13	37	14	Chapter 4 section 4.3.7 and Box 4.13 provide assessment of SRM, please reference these [Elvira Poloczanska, Germany]	Accepted - text revised
1176	37	13	37	15	Ch5 doesn't deal with SRM in the text - our preference is to have all dimensions discussed in one x-chapter box. [Petra Tschakert, Australia]	Accepted - text revised accordingly
802	37	16	37	16	States Box 4.2 I think it should be Box 4.13 [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
1577	37	16	37	16	Change "Box 4.2" to "Box. 4.13" Box 4.2 has nothing to do with SRM. [Alan Robock, United States of America]	Accepted - text revised
13691	37	22	37	22	What about ocean related approaches such as spray or increased albedo ? [Elvira Poloczanska, Germany]	We have now included text on MCB.
6071	37	22	37	45	I am not sure this section adds much which has not already been said? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - text revised
6609	37	22	37	45	The brevity of this section testifies to the lack of attention to implementation, but more could be done to emphasise the significance of this. First, the urgency around implementation needs to be highlighted. Implementation cannot be addressed through a similar scientific process that got the climate community to Paris, there isn't time. Therefore, implementation has to be addressed by both research and practice together, and the role of experimentation in policy and implementation becomes critical. From a complex systemic perspective, innovation and experimentation are desirable and necessary features of a sustainable system. The point made in the executive summary that the social sciences are particularly needed for implementation is missing from this section. [Emily Tyler, South Africa]	This section has been expanded taking into consideration the comments and their relevance
3283	37	24			There are many instances in the lines leading up to this one where ‘greenhouse gases’ is used instead of GHG. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Noted
1075	37	24	37	24	Highlight: this line. It’s an important take away for policy implementation as well as sends strong signals to the business community. Additionally it has effective climate communications. [Martini Catherine, United States of America]	Noted
14207	37	24	37	26	It is important to distinguish between 'renewable' and 'low-carbon'. The goal here is lower our GHG emissions, some discussion of nuclear power needs to be included here as nuclear power is a significant part of our energy infrastructure, and provides roughly half of all of the CO2 free electrical generation (with hydro being most of the other half). [Jason Donev, Canada]	Noted
7303	37	24	37	26	Delete the text "There is a growing literature that suggests the costs of policies that eliminate GHGs may be small or negative, and that policies to expand renewable energy also make them cheaper, for example in some cases of providing renewable energy compared to fossil fuels (Patt 2017)". [Eleni Kaditi, Austria]	Noted. Reference will be assessed
1981	37	24	37	26	In absence of a Carbon tax the intermittent renewable energies (wind and solar) are far from being competitive with coal and gas for producing electricity in absence of direct or indirect subsidies. Furthermore, Intermittent energies have to manage their intermittency which requires either non renewable backup or electricty storage. Hydroelectricity is ideal for backup but limited in potential. As shown in the articles IJGEI V40 N1/2 2017 and IJGEI V40 N3/4 2017, nuclear energy is a very efficient, maybe essential way to reach the 1.5 °C limit. [Herve Nifenecker, France]	Noted
18833	37	24	37	27	What is said about renewable energy is also true about nuclear fission energy. Since fission energy sources are as equally efficient as renewable energy sources to meet the 1.5°C objective, the nuclear option should be quoted alongside renewable energy. The report should also consider that the necessary conditions to make some types of nuclear energy sources renewable can be reached as soon as a GHG tax makes fossil fuels more expensive than fission energy. References available here: https://www.forbes.com/sites/jamesconca/2016/03/24/is-nuclear-power-a-renewable-or-a-sustainable-energy-source/ [Stephan Savarese, France]	Noted
11685	37	24	37	40	This paragraph seems to rehash a lot of concepts/assertions without moving the understand forward very much. It also contains several concrete statements (e.g., "Incorporating strong linkages across sectors, devolution of power and resources to sub-national and local governments and facilitating partnerships among public, civic, and private sectors will be key to implementing identified response options.") that do not seem to be backed up by citations. [David Schoeman, Australia]	Noted. Changes made in the sequence and structure of this section

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13096	37	25	37	26	Why would only one reference be used here? Renewable energy is central, it is important. Why not refer to the Global Status Report on Renewable Energy 2017? Or the Internatonal Energy Agency? Or IRENA ? [Veryan Hann, Australia]	Noted and more references will be assessed in case there are
3398	37	25	37	26	...cheaper. "As and example, sometimes providing renewable energy instead of fossil fuels can be cheaper" (Patt 2017). [Paul Doyle, Canada]	Noted
3399	37	27	37	27	ADD .....temperature "rise" to..... [Paul Doyle, Canada]	Noted
16143	37	28	37	28	Change "constrains" to "constraints" [Michael MacCracken, United States of America]	Change made
15275	37	28	37	28	copy edit: "human resource constrains" should be "human resource constraints" [Pauline Midgley, Germany]	Change made
15024	37	28	37	28	See comment above about "barriers". [Farhan Akhtar, United States of America]	Noted
16144	37	34	37	34	Delete comma after "such" [Michael MacCracken, United States of America]	Change will be made
3400	37	37	37	40	CHANGE last sentence to read ".....policy itself is not well understood. Intergrating other.... measures and public participation mechanisms to address vulnerabilities to climate-related hazards (Forino et al. 2017) make this implementation task even more difficult." [Paul Doyle, Canada]	Noted
15276	37	42	37	42	For clarity, change "Chapter 20 of IPCC AR5" to read "Chapter 20 of the Working Group 2 contribution to IPCC AR5" [Pauline Midgley, Germany]	Noted
17848	37	42	37	42	Please make it clear that this is the WGII AR5 report. A suggested rephrase "Implementation options could be informed by a key message from Chapter 20 of the IPCC WGII AR5:" [Wilfran Moufouma Okia, France]	Noted
2295	37	42	37	42	It should be made clear which of the AR5 WG reports is being referred to here. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Noted
10536	37	42	37	45	I don't think directly quoting IR5 is informative and useful in this case. [Linda Yanti Sulistiawati, Indonesia]	Noted and change will be made
20858	37	42	37	45	First time that 'climate resilient pathways' is used but this concept is not explained here. [Heleen de Coninck, Netherlands]	Noted
1177	37	43	37	45	Climate-resilient pathways' should be discussed in Box 1.1 and clearly delineated from 'climate-resilient development pathways' used in Ch5. X-reference 5.1 and 5.7 here. [Petra Tschakert, Australia]	This term is clarified in Ch 5
1739	37	48			The section heading "1.4 - 1.5°C in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, with consideration for ethics and equity" is simply too long to digest. I was also suprised based on the title to find the important Box 1.3 describing feasibility. I suggest: "Mitigation and adapation, feasibility, and sustainable development, with consideration for ethics and equality" [Levi Golston, United States of America]	It is the section heading in the 1.5 Special Report approved outline
10426	37	48	39	33	Section 1.5 needs careful native-English copy-editing paying attention inter alia to correct and standardized use of hyphens and commas; singulars and plurals; unwieldy sentence structures; jargon and dense language. [Jonathan Lynn, Switzerland]	Addressed
11686	37	51	37	51	Which report? [David Schoeman, Australia]	Addressed
15279	37	51	37	51	I suggest "The information for this report ..." in place of "The information for the report …" [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
12252	37	54	37	54	Re "the time scale of the assessment": I hope some scenarios and analyses will go beyond the 21st century (e.g. ice sheets, sea level rise, but also temp). If so, the text should be modified; e.g. inserting "main" before "time scale". [Jan Fuglestvedt, Norway]	Accepted. Will change the text accordingly.
11687	37	55	37	55	the occurrence of a 1.5°C world... This wording is awkard. This, and the many other similar instances throughout the chapter need addressing. [David Schoeman, Australia]	Addressed
12725	37	55	37	55	spatially [Vassilis Daioglou, Netherlands]	Accepted. Will change the text accordingly.
12353	37	55	38	2	This is not correct according to the definition of 1.5 being defined as a long-term global mean temperature given above. [Bill Hare, Germany]	Accepted. Will change the text accordingly.
13043	37	55	38	3	Delete the sentence from "it is recognized … ...capacity ", not necessary and already written previously [Caserini Stefano, Italy]	Addressed
16145	38	1	38	1	Capitalize "earth's"--we are talking about the planet. And needed for consistency through chapter [Michael MacCracken, United States of America]	Sentence deleted
15280	38	1	38	1	copy edit: for consistency, change "earth's surface" to "Earth's surface" [Pauline Midgley, Germany]	Sentence deleted
11688	38	1	38	7	This text seems repetitive of previous material. [David Schoeman, Australia]	Deleted
12726	38	5	38	6	share sustainability pathways should be "Shared Socioeconomic Pathways" [Vassilis Daioglou, Netherlands]	Addressed
1178	38	5	38	7	Ch 5 does not link the SDGs with the SSPs (see our FOD); and the 'connection to social innovation' seems more appropriate for Ch4. [Petra Tschakert, Australia]	Addressed
3401	38	13	38	13	CHANGE ....that "could" be..... to.....that "must" be..... [Paul Doyle, Canada]	Addressed
12354	38	16			This section fails to discuss this important issue in an exhaustive fashion and it is unclear, why this should be addressed in the framing chapter. It should be deleted. [Bill Hare, Germany]	Addressed, the section has been revised
9541	38	16			Add sub-title :-difficulty of comaprison. Many audience may be expecting clear judgement by cost-benefit methodology, and so, it is necessary toclear its appropriateness here. [Shuzo Nishioka, Japan]	Addressed, the section has been revised
9567	38	16			Add sub-title :-difficulty of comaprison. Many audience may be expecting clear judgement by cost-benefit methodology, and so, it is necessary toclear its appropriateness here. [Shuzo Nishioka, Japan]	Addressed, the section has been revised
19685	38	16			Section on Multidimensional costs and benefits: this section would benefit from the inclusion of rights based approaches and how they can be used to support tools like cost benefit analysis when assessing the risks and benefits of climate action. [Tara Shine, Ireland]	agreed, because space constraints that could not be added; however elements of rights were included elsewhere
3133	38	16	38	53	This fairly good section on the problems with relying on cost/benefit analysis to create scenarios should briefly discuss the very important role of the discount rate in most cost/benefit analyses. There is a very big literature on this issue, including the 2006 Stern Report. Also, published papers that were critical of how IAMs were used in th6e past, e.g. for the AR5 WGIII report should be mentioned in connection with the numerous costs omitted from the IAMs relied on. See Rosen, R. in Climate Change Economics, vol.7, no.1, 2016. As with the rest of chapter 1, this section 1.5.1 needs to be written more clearly. [Richard Rosen, Germany]	Addressed, the section has been revised

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21137	38	16	38	53	Should note here that while the impacts of extreme, individual climate-driven disasters are relatively clear the cumulative impacts from small, recurrent disasters over time can equal or even exceed those from larger catastrophese - cite to Campos et al. 2010, Analysis of disaster risk management in Colombia: a contribution to the creation of public policies. [Nathan Borgford-Parnell, Switzerland]	the reference has been reviewed and considered. Given its status as a world bank document we also sought out other references
6076	38	16	38	53	I found this section very confusing. The first paragraphs seem to suggest that cost benefit analysis is not appropriate, and then the last paragraphs seem to report on cost benefit approaches? It says costs and benefits could be estimated taking the constraints into account. How? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
17380	38	16	38	53	Mentioning that there are significant 'opportunity costs' involved with the selection of each pathway. [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Will change the text accordingly.
5700	38	16	40	35	The text in Section 1.5.1 seems not related to the theme of Section 1.5 which is about assessment frameworks and methodologies. [Hong Yang, Switzerland]	Addressed, the section has been revised
4428	38	18		30	Could you provide a suggestion for cost-benefit analyses? [Jingyong Zhang, China]	Addressed, the section has been revised
2091	38	18	38	18	Is more thinking required on alternatives to Cost Benefit Analysis are the multiscalar levels? OR starkly differing schems altogether? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Not Clear
6072	38	18	38	18	include suggests that there will be a list, but only cost benefit analysis is mentioned. Suggest rephrasing. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
13097	38	18	38	19	There are some significant issues with the cost-benefit analysis method. I haev written about this in a PhD chapter, so I haev done some research on this, as well as conducting a CBA. CBA has a problem with quantifying intangibles; a problem of objectivity (it converts all elements to a common currency so this can be incompatible for weighing up incommsensurables; also, not all rational human decisions are economic decisions; and CBA is recognised for being used for political manipulation because what to choose to put in or leave out for measurement can be subjective and arbitrary as well the choice of the discount rate for Net Present Value. Cost-benefit analysis can also be criticized for being anti-regulatory because it relies on market behaviour, and therefore is not an impartial policy tool. Three good references on this are: Porter, T. M. (1996). Trust in numbers: The pursuit of objectivity in science and public life: Princeton University Press. Also; Sunstein, C. R. (1994). Incommensurability and Valuation in Law. Michigan Law Review, 92(4), 779-861. doi:10.2307/1289693 [Veryan Hann, Australia]	Addressed, the section has been revised
11022	38	18	38	30	Again, (economic) cost-benefit analysis plays a minor role in actual climate policymaking, it's much more about political cost-benefit considerations (policy vs. politics). See, among others, Victor 2013 (Global Warming Gridlock), Vogler 2015 (Climate Change in World Politics); Geden 2016 (The Paris Agreement and the inherent inconsistency of climate policymaking); Cairney 2016 (The politics of evidence-based policymaking); Brunsson 2009 (The Consequences of Decision-Making) [Oliver Geden, Germany]	agreed, the discussion here is focused on potential assessment of which benefit - cost analysis is one
2776	38	18	38	30	Section can be strengthened. C-B not appropriate for non-marginal changes -- Morgan, M. Granger, Parth Vaishnav, Hadi Dowlatabadi, and Inês L. Azevedo. "Rethinking the Social Cost of Carbon Dioxide." Issues in Science and Technology, 33 (4) (Summer 2017). http://issues.org/33-4/rethinking-the-social-cost-of-carbon-dioxide/ Also C-B not appropriate when objective specified, i.e., temperature increase of 1.5oC. Cost-effectiveness (achieving 1.5oC at lowest cost) is relevant and important and is built into most of the IA models, in which case that approach should be mentioned. [Erik Haites, Canada]	Addressed, the section has been revised
12254	38	18	38	53	You may refer to Box 3.1. in SyR [Jan Fuglestvedt, Norway]	Addressed, the section has been revised
12256	38	18	38	53	I find it strange that discounting is not mentioned in section 1.5.1. I suggest you introduce the issue of weighting of costs and benefits over time. [Jan Fuglestvedt, Norway]	Addressed, the section has been revised
12253	38	20	38	20	the reference to Anthropocene does not seem necessary. [Jan Fuglestvedt, Norway]	Addressed, the section has been revised
12255	38	22	38	22	I suggest inserting "some" before "costs" [Jan Fuglestvedt, Norway]	Addressed, the section has been revised
1007	38	24	38	26	Discount rate allows comparison of monetary value across different times, but there is a debate in economics as to what the appropriate discount rate ought to be (e.g., the Stern vs. Nordhaus debate). What value is assumed has huge implications on policy adoption. Should discount rate be discussed somewhere? [Katsumi Matsumoto, United States of America]	Addressed, the section has been revised
10679	38	24	38	27	Yet better acknowledging the close interactions between climate, socio-ecological systems' management and non-linear dynamics can help interventions to meet their intended goals, while supporting climate change adaptation and mitigation (Sietz et al. 2017). Linking cost-benefit analysis to complex systems theory, such as ecological theory of non-linear ecosystem dynamics, can deliver essential insights into appropriate timings, climate-induced windows of opportunities and risks and the financial viability of investments as shown for sustainable land management strategies (Sietz et al. 2017). ---- Reference: Sietz, D., Fleskens, L. and Stringer, LC. (2017) Learning from non-linear ecosystem dynamics is vital for achieving Land Degradation Neutrality. Land Degradation and Development. Online First. DOI: 10.1002/ldr.2732. http://onlinelibrary.wiley.com/doi/10.1002/ldr.2732/full [Diana Sietz, Netherlands]	Point taken - these elaborate approaches will be best handled in AR6
3402	38	26	26	26	CHANGE ....."regions. In cases like that," standard cost-benefit..... [Paul Doyle, Canada]	Addressed, the section has been revised
3403	38	27	38	29	Run-on sentence. Needs reworking for a clear understanding and good grammar/punctuation. [Paul Doyle, Canada]	Addressed, the section has been revised
13625	38	28	38	28	what are 'human resource constrain(t)s'? see also p5 line 22 [Elvira Poloczanska, Germany]	Addressed, the section has been revised
21138	38	30			Should note here that recurring extreme events compound the costs needed for recovery, expecially for the poorest populations - Cite to: World Bank 2013, Building Resilience: Integrating Climate and Disaster Risk into Development. [Nathan Borgford-Parnell, Switzerland]	agreed, because space constraints that could not be added; however elements of rights were included elsewhere
10655	38	30	38	30	Furthermore, recurring extreme events compound the costs needed for recovery, especially for the poorest populations (World Bank 2013, Building Resilience: Integrating Climate and Disaster Risk into Development). [Kristin Campbell, United States of America]	agreed, because space constraints that could not be added; however elements of rights were included elsewhere
4167	38	32		47	It is important to note that costs that have the potential to go beyond the current generation could be devastating to local communities and economies. Unless viable options are presented, there will be little will to change. IE: losses in the fossil fuel related industry are not expected to be made up for in the green-orientated industry when comparing wages. This will have a cascading effect on the broader economics of a country IE: Venezuela. Additionally, there should be notes about the potential environmental and human costs of the green-oriented industries IE: employment, job and economic security, land impacts for food security, waste and even water supplies and ability of water reuse or recycling. [Michelle Leslie, Canada]	agreed, because space constraints that could not be added; however elements of rights were included elsewhere

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6073	38	33	38	34	suggest clarifying this sentence - since adaptive capacity is part of risk? So overall it doesn't quite make sense. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
19686	38	35	38	40	Refer also to the differential costs and benefits experienced by wealthy versus developing countries (esp. LDCs). The costs of climate action will fall disporoportionately on the countries with the lowest levels of development as they have to lift their citizens out of poverty whjile simultaneously embracing a low carbon, climate resilient development pathway. See Mary Robinson Foundation report Zero Carbon, Zero Poverty. Failure to support less developed countries to make this transition will hold back global progress towards the 1.5 goal and create further inequality. [Tara Shine, Ireland]	agreed, because space constraints that could not be added; however elements of rights were included elsewhere
15282	38	37	38	38	copy edit: hyphenation needed "fossil fuel-related industries versus green-oriented ones" [Pauline Midgley, Germany]	Addressed, the section has been revised
6452	38	38	38	38	The word 'green' is vague and should be replaced. [Jonny Williams, New Zealand]	Addressed, the section has been revised
15025	38	38	38	38	green-oriented ones -- find alternative phrasing e.g., low-emissions, low carbon. [Farhan Akhtar, United States of America]	Addressed, the section has been revised
17849	38	39	38	40	Reference: Aaheim 2016 has been mentioned twice. [Wilfran Moufouma Okia, France]	Addressed, the section has been revised
3404	38	42	38	42	CHANGE ...investing "on" a low emissions....to....investing "in" a ..... [Paul Doyle, Canada]	Addressed, the section has been revised
4924	38	42	38	43	The first sentence of this paragraph is very awkwardly phrased. Suggest rephrasing, perhaps as: The significant benefits to future generations from low emissions development pathways are likely to be experienced by current society as sacrificial investments. [Marcy Rockman, United States of America]	Addressed, the section has been revised
11449	38	42	38	43	The previous page claims mitigation can occur at low or negative cost. This sentence states the current generation needs to make economic sacrifices. Consistency and clarity is needed here, even if it is to acknowledge there are contrary findings in the research literature. [Stewart Lockie, Australia]	Addressed, the section has been revised
6074	38	42	38	43	What are the assumptions behind low emissions investment being a "sacrificial approach" - is this always the case? Does it assume investment in green tech is not profitable? (for example) [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
13626	38	42	38	45	This paragraph is unnecessary – see subsection 1.4.3 [Elvira Poloczanska, Germany]	Addressed, the section has been revised
3405	38	42	38	53	Both paragraphs need to be reworded for better clarity and understanding of points being made. [Paul Doyle, Canada]	Addressed, the section has been revised
3286	38	43			Remove 'While' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
15283	38	43	38	43	While not serving any purpose; delete [Pauline Midgley, Germany]	Addressed, the section has been revised
6610	38	43	38	43	The term 'sacrificial' used here closes down options for considering societal 'development' and 'progress', and needs further description. Current society might need to sacrifice in some areas (largely material) but may gain in others (health, psychological well-being, equality). [Emily Tyler, South Africa]	Addressed, the section has been revised
1572	38	43	38	45	Not a sentence. Change "While" to "in addition," [Alan Robock, United States of America]	Addressed, the section has been revised
7414	38	43	38	45	Please consider to delete the term geoengineering fromthis sentence. Rationale: Please look to the description given in Chapter 4, page 39, line 31-34 [Øyvind Christophersen, Norway]	Addressed, the section has been revised
11450	38	43	38	47	These sentences do not make sense. The sentence commencing "While large-scale intervenion…" is incomplete. The following sentence presumes knowledge of information that has not yet been presented. [Stewart Lockie, Australia]	Addressed, the section has been revised
17850	38	44	38	44	Geoengineering does not include solar radiation management, suggest to include this in the e.g. [Wilfran Moufouma Okia, France]	Addressed, the section has been revised
16146	38	44	38	45	I would suggest changing "far reaching costs" to "far reaching costs and obligations to sustain the efforts" in order to indicate that one cannot just stop SRM without impacts on the climate. There is the potential to eventually phase out such obligations by using CDR to pull down the CO2 concentration, but this will likely actually increase costs, at least for some prolonged period (certainly going beyond the present generation--indeed likely for at least several generations). [Michael MacCracken, United States of America]	Addressed, the section has been revised
16147	38	45	38	47	I don't understand, especially the second part of this sentence (i.e., after "pointing") and linkage to the first part. Needs clarification. [Michael MacCracken, United States of America]	Addressed, the section has been revised
2296	38	45	38	47	The sentence that spans these lines is difficult to understand. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
15284	38	50	38	50	copy edit: "framework" should be "frameworks" [Pauline Midgley, Germany]	Addressed, the section has been revised
13627	38	51	38	51	the report' - what report? [Elvira Poloczanska, Germany]	Addressed, the section has been revised
15285	38	51	38	52	Not clear what "required, innovations" is supposed to be; should it be "required innovations", i.e., delete the comma, "requires innovations" or does the adjective "required" qualify something else? Also "to emerge" is not serving any grammatical purpose so I think this sentence needs a re-think/re-write [Pauline Midgley, Germany]	Addressed, the section has been revised
16148	38	51	38	53	I don't understand the sentence--needs rewrite. [Michael MacCracken, United States of America]	Addressed, the section has been revised
13628	38	51	38	55	These points have been covered earlier [Elvira Poloczanska, Germany]	Addressed, the section has been revised
6075	38	52	38	52	What is meant by "to emerge"? Suggest removing/revising sentence. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
13500	38	53	38	53	Anthropocene is a key point. Can you show the degree of cost-benefit analysis or modeling proposal, limit it to exempting developing countries or assessing related costs? [Soonuk Yoon, Republic of Korea]	Addressed, the section has been revised
3284	38	54			A focus on the near-term, medium term and long term is a focus on the entire future. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised
3285	38	55			'It is recognised…' repeats sentiments expressed earlier. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Addressed, the section has been revised

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7184	39				Box 1.4: The box deals with experiences of 1.5°C temperature increase. The text very much tries to cover the entire topic of traditional knowledge. The authors should concentrate the attention of the text on the purpose of the box rather than deviating in too general issues. For instance, I do not understand what the relationship between the text and figures is and how this connects with the title of the box. They appear to be entirely separated. Instead the reader learns from the about weather proverbs in Nepal and the relationship to some plants with latin names that nobody can remember, while the figure shows an "SDG global index score" that has not been mentioned in the text; what is SDG standing for? Also, it is not clear from the caption that traditional knowledge has been used or was necessary for the data plotted. The caption says that there is the GISTEMP dataset. Hence, in the context of Box 1.4 what is this traditional knowledge issue about? [Nico Bauer, Germany]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
3134	39	1			This section 1.5.2 is not in the right place. It should be greatly shortened, and put in the front of the chapter, if it is needed at all. [Richard Rosen, Germany]	Disapprove because section will be sharpened and it is in the approved outline
17297	39	1	39	1	I suggest to explain what the IPCC assessment does in this section (it provides a comprehensive review and makes an assessment) [Corinne Le Quéré, United Kingdom (of Great Britain and Northern Ireland)]	Addressed by additional text on the IPCC assessment approach
10968	39	1	39	1	This section would be nore helpful if it flagged where in the report different types fo knowledge are used. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Will change the text accordingly.
7415	39	1	39	33	The arguments for not using cost-benefit analysis in the preceeding Section 1.5.1 seems convincing. However, we do not think that this Section 1.5.2 clarifies which method(s) has actually been used. Please consider adding a few sentences on this issue. A theoretical approach supplemented with different types of models? [Øyvind Christophersen, Norway]	Addressed, the section has been revised
13692	39	1	39	7	Chapter 3 is not mentioned [Elvira Poloczanska, Germany]	Addressed
19687	39	1	39	8	As Grey Literature is to be included in this chapter / report - I call the Authors attention to the publications of the Mary Robinson Foundation - Climate Justice (www.mrfcj.org). In particular: [Tara Shine, Ireland]	Checked and use where appropriate
19688	39	1	39	8	Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015. Online at http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19689	39	1	39	8	Rights for Action Putting People at the Centre of Action on Climate Change (Nov 2015) Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-Rights-for-Action-edition-2.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19690	39	1	39	8	Incorporating Human Rights into Climate Action Version 2 May 2016. Online at http://www.mrfcj.org/wp-content/uploads/2016/05/Incorporating-Human-Rights-into-Climate-Action-Version-2-May-2016.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19691	39	1	39	8	The Full View second edition: ensuring a comprehensive approach to achieve the goal of gender balance in the UNFCCC process (2016). Mary Robinson Foundation and UN Women. Online at http://www.mrfcj.org/wp-content/uploads/2016/11/MRFCJ-Full-View-Second-Edition.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19692	39	1	39	8	Women's Participation An Enabler of Climate Justice. First edition: November 2015. Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-_Womens-Participation-An-Enabler-of-Climate-Justice_2015.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19693	39	1	39	8	Cllmate Justice: Equity and Justice informing a new climate agreement. World Resources Institute and Mary Robinson Foundation Working Paper. Online at http://www.wri.org/sites/default/files/climate_justice_equity_and_justice_informing_a_new_climate_agreement.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19694	39	1	39	8	The Role of Social Protection in Ending Energy Poverty: Making Zero Carbon, Zero Poverty the Climate Justice Way a Reality. 2016. Online at http://www.mrfcj.org/wp-content/uploads/2016/09/The-Role-of-Social-Protection-in-Ending-Energy-Poverty.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19695	39	1	39	8	Pursuing Climate Justice within Environmental, Social and Governance Frameworks. 2017. Online at http://www.mrfcj.org/wp-content/uploads/2017/03/Policy-Brief-Pursuing-Climate-Justice-within-ESG-Investment-Frameworks-Mary-Robinson-Foundation-Climate-Justice-Jan-2017.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19696	39	1	39	8	Essay by Henry Shue for the Mary Robinson Foundation. Share Benefits and Burdens Equitably. 2015. Online at http://www.mrfcj.org/wp-content/uploads/2015/09/Sharing-the-Benefits-and-Burdens.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19697	39	1	39	8	Essay by Ravi Kanbur for the Mary Robinson Foundation. Education for Climate Justice. 2015. Online at http://www.mrfcj.org/wp-content/uploads/2015/09/Education-for-Climate-Justice.pdf [Tara Shine, Ireland]	Checked and use where appropriate
19698	39	1	39	8	Esaay by Joy Hyvarinen for the Mary Robinson Foundation. Respect and Protect Human Rights – Lessons from Transitional Justice. Online at http://www.mrfcj.org/wp-content/uploads/2015/09/JoyHyvarinen_Respectandprotecthumanrights_lessonsfromtransitionaljustice.pdf [Tara Shine, Ireland]	Checked and use where appropriate
1179	39	1	40	35	This section could be much stronger! Box 1.4 should explicitly state how community knowledge adds to understandings of local-regional risks and responses to 1.5C, and what the limitations may be. How does a world map of human-induced warming represent community knowledge? Better to use the map from Savo et al. 2016. [Petra Tschakert, Australia]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
12962	39	3	39	7	It would be good to have this explanation of Antrhopogene come earlier in the report. [Johanna Nalau, Australia]	Covered already in section 1.1
3287	39	4			Anthropocene defined earlier [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Done
16149	39	4	39	4	Please capitalize "Earth" as this is about the planet, and not dirt. One does not use the term "jupiter system science"--planet names are capitalized. [Michael MacCracken, United States of America]	Accepted. Will change the text accordingly.
16150	39	5	39	7	Grammar needs smoothing [Michael MacCracken, United States of America]	Agreed
3406	39	6	39	6	CHANGE to either ...."a" s-e" system..... or...s-e "systems"..... [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
15286	39	6	39	6	copy edit: "system" should be "systems" [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
3407	39	7	39	8	What about 3rd source, indigenous knowlege mentioned numerous times in following paragraphs? [Paul Doyle, Canada]	Important but Chapter is using IPCC Assessment Convention
15288	39	8	39	8	The IPCC term is usually "grey" literature, not "grey-unpublished literature" [Pauline Midgley, Germany]	Cleaned it up

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17851	39	8	39	8	Grey literature can be published, it just has not been under academic peer-review. Suggest to remove the word 'unpublished' [Wilfran Moufouma Okia, France]	Cleaned it up
12257	39	8	39	8	You may also mention assessments and reports from IPCC; UNEP etc. [Jan Fuglestvedt, Norway]	Noted
3408	39	10	39	10	CHANGE...knowledge "on" the physical.....to.....knowledge "regarding" the physical..... [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
16151	39	10	39	25	I'm surprised that mention is not really made of technological development,conservation, efficiency, etc., except rather indirectly in line 17. Given their importance in contributing to reducing emissions, I would think that explicit mention should be made. [Michael MacCracken, United States of America]	Addressed and included under mitigation pathways
15289	39	11	39	11	copy edit: please insert hyphen in "human-induced" [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
3409	39	14	39	14	CHANGE... knowledge from "lived" experiences....to..... knowledge from "actual human" experiences..... [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
12258	39	14	39	17	It would be useul if the authors could explain how knowledge from lived experiences can be used in assessments. [Jan Fuglestvedt, Norway]	Can't use it must be according to IPCC convention
3410	39	15	39	15	CHANGE.... context of social-ecological system.....to.....context of "the" social-ecological system.... [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
3411	39	16	39	16	CHANGE..... within "this" is "co-production" of local knowledge...to....within "which" is "a body" of local knowledge..... [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
3412	39	17	39	17	CHANGE..... projections "in" the future. ....to.....projections "into" the future. [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
3413	39	19	39	19	INSERT a comma after interviews, [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
15293	39	19	39	19	Suggest including a reference to the IPCCprocedure on the use of literature (Annex 2 to Appendix A to the Principles Governing IPCC Work, 2013) [Pauline Midgley, Germany]	Use IPCC guidance
4519	39	19	39	25	According to IPCC discussion after AR4 the grey literature has to be (or should be) labelled in the Reports. [Radim Tolasz, Czech Republic]	Addressed
13629	39	20	39	20	Please ensure agreement in the use of the Anthropocene. If included it will need defining [Elvira Poloczanska, Germany]	Define in section 1.1
3414	39	20	39	20	Eliminate "for example" [Paul Doyle, Canada]	Addressed
11689	39	21	39	21	"Industries"...seems out of place...reports from industries? Not clear. [David Schoeman, Australia]	To be corrected
13630	39	22	39	22	Not 'may' – climate change DOES impact human lives etc. [Elvira Poloczanska, Germany]	Accepted. Will change the text accordingly.
15290	39	22	39	22	copy edit: please insert hyphen in "media-based" [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
15294	39	22	39	22	I believe the word should be "non-written" rather than "un-written" [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
3415	39	22	39	23	REWORD sentence to.... "does not use oral evidence nor media reports nor newspaper publications." [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
13631	39	23	39	23	'cultures' (plural not singular) [Elvira Poloczanska, Germany]	Addressed
6077	39	23	39	25	Suggest revising sentence. What does it mean for publications to be in "the geopolitics"? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Revised
3416	39	24	39	24	CHANGE ..."with exception to Australia".....to..."with the exception of Australia".... [Paul Doyle, Canada]	Addressed
15295	39	24	39	24	the most vulnerable what? Insert a noun: "part of the world" perhaps? [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
10572	39	24	39	25	what is the proportion?, is this only from English language literature? [Elemer Briceño-Elizondo, Costa Rica]	Addressed
3417	39	24	39	25	This sentence needs to be rewritten to make sense. [Paul Doyle, Canada]	Addressed
15296	39	27	39	27	copy edit: "structure" should be "structures" [Pauline Midgley, Germany]	Accepted. Will change the text accordingly.
3418	39	27	39	29	This sentence needs to be rewritten to better clarify points being made. [Paul Doyle, Canada]	Addressed
6078	39	29	39	29	Not sure James et al. (2017) is a suitable reference here? It is more about methods for examining climate data and doesn't say much about response options. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Accepted - references have been corrected.
6079	39	29	39	33	I am not sure I agree that incorporating knowledge is enough to advance decision making and implementation. Perhaps a necesssary but not sufficient condition? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	It is one amongst many
3419	39	30	39	30	CHANGE....."channel, and educating and building awareness"....to....."channel while building awareness".... awareness"..... [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
6080	39	30	39	30	What does "setting a mulit-faceted information channel" mean? [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Will write that more clearly
19699	39	30	39	33	and inform it? The value of local, traditional and indigenous knowledge is given attention but not 'how' it will be integarted into this report? Are workshops with representative community groups envisaged? See the report of the International Conference on Hunger, Nutrition, Climate Justice - which demonstartes how local communities can be enagaged in climate research and action. See the report online at http://www.mrfcj.org/media/pdf/HNCJ-Conference-Report.pdf [Tara Shine, Ireland]	Through IPCC Channels, need to clarify how TK is used through published literature
19700	39	30	39	33	Need to emphasise grassroots and local women's knowledge in particular. See for example this publication. Women's Participation An Enabler of Climate Justice. First edition: November 2015. Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-_Womens-Participation-An-Enabler-of-Climate-Justice_2015.pdf [Tara Shine, Ireland]	Accept, will follow through with reference given
3420	39	31	39	31	ADD s to "responses" [Paul Doyle, Canada]	Accepted. Will change the text accordingly.
12963	39	36	39	54	It seems that most of the discussion here relates to Traditional Ecological Knowledge. However, TEK is a small part of Traditional/Indigenous Knowledge and there is an increasing critique towardsr climate change research that it ignores the wider Indigenous Knowledge that TEK is a part of. See e.g. Parsons, M., Fisher, K., & Nalau, J. (2016). Alternative approaches to co-design: insights from indigenous/academic research collaborations. Current Opinion in Environmental Sustainability, 20, 99-105. Most of Indigenous Knowledge at community level will be important in 1.5 degree world; the question is how this body of knowledge is integrated in IPCC assessments as a holistic body of knowledge and what other lessons can be drawn from it than just weather and climate indicator focused knowledge. [Johanna Nalau, Australia]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1

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10573	39	36	40		The importance of local knowledge is sometimes overlooked; particularly from "remembered" evidence. Normally in local Central American communities there are a lot of individuals with no technical knowledge on what a certain degree of change is or means, but although they may not even understand the physical science, the consequences are a memory record that can be perfectly doccumented. This is combination with hard evidence on changes through time can be correlated, in particularly with difficulty to sustain crops or effects on wild life and forest yields. Other productive systems and neccesities can function equally as evidence of change. This information incorpotated into this report via structured interviews can be useful. [Elemer Briceño-Elizondo, Costa Rica]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
5701	39	36	40	35	It seems that the content in Box 1.4 is not directly related to the theme of Section 1.5. [Hong Yang, Switzerland]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
2704	39	36	40	35	Need to present other perspectives from the literature that show potential limits of traditional knowledge in dealing with climate change - this was already presented in AR4 (e.g. see Boko et al 2007) and AR5 (e.g. see Niang et al 2014). [Penny Urquhart, South Africa]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
11690	39	36	40	35	This box is poorly written and punctuated in several places. The text also ignores the significant elephant in the room...it is all very well to accept indigenous knowledge that "aligns" with data, but the challenge is where it runs counter to data (i.e., evidence, as would be the case if you spoke to climate skeptics whose beliefs (= "subjective knowledge") are naturally at odds with observable evidence). If you accept this (the skeptics') "knowledge", it invites perception/belief to overwhelm objective reality; if you do not, you risk being accused of cherry-picking perceptions that support scientific knowledge. Either way, this seems to just weaken the arguement. I think this needs careful consideration in future drafts. [David Schoeman, Australia]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
6083	39	36	40	35	I feel very nervous about this box. I think it is good to highlight that indigenous knowledge can help us understand climate change and how to respond to it. I also think it is good to highlight that for some regions, a 1.5C global warming will mean much larger regional or local warming. Equally it is very important that at our current level of warming (about 1C) many regions have experienced more than 1C of warming. However, I am nervous about the idea of finding places that have more than 1.5C local warming and using that to take lessons about 1.5C. This might imply that those places help us understand what a 1.5C target might mean on the ground. This could substantially underestimate the impact of a 1.5C global warming for vulnerable people. If places have already experienced 1.5C local warming, impacts associted with a global warming of 1.5C might be much greater, and they may need to prepare for more change. None of us have experienced the implications of a 1.5C world yet. If we want to imagine what it would be like, we need to imagine beyond current experience. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
6400	39	39	39	40	should the sentence read: ….there are large uncertainties (delete where) in this information (delete is produced) in addition to ….. [Sybil Seitzinger, Canada]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
3421	39	39	39	41	CHANGE.... "limited and there are large uncertainties where information is produced in addition to research gaps".....to....."limited and not well documented in addition to research gaps"..... [Paul Doyle, Canada]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
12259	39	39	39	51	It would be useul if the authors could explain how knowledge from lived experiences can be used in assessments. [Jan Fuglestvedt, Norway]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
13632	39	43	39	43	Ok this idea about 'sacrifice' has been discussed in the literature – it is not necessarily a sacrifice to change how we live, it could actually make us a lot happier and healthier [Elvira Poloczanska, Germany]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
13633	39	45	39	47	sentence needs rewriting, for clarity [Elvira Poloczanska, Germany]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
895	39	48	39	48	data tends --> "data tend" [Sarah Gille, United States of America]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
20671	39	49	39	49	Central Africa and Central America are regions, not countries [Debora Ley, Guatemala]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
6081	39	49	39	49	Suggest rephase - Central Africa and Central America are not countries [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
899	39	53	40	23	the text is misleading, giving the impression that people who have already experienced temperatures of 1.5°C above pre-industrial level have knowledge of the local effects of a 1.5°C global warming. A 1.5°C global warming will result on most continental areas in a noticeably higher warming since the ocean warming is lower. People may have a useful knowledge of the local climate and the changes that have occured. To what extent can these changes be extrapolated to higher warmings : the climate and its impacts have not a linear behavoiur. [Jean Poitou, France]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
3422	39	54	39	54	Eliminate "Whilst" [Paul Doyle, Canada]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
15297	39	54	39	54	copy edit: delete comma after "Whilst" [Pauline Midgley, Germany]	Box 1.4 removed and Box 1.4 figure 1 moved to section 1.1
2297	40	1	40	35	The caption of Box 1.4, Fig.1, refers to the human-induced warming of 2007-2016 relative to 1850-1879, based on GISTEMP. As GISTEMP starts only in 1880, presumably the shift to 1850-1879 made use of HadCRUT4. More seriously, what else was used? GISTEMP alone cannot separate the human-induced warming from the total warming. A ten-year period is too short to filter out natural variability. 2015 and 2016 were exceptionally warm, but this should not be attributed to human-induced warming unless backed up by numerical simulation. There was a strong El Nino, and some of the warmth of the Arctic may have been due to natural variability. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	figure to move to section 1.1 and improved
3288	40	2			These sentiments have been expressed earlier [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Figure 1 moved to section 1.1 and improved
3423	40	2	40	2	Break long sentence into two sentences in this way: .... "2017). Large parts"..... [Paul Doyle, Canada]	Figure 1 moved to section 1.1 and improved
9856	40	2	40	3	I think such statements are misleading as experienceing one season with 1.5°C is different from living in a 1.5°C world see chapter 3, page 7 L19-22) [Christopher Reyer, Germany]	To be corrected
1290	40	2	40	4	It's important to note that climate impacts are not uniformly distributed across seasons, and thus even though a majority of the world has experienced warming >=1.5 C in a season, this does not mean that the true impacts of 1.5 C warming have been accurately or completely previewed (e.g. warming in mid-latitude winter has less effect on human health, energy demand, etc. than warming in mid-latitude summer). [Colin Raymond, United States of America]	To be corrected

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12355	40	2	40	4	While this might be correct, it is unclear, and in sharp contrast with the definition of 1.5° GMT increase given above, why an increase in regional seasonal temperature should be a good representative for a 1.5°C world. Quite to the contrary, this is quite misleading. What is, however, potentially very relevant is the experience of 0.5°C GMT warming difference over the observational record until today (~1°C), that could give an indication (and in most cases a lower bound) of how future impacts at an additional 0.5°C warming could look like. [Bill Hare, Germany]	Figure 1 moved to section 1.1 and improved
4520	40	3			Compare the "70% of the global population for which …" with 50% in the Box 1.4 Fig. 1. It is not clear. [Radim Tolasz, Czech Republic]	To be corrected
7304	40	3	40	32	In line 3, it is stated that 70% of global population has already experienced at least one season with human-attributable warming above 1.5oC. In line 32, this share is 50%. Revise accordingly to ensure consistency. [Eleni Kaditi, Austria]	To be corrected
17852	40	4	40	4	they will be in a future 1.5°C WARMER world [Wilfran Moufouma Okia, France]	To be corrected
13634	40	8	40	8	But many 'grey' literature texts are published – just not with traditional academic publishers. Suggest using the term robust grey literature [Elvira Poloczanska, Germany]	To be corrected
11900	40	9	40	12	I am afraid that this sentence gives an impression that the use of grey literature is encouraged. More conservative attitudes are advisable. [Junichi Tsutsui, Japan]	To be corrected
3424	40	9	40	9	CHANGE..... " critical to developing local".....to..... " critical in developing good local".... [Paul Doyle, Canada]	To be corrected
3425	40	10	40	10	CHANGE....." it either exists in grey literature outside of peer-reviewed process or remains".....to....." it either exists only in grey literature or remains"..... [Paul Doyle, Canada]	To be corrected
13644	40	10	40	11	This is not true : it is not EITHER grey literature or oral. There is a considerable amount of peer-reviewed anthropology literature, for example [Elvira Poloczanska, Germany]	To be corrected
13645	40	11	40	12	It's not just impacts and mitigation, community/local knowledge also relates to adaptation practices. Furthermore, is it correct to say it 'falls outside the scope' of scientific literature? It doesn't have to fall outside the scope, it depends on the type of literature and what is considered to 'scientific' – it is not outside the scope of social science and anthropology. Also, even if such knowledge is not discussed in scientific literature, that does not mean it can't be considered by policy makers and used to inform decision-making. [Elvira Poloczanska, Germany]	Valid point, text to be edited
3426	40	16	40	16	ADD "in developed countries." to..... computer models..... [Paul Doyle, Canada]	Noted
3427	40	16	40	19	Break long sentence into two sentences and change it in this way: " .... climate. Similar findings have also been established among the Nepalese ....." [Paul Doyle, Canada]	Noted
13635	40	19	40	19	Interviews are a type of research method, not a type of literature category. Do the authors mean qualitative data ? [Elvira Poloczanska, Germany]	Valid point, text to be edited
3428	40	19	40	19	CHANGE "This is equally so for indigenous"....to....."So too for indigenous"..... [Paul Doyle, Canada]	Noted
13693	40	19	40	23	This is a distraction. Much of this is in the IPCC guidance note on use of literature which could be cited instead of listing literature types used and excluded. The key issue is the scarcity of published literature and the biases in regions for information [Elvira Poloczanska, Germany]	Use IPCC guidance
3429	40	20	40	20	INSERT an "a" in.... Islands with "a" rich understanding..... [Paul Doyle, Canada]	Addressed
3430	40	22	40	22	CHANGE .....planting and "harvest" of breadfruit....to...planting and "harvesting" of breadfruit.... [Paul Doyle, Canada]	Noted
13636	40	24	40	24	Is this the first the 'the South' has been used in the report ? Is it a term used elsewhere in the report ? Does it need to be 'global South' ? [Elvira Poloczanska, Germany]	Box 1.4 removed
13637	40	24	40	24	Unclear – does 'the most vulnerable' refer to 'the South' or is it a separate category ? The most vulnerable what ? [Elvira Poloczanska, Germany]	Box 1.4 removed
6453	40	24	40	25	Regarding box 1.4, figure 1: This colour bar is unsuitable for some colour deficient readers. For example the colour representing -3 -> -2.25 appears very similar to the colour for values greater than +3. [Jonny Williams, New Zealand]	Figure 1 moved to section 1.1 and improved
13638	40	24	40	25	'far lower in the geopolitics of documented knowledge' - please avoid jargon [Elvira Poloczanska, Germany]	Box 1.4 removed
13044	40	24	40	26	Box 1.4 Fig. 1: add "Temperature increase" in the x-axis of panel b) [Caserini Stefano, Italy]	Figure 1 moved to section 1.1 and improved
3135	40	24	40	34	Figure 1 in Box 1.4 is quite interesting for most readers, and should be a stand alone figure put up front near the beginning of the chapter since it describes the regional variations of climate change which is discussed up front. [Richard Rosen, Germany]	Figure 1 moved to section 1.1 and improved
6082	40	24	40	35	I think this figure needs more explanation. Why are their only coloured dots shown for some places (and these are quite difficult to see at this size). Are the dots only for places where studies have been carried out? It's unclear. [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	Noted
12818	40	27			The superposition of grey shades and colors makes this map very difficult to read. The SDG Gloabal Index score is not explained. How is it determined, what do the numbers of this score mean? [Thomas Stocker, Switzerland]	To be corrected
17457	40	27			C [Tom Gabriel Johansen, Norway]	Noted
17497	40	27			C [Angela Morelli, Norway]	Noted
11901	40	27			Box 1.4 Figure 1: Overlaying different shading should be avoided. There is no description about SGD Global Index Score. [Junichi Tsutsui, Japan]	To be corrected
10193	40	27			I really like this figure [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Noted
4913	40	27	40	27	Please, verify the following text: "Box 1.4, Figure 1: Realised experience of present-day warming. Panel a): colours indicate human-induced warming",since it is difficult to understand what means "realised experience". Also, there are two color code bars that cannot be well recognized in the Figure. [Rubén Piacentini, Argentina]	To be corrected
15298	40	27	40	27	Box 1.4, Figure 1, Panel (a) needs to be reproduced on a larger scale to make the information meaningful [Pauline Midgley, Germany]	Figure 1 moved to section 1.1 and improved
16152	40	27	40	34	Somehow the caption and the figure, particularly for the left panel, do not match. In any case, the colors are not very reader friendly. Also I just do not see the dots or the underlay that are mentioned. [Michael MacCracken, United States of America]	Figure 1 moved to section 1.1 and improved

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10427	40	27	40	34	In Box 1.4 lines 27-34 cannot relate caption to figure e.g. “density of dots” in line 29 and “yellow shading” in line 31 [Jonathan Lynn, Switzerland]	Figure 1 moved to section 1.1 and improved
3431	40	27	40	35	Box1.4 Fig. 1. Caption needs to be cleaned up and explained better. [Paul Doyle, Canada]	Figure 1 moved to section 1.1 and improved
4914	40	29	40	29	In the text: "The density of dots indicates the population (2015) in any 1°x1° grid box." gives an information that is not available in the Figure 1, since the dots cannot be seen. Also, the letters in the Figure must be at least of equal or greater dimensions than those in the text. [Rubén Piacentini, Argentina]	To be corrected
9542	40	30			SDG Global Index Score: Need explanation of the graduation in the upper figure. Please explain what this overlayed evaluation means. [Shuzo Nishioka, Japan]	To be corrected
9568	40	30			SDG Global Index Score: Need explanation of the graduation in the upper figure. Please explain what this overlayed evaluation means. [Shuzo Nishioka, Japan]	To be corrected
13639	40	31	40	31	responses' plural not singular [Elvira Poloczanska, Germany]	Noted
12819	40	38			In this section the reader is left with the impression that the former, well-established and documented practice of the IPCC uncertainty language will be abandoned. I appreciate the challenge of a consistent language in a report which is combining contributions from all WGs. But this is no different from the SYR of AR5, and the AR5 Guidelines have been proven useful and comprehensive. Therefore, the authors must be very clear whether they will abandon these guidelines, or whether the Guidelines will be used in modified form. In any case, a very clear documentation must be provided. It would be a big mistake to go back to a situation that is less clear than that at the time of AR5. [Thomas Stocker, Switzerland]	No previous practice is abandoned in this report - hopefully the revised and shortened text no longer gives this impression.
12820	40	38			In this section, nowhere is there mention of italic typsetting of the reserved uncertainty language terms such as likely, medium confidence, etc.. Is this useful visual distinction in the text abandoned? Again, if yes, a very clear update on the uncertainty guidelines would have to be provided. [Thomas Stocker, Switzerland]	Final copy-editing will deal with italics and other matters.
3136	40	38			Section 1.6 should be clarified, and shortened. The confidence issue always is quite wishy washy, since it depends on who you ask. But there should be a more precise discussion of uncertainty, and how uncertainty affects these kinds of studies of the distant future. (Even 2050 is the distant future for our purposes here.) On the other hand, policy makers need to know what kinds of projections or statements are more certain than others. [Richard Rosen, Germany]	This section has been shortened. This report does not differ from earlier reports regarding the use of uncertainty language and there is therefore no extended discussion of these matters here.
15301	40	38			It has been usual practice in IPCC reports to italicise the calibrated confidence and likelihood language including in the section or text that explains it. This entire section needs those copy edits [Pauline Midgley, Germany]	This will be followed during final copy-editing.
10969	40	38	40	38	Do we need to go though all of the standard guidance here? It uses up scarce page space and the existing guidance could simply be referred to [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	This has now been reduced considerably.
20242	40	38	42	45	The discussion of confidence, uncertainty and risk calls out the specific language used in the report. The explication of the style is clear but the decision process by which this process or any discussion of alternatives aren't presented. This would give the report's treatment of this topic more credibility and transparency. [Joshua Loughman, United States of America]	This has now been reduced considerably. The reviewer is referred to the uncertainty guidance literature of the IPCC.
13640	40	39	40	40	‘where’ this information is produced ? what does that mean [Elvira Poloczanska, Germany]	We do not understand this comment
16153	40	40	40	40	Need to change to "are fundamental" [Michael MacCracken, United States of America]	changed (but should be verified by another native speaker)
13641	40	41	40	42	local knowledge is not necessarily traditional i.e. accumulated over generations. Also, terminology use is not consistent in this subsection : is it ‘community’ knowledge or ‘local’ knowledge or ‘traditional’ knowledge or ‘indigenous’ knowledge? They are not interchangeable terms - but usage of one term or another in this Box seems arbitrary. Check terminology with AR5 WGII pp765-766 [Elvira Poloczanska, Germany]	Noted - we will work to refine understanding of this across chapters in the glossary
17853	40	42	40	42	building on IPCC (2005) - also builds on the guidance note for AR5 (Mastrandrea et al., 2010). TSU has corrected author name of IPCC (2005) in Mendeley to Mastrandrea et al. (2005) [Wilfran Moufouma Okia, France]	Noted and corrected
17854	40	42	40	42	Reference: IPCC 2005 not listed in the references [Wilfran Moufouma Okia, France]	Noted and corrected
15299	40	42	40	42	No IPCC 2005 citation is given in the list of References; I believe this refers to the "Guidance Notes for Lead Authors of the IPCC Fourth Assessment Report on Addressing Uncertainties" which is incorrectly cited in the list of References (p. 50) as "Mastrandrea, M. D., and Co-Authors" so the reference list needs correction. [Pauline Midgley, Germany]	Noted and corrected
12260	40	43	40	43	proposed should be changed to "adopted" [Jan Fuglestvedt, Norway]	For the moment, changed to "made", however this whole sentence may become victim to additional shortening of this section.
13642	40	50	40	51	verified by whom/what? There is an underlying presupposition with this statement that community knowledge is not trustworthy and needs to be verified by some other more trustworthy form of knowledge - so there is an implied hierarchy of knowledge. [Elvira Poloczanska, Germany]	still not clear what this refers to, in our copy, page 40 has only 43 lines of text.
13643	40	53	40	53	please be consistent in use of local, traditional and indigenous knowledge [Elvira Poloczanska, Germany]	still not clear what this refers to, in our copy, page 40 has only 43 lines of text.
3432	41	4	41	4	Dot replaced with a 1. [Paul Doyle, Canada]	this will be considered during final copy editing
3433	41	6	41	6	Dot replaced with a 2. [Paul Doyle, Canada]	this will be considered during final copy editing
6343	41	8	41	15	The authors are at risk of de-facto re-defining (or ignoring) the uncertainty guidance, despite their assertion to the contrary in this section. The guidance is simple: if likelihood can be quantified (based on statistical data, ensembles etc), then please do so, using likelihood language. Yet the authors seem to suggest arbitrarily avoiding likelihood statements even where they might be justifiable. The authors assert that the reason why WGs II and III have used few likelihood statements in the AR5 was a difference of practice, but this is not correct in my view; the reason is simply that most statements of relevance from WGII and WGIII don't rely on data that can be analysed objectively by statistics, and hence rely to such a large extent on expert judgement and evaluation of non-quantified information that a likelihood statement is simply not appropriate. That's very different from saying it's a difference of 'practice' (even though I don't deny that discipplinary norms and perceptions influence thinking of when likelihood statements are appropriate and justified). For this report, the authors should use likelihood startements where this is appropriate (e.g. likelihood that certain emissions result in certain warming), otherwise you are de-facto rejecting the existing uncertainty guidance. [Andy Reisinger, New Zealand]	Evidence is built through various means across disciplines and statistics are not "the only objective method" as the reviewer seems to believe. We do not share his concern that the differing practices in IPCC Working Groups can or should be discussed in this particular report, but we want to draw the reviewer's attention to the fact that, due to the nature of the information analysed, even inside working group II paradigms for evidence-building differ quite widely.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6454	41	11	41	11	The use of semicolons here is confusing. Dashes or brackets should be used instead, [Jonny Williams, New Zealand]	semicolons have been replaced with commas, however this sentence may end up being reduced further during additional editing.
11492	41	19	41	44	Titles in this section are not numerated, it is intentionally so? [Meimalin Moreno, Venezuela]	this was an oversight and has now been corrected
3434	41	23	41	23	INSERT "and" in ....evidence "and" the second..... [Paul Doyle, Canada]	has been inserted, however this sentence may end up being reduced further during additional editing.
6344	41	28	41	28	Careful here: it is inconsistent with the uncertainty guidance in my view to claim "high confidence" if you have individually very robust but mutually contradictory conclusions (e.g. only medium, let alone low, agreement). The difference is that you can have a few, individually very robust, or lots of but individually maybe more shaky findings, and then collectively have high confidence in both situations. But if you have substantive differences in conclusions then you cannot have high confidence in any specific conclusion. (E.g. study A says X and study B says Y, and both studies are very robust: what exactly is it that you have high confidence in, other than that they disagree?) Please re-word accordingly (and I suggest this needs to be discussed and reconfirmwed across all chapter teams to ensure consistent use and interpretation of confidence terminology). [Andy Reisinger, New Zealand]	this should be noted for further discussion but it is unlikely that this chapter can resolve the issue.
10428	41	28	41	30	missing word/s in this sentence after “between”? [Jonathan Lynn, Switzerland]	we find nothing incorrect with this sentence, however, it may end up being reduced further during additional editing.
10429	41	35	41	38	should be “…ranging from… to…” not “ranging from… and…” [Jonathan Lynn, Switzerland]	has been corrected
13045	41	39	41	41	please explain better this concept, how this correspondence is evaluated [Caserini Stefano, Italy]	the statement essentially says that model simulations alone cannot be used to assess uncertainty - we do not see any much better way to say this than what is done here.
20541	41	44	41	44	Most importantly, this section needs to talk about uncertainty of changes in the scale and frequency of extreme weather events associated with 1.5 degrees, as well as uncertainty associated with extremes of human (e.g. Kates. R.W. et al, 2006, Reconstruction of New Orleans after Hurricane Katrina: A research perspective. PNAS, 103: 40, 14653-14660, doi: 10.1073/pnas.0605726103) and ecosystem responses (e.g. Palmer G et al. 2017 Climate change, climatic variation and extreme biological responses. Phil. Trans. R. Soc. B 372: 20160144. http://dx.doi.org/10.1098/rstb.2016.0144) associated with 1.5 degrees. It is these extremes rather than the general trends that should be the focus of this entire report and that will be defining of impacts on ecosystems and people, their responses and ability to adapt. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Throughout the report, reference to the scale of the assessment is made quite consistently, and the issue is also discussed in 1.2.2 for example. We do not think that there is a special need to return to the question here.
10237	41	46	41	46	One also needs to include risk appetite whne discussing the risk because some countries are willing to take more risk [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	We are not aware of scientific publications about "risk appetite".
17855	41	46	42	4	For extra clarity, an example of exactly what could be used in the report could be added at the end of this section. [Wilfran Moufouma Okia, France]	We do not think that we have enough space for adding examples to this section.
6345	41	46	42	4	Two substantive issues: (1) don't carelessly mix uncertainty and risk. Risk is a different issue, and relies on information about uncertainty as well as a host of other factors. It would be necessary to clearly define the concept of risk and then explain the role that assessment and communication of uncertainty and confidence plays in assessing and communicating risk. Otherwise you effectively re-interpret the concept of risk as just another way of talking about uncertainty, which is wrong. Please ensure you introduce and treat risk in a more nuanced and well defined way, and don't just throw it in along with uncertainty. [Andy Reisinger, New Zealand]	We are not of the opinion that we have been carelessly mixing uncertainty and risk in the report. The sentence introduces all three following challenges and therefore speaks about both topics.
6346	41	46	42	4	Two substantive issues: (2) the text is misleading in that it gives the impression that a statement "very likely, medium confidence" is a likely (frequent) prospect. Given that likelihood statements are meant to be quantified statements about real-world probabilities, it is very difficult to see a situation where one can claim to be able to make a "very likely" statement even though there is only limited or generally weak evidence (as would be implied by medium confidence). In AR5, WGI had only one instance where it gave a "likely" (note: not "very likely") statement 'medium confidence', and that was very deliberate and an exception, intended to highlight the weaker methodological basis for the finding. Generally, if authors don't have high or very high confidence then they probably can't/shouldn't make a likelihood statement (and saying "66%" instead of "likely" doesn't address the problem any better, if the "66% chance" is intended to refer to the real world). I see no reason why one can't state that likelihood statements generally imply high or very high confidence unless stated otherwise, and then get on with it. The AR5 guidance says exactly this, so arguing against it means the authors in fact do want to change the uncertainty guidance. I don't think the SR1.5 is the right place for revising the guidance - please stick to the AR5 guidance as provided. [Andy Reisinger, New Zealand]	We see the issue, but we do not understand where our current text is in disagreement with the reviewer's comment.
2093	42	6	42	21	Quite long-winded, inherently confusing (?) discussion of uncertainty! Could you lose a reader here? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	We have tried to reduce the long-windedness of the text through some editing.
15302	42	12	42	12	Should this be "risks are conditional" rather than "risks are conditioned"? [Pauline Midgley, Germany]	Probably, we have changed according to the suggestion.
3289	42	33			This repeats aims expressed earlier [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Thank you, we have deleted the sentence altogether.
6347	42	33	42	33	can justifiably say "this report DOES DO the following" - and make sure each chapter actually does implement this approach. No point in chapter 1 proposing an approach if it isn't followed through (which at present, even chapter 1 itself hasn't followed through as it also makes no use of uncertainty language in the FOD). [Andy Reisinger, New Zealand]	Following debate with the co-chairs, this statement is no longer relevant and has been removed.
13098	42	37	42	37	Excellent and important graphic (table). However the darker shading of grey can make it less easy to read, could not be so dark in the top RH corner. [Veryan Hann, Australia]	The illustration has appeared in earlier documents and has been removed here to save space.
13499	42	37	42	38	confidence is a "qualitative", "evidence" is a "quantified" indicator, and it is necessary to show the reliability of the methodology. [Soonuk Yoon, Republic of Korea]	The treatment here cannot be extended to a full assessment of reliability.
17458	42	40			C [Tom Gabriel Johansen, Norway]	Figure has been removed
17498	42	40			C [Angela Morelli, Norway]	Figure has been removed
20824	43				It would be good to put section 1.7 (storyline of the report) right at the beginning of chapter 1, as it presents the outline for chapter 1 itself, and the way in which this links to the other chapters. Chapter 1 would then make a lot more sense - at the moment it seems rather disjointed and hard to follow. [Alison Smith, United Kingdom (of Great Britain and Northern Ireland)]	Thank you - this was done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18840	43				I like section 1.7, Storyline of the report. It answers several questions I had when starting to read Chapter 1. For readability, I suggest moving this section up to become section 1.1, starting straight after the Executive Summary. [Bjørn Samset, Norway]	Thank you - this was done
6482	43		43		Section 1.7 'Storyline of the report' would be better placed and make more sense at the start, as part of the introduction, not the conclusion to the chapter. [Roger Bodman, Australia]	This was done in section 1.1
9153	43		43		Same general comment regarding the Paris Agreement which is why this SR is now coming in, and which is not mentionned in the storyline. The authors might want to add the Paris Agreement when talking about SDGs for instance. [Timothée OURBAK, France]	Noted, text was revised
5209	43		44		Section 1.7 Storyline of the report is a helpful section for the reader. Figure 1.8 gives clear relationships and connctions between the chapters. I recommend that you move this entire section up front. It should not be buried in the back. [Arthur Lee, United States of America]	This was accomplished
7416	43	1			have a section 1.7 that is currently called "Storyline of the report". Please consider to move this section to a more prominent place in chapter 1. We suggest that you incorporate this text under currently section 1.1 "Human, ecological and physical dimension ...". Please consider to rename this title so also the storyline of the report can be included upfront. [Øyvind Christophersen, Norway]	This was accomplished
13099	43	1	43	1	Suggest replacing "storyline" with another more scientific word - for example "structure" or "outline" or "layout." This is not a 'storyline' [Veryan Hann, Australia]	Storyline title was from the Plenary
20542	43	1	43	1	Again, it is vital that the storyline gives due prominence to the scale and frequency of extreme weather events associated with 1.5 degrees, as well as uncertainty associated with extremes of human (e.g. Kates. R.W. et al, 2006, Reconstruction of New Orleans after Hurricane Katrina: A research perspective. PNAS, 103: 40, 14653-14660, doi: 10.1073/pnas.0605726103) and ecosystem responses (e.g. Palmer G et al. 2017 Climate change, climatic variation and extreme biological responses. Phil. Trans. R. Soc. B 372: 20160144. http://dx.doi.org/10.1098/rstb.2016.0144) associated with 1.5 degrees. It is these extremes rather than the general trends that should be the focus of this entire report and that will be defining of impacts on ecosystems and people, their responses and ability to adapt. (e.g. Palmer G. et al. 2017 Climate change, climatic variation and extreme biological responses. Phil. Trans. R. Soc. B 372: 20160144. http://dx.doi.org/10.1098/rstb.2016.0144) [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	The storyline cannot be about one item but rather extends to the broad goals of all the chapters. The suggestion however is useful for Chapter 3 and 4 and the references are useful
1076	43	1	43	47	This is very helpful. Suggest moving it to page 6 right after the Executive Summary so it doesn't get burried. It's a very helpful useful tool to orient and assit readers to navigate the rest of the report. Move it up. [Martini Catherine, United States of America]	The point was taken
3137	43	1	43	47	This section is less of a storyline than a summary of the chapters in order. A real story line should be pulled from the goals of this report, and should focus on how a policy maker needs to proceed to understand the requirements of a 1.5 degree non-overshoot scenario, and the pluses and minuses of such a scenario compared with an overshoot scenario. [Richard Rosen, Germany]	This was taken into account and we believe 1.7 is now a storyline
1180	43	1	43	47	The section 1.7 does not truly capture the storyline of the SR. More needs to be done here to outline a compelling narrative rather than reiterating what will be covered in the following chapters. Also, why leave the storyline to last? Considering the purpose of Ch1 is to frame the whole SR, we should be telling the reader what to expect in the opening pages. Also, while Ch2 is indeed a very important chapter, why suggest this one to be the only one 'key to the whole report'? Don't lump together Ch4 and 5 in the same sentence (l37). [Petra Tschakert, Australia]	Section 1.7 was revised and CLAs of all the chapters contributed to the revised storyline
10971	43	1	43	47	This is an annotated contents list rather than a storyline! [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Indeed the storyline was developed in the SOD
7722	43	1	43	8	Considering that herein, it is stated at the beginning of this chapter that the thrust of this report is “to establish feasible options for the global community within the context of the SDGs”, somewhere in Chapter 1, the SDGs need to be presented and schematically linked to the various options. This implies an additional more detailed diagram and/or table than Figure 1.8 [Hilary Inyang, Nigeria]	This has been done
6029	43	1	44	4	Would it be more helpful for the reader to get the storyline for this chapter, and the entire report at the beginning of the chapter? Perhaps as orientated around some key questions that the report seeks to answer? (elaborating on the questions in Figure 1.8) [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	This was done and this section was revised
10194	43	1	44	4	I like the storyline section and figure [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thank you although the figure was revised
10238	43	3			the use of word "The thrust of this report" is inappropriate. It would be advisable to use more moderate word, e.g. "an ulitmate goal"… [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	This was revised
6455	43	3	43	3	Use of the word 'Thrust' here is poorly defined and should be replaced. [Jonny Williams, New Zealand]	This was revised
10970	43	3	43	3	The "feasible" word makes it seem as though the report is all about mitigation. Its great to discuss feasibility but, as a concept, it has been elevated far too high. [Skea Jim, United Kingdom (of Great Britain and Northern Ireland)]	Other concepts are also covered in this report. Beside the section was reviewed
6030	43	3	43	6	This sentence, and the figure, perhaps assume that limiting to 1.5C would be beneficial, and feasible. Isn't part of the point to assess whether it is feasible, and benefits outweigh costs? Perhaps the assessment of these questions could be embedded in this sentence, describing the aim of the report, and the figure. For example "How do we get there?" could be "How could we get there?" [Rachel James, United Kingdom (of Great Britain and Northern Ireland)]	This comment was considered with other views on the figure
2464	43	3	43	8	Start report with this paragraph; it is succinct, significant, and informative [Lisa Lucero, United States of America]	Thank you but others had different views
3290	43	4			The SDG acronym defined earlier [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	OK
20081	43	10	43	22	It is a bit confusing to have here a repetition of the material covered in Chapter 1, while having this intertwined with the material covered in Chapters 2-5. It is easier to simply state that Chapter 1 provides an introduction to the whole report, and to mention in the next paragraphs where introductory material to the respective chapters is found in Chapter 1. E.g., include at the end of the next paragraph a sentence stating "Introductory material to Chapters 2 and 3 is provided in the present chapter in Sections ...". This can be done similarly in the last paragraph for Chapters 4 and 5. [Sonia Seneviratne, Switzerland]	A link to other chapters has been done in the chapters. The section 1.7 was revised
11902	43	10	43	22	It is unusual that overview of chapter 1 is located in the end of chapter 1 itself. [Junichi Tsutsui, Japan]	Point taken and attended to
20190	43	12			…in the context of the Anthropocene. [Ton Wildenborg, Netherlands]	Noted and revised
14339	43	12	43	12	In the context OF the Anthropocene [Alessio Giardino, Netherlands]	Noted and revised
9298	43	12	43	12	There is a missing word "of" in the phrase "social-ecological systems in the context (of) the Anthropocene" [Siir KILKIS, Turkey]	Noted and revised
3435	43	12	43	12	INSERT "of" between .... context "of" the Anthropocene [Paul Doyle, Canada]	Noted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10371	43	12	43	12	Should say "…in the context of the Anthropocene…" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Noted and revised
12261	43	21	43	21	have more on this in chapter 1. [Jan Fuglestvedt, Norway]	Attempts have been made as far as is feasible for this report
4889	43	24	43	24	how 1.5°C global warming could be achieved should be rewritten here. Global warming is not the goal, the goal is to limit global warming. [Sigrid Kusch, Germany]	Revised
20859	43	24	43	24	Suggests Ch2 is about the 'how' of 1.5C while it was decided that Ch2 would be about the 'what' of 1.5C, and Ch4 about the 'how' [Heleen de Coninck, Netherlands]	Noted and revised
3436	43	25	43	25	INSERT "are" and "a" as shown..... emissions "are" consistent with "a" warming ..... [Paul Doyle, Canada]	Text Revised
7417	43	25	43	26	Please note that in the outline it is said that this should include warming og 1.5C compared to 2C. We feel that this is a very important point to be included in Chapter 2. [Øyvind Christophersen, Norway]	Noted and taken care of in chapter 2 and subsequent chapters as appropriate
7418	43	26	43	29	Please note that in the outline second bullet point for chapter 2 it is mentioned both 1.5C and 2C regarding constraints and uncertainties. [Øyvind Christophersen, Norway]	Noted
3291	43	28			Change 'developed' to 'development' [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	Text was revised
10372	43	28	43	28	should end "…sustainable development in…" [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Text was revised
15278	43	28	43	28	the abbreviation WG is only used twice in this Chapter so I suggest spelling out "IPCC Working Group 2" for "IPCC WGII"; also need to decide whether using Roman or arabic numerals for the WGs and be consistent [Pauline Midgley, Germany]	Noted
10430	43	28	43	28	"development" not "developed" [Jonathan Lynn, Switzerland]	Text was revised
15303	43	28	43	28	Should this be "sustainable development" rather than "sustainable developed"? [Pauline Midgley, Germany]	Text was revised
20082	43	30	43	31	Replace "This third chapter is focused on observed and attributable" with "This third chapter is focused on observed, attributable and projected". Most of the Chapter 3 material is on projected risks at 1.5°C vs 2°C and higher levels of warming. [Sonia Seneviratne, Switzerland]	Text was revised
2369	43	31	43	31	Better off using "risks" rather than "vulnerabilities" [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Text was revised
20825	43	33			Insert 'are' before 'compared'? [Alison Smith, United Kingdom (of Great Britain and Northern Ireland)]	Noted
15304	43	33	43	33	Sentence seems to be missing a verb; should this be "at 1.5°C are compared with 2°C" rsther than "at 1.5°C compared with 2°C"? [Pauline Midgley, Germany]	Noted text was revised
10373	43	33	43	34	The part beginning 'In this context' is not a sentence. Perhaps it should read "…risks at 1.5°C are compared…"? [Matt Law, United Kingdom (of Great Britain and Northern Ireland)]	Text was revised
20672	43	40	43	40	Ch. 4 doesn't have a specific sub-section on case studies, rather, they are distributed and interspersed in the text. [Debora Ley, Guatemala]	Noted
2094	43	46	43	47	Are transnational case studies (e.g. comparative) of interest too/are they available and relevant? [Timothy Barker, United Kingdom (of Great Britain and Northern Ireland)]	Noted
3292	43	48			Overall, the chapter needs to be made more concise and clear. A number of messages are repeated, including a summary of what the chapter will say coming at the end of the chapter itself. The early definitions of scenario, pathway, how data will be dealt with and tying the work into previous IPCC and UN documents is valid. Other rambling discussions could be moved to the specific chapters where those issues are dealt with in more detail. [Justin Bishop, United Kingdom (of Great Britain and Northern Ireland)]	The chapter has been heavily revised
12940	44			44	Fig 1.8 can improve through more cross chapter discussion and needs much better description for each chapter boundary . Can be a task at LAM3. [Joyashree Roy, India]	Noted
1105	44		44		Figure 1.8. The difference between Ch4 and Ch5 is clearer in the text than in the figure: response options are mainly in Ch4, with Ch5 looking at the SD context. It is not clear where "synergies and trade offs' are discussed in the chapter. If in Ch5, this should be reflected in the figure. [Rob Swart, Netherlands]	Noted - other views on the figure also had to be considered
1740	44		44		Fig 1.8: Ch5 box somehow needs to convey that the impact of response options are described in Ch 5, not the response options themselves [Levi Golston, United States of America]	Accepted - text revised
1741	44		44		Fig 1.8: The arrows connecting chapters 2 and 3 are unclear. Why would mitigating climate change, and the impacts of climate change have synergies or tradeoffs? The arrow between Ch 4 and Ch 5 makes more sense. [Levi Golston, United States of America]	The figure has been revised
1742	44		44		Fig 1.8: The words on outside focus mainly on only one aspect of the report: Recommend replacing "poverty eradication" and "equity" with "avoided impacts" and "feasibility" to give a better sense of the main themes. [Levi Golston, United States of America]	Noted
1743	44		44		Fig 1.8: The intent on the thermometer bar is probably to show a delta between 1.5 C and 2.0 C, and between 1.5 C and beyond, however right now one can't see this. Perhaps 2.0 C can be labeled Paris Goal and somewhere beyond labeled Business as Usual. Right now the arrow points from 1.5 C to "what are the benefits", which doesn't really make sense without illustrating that the benefits are relative to a world with greater amounts of warming. [Levi Golston, United States of America]	The comments were used to improve the figure
13646	44	1			Not sure it works to have this subsection on Storyline of the report right at the end of the chapter. At the verz least, the diagram should be placed after the first paragraph to make it easier for the reader. [Elvira Poloczanska, Germany]	Thank the text was revised
13100	44	1	44	1	This appears to be unsophisticated graph visually, which is a shame given the detailed information it provides. Itcan be easily amended; with reduced font, not using bold, and using less strong colours- except for the thermometer which is central, so that should stay as it is. [Veryan Hann, Australia]	Noted the graph was revised
2370	44	1	44	1	Figure 1.8 The two points "How do we get there" and "What are the benefits" are surely incorrect ways to frame the issue. We actually do not want to get to a 1.5 world, we want to stay below it, so therefore replace "w"How do we get there" with How do we keep below 1.5" and replace "what are the benefits" with "What are the benefits of keeping below 1.5". [David Viner, United Kingdom (of Great Britain and Northern Ireland)]	Thank you - there were other views too on the figure that had to be considered
6290	44	1	44	2	Figure 1.8. Not up to the IPCC standard. Standardise font, circumfrence text alignment, and actuall double arrows. [Nathanael Melia, New Zealand]	The figure was revised
6966	44	1	44	4	Typo error: "Cllimate-resiliant" in Figure 1.8 [Sai Ming Lee, China]	Corrected

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3957	44	1	44	4	Figure 1.8: This figure didn't aid my understanding of the report storyline or structure. It's also hard to read and unattractive. Climate is spelt wrong in the lower right quadrant. Middle box on the right stating 'what are the benefits?' makes it sound like the report is trying to find benefits for a 1.5C warming (when I suspect the message is about benefits of restricting warming to < 1.5C) [Stephanie Henson, United Kingdom (of Great Britain and Northern Ireland)]	The figure has been re-designed and we believe it now best sends the message required on the storyline
13291	44	1	44	4	Figure 1.8: Recommend limiting use of colour in this figure where to where it helps to convey meaning, or to highlight one or two aspects - too much colour that doesn't convey meaning can create visual clutter making a figure more difficult to comprehend. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure was revised
13292	44	1	44	4	Figure 1.8: Upside down text is difficult to read. Recommend rotating 'Ethics' and 'Climate-resilient development pathways. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure was revised
13293	44	1	44	4	Figure 1.8: Suggest removing the thermometer icon, as does not add meaning to the storyline of the report, but is visually salient, potentially drawing attention away from the more meaningful content in this figure. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Thank you the figure was revised
13294	44	1	44	4	Figure 1.8: The storyline may be more intuitively understood as a linear diagram (stories usually follow linear narratives, so using this as a metaphor in the visual layout of this figure may increase clarity.) Re-structuring the layout could also help direct the reader's understanding around this figure in a structured way (at the moment its difficult to know what to start reading first in the figure). [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure was revised
7153	44	2	44	2	Avoid mixing questions (e.g., how to get there) with Chapters (What does 1.5 means (Ch1). Suggest adding a box on top of the thermometer and below "What does 1.5C means" titled, for example, Defining concepts (Ch 1). Consider using a different font color for questions. [Iulain Florin VLADU, Germany]	These suggestions were used to revise the figure
17459	44	3			C [Tom Gabriel Johansen, Norway]	Noted
17499	44	3			C [Angela Morelli, Norway]	Noted
9299	44	3	44	3	Figure 1.8 that presents the "Schematic storyline figure for the rest of the report" is descriptive and clear for setting the expectations from the chapters. Chapter 5 on "Response Options and SDGs" in the present form may be strengthened to fulfil all of these expectations, particularly on the response options. Additional information from the "Beyond 2 degrees Scenario – B2DS" of the Energy Technology Perspectives 2017 (ETP 2017), the emphasis on cities in "Energy Technology Perspectives 2016 - Towards Sustainable Urban Energy Systems," as well as "Renewable Energy Sources and Climate Change Mitigation Special Report of the Intergovernmental Panel on Climate Change" may be represented in Chapter 5. [Siir KILKIS, Turkey]	Thank you these are picked up in Chapter 5
9857	44	3	44	3	Could the figure by extended to indicate that there are synergies and trade-offs between adaptation and mitigation? [Christopher Reyer, Germany]	Noted as figure was revised
13647	44	10	44	22	But we've already read Chapter 1 by the time we get here. [Elvira Poloczanska, Germany]	Noted
15218	45	1			copy edit: "Cambirdge University Press" should be "Cambridge University Press" - multiple occurrences in the References to Chapter 1 and possibly others (I have not checked) [Pauline Midgley, Germany]	Noted and corrected
15220	45	1			The IPCC-requested style for citations of chapters of WG contributions to the AR5 has "In:" between the chapter title and the name of the report; this needs to be inserted throughout the References to Chapter 1 and likely others (I have not checked). The same applies to citations of the Technical Summary and the Summary for Policymakers [Pauline Midgley, Germany]	Noted and corrected
13694	45	3	45	3	this figure misses ecosystems [Elvira Poloczanska, Germany]	Noted - we will aim revise this figure for the final version
10537	48		48		Figure 1.8. I think the figure should be shown in the beginning of the chapter, as it explains the flow of the report. [Linda Yanti Sulistiawati, Indonesia]	Noted and corrected
15217	48	50	48	60	Please place these citations in the order a, b, c, d [Pauline Midgley, Germany]	Noted and corrected
15219	48	52	48	54	copy edit: : citation duplicated, can be deleted [Pauline Midgley, Germany]	Noted and corrected
15226	48	60	48	60	This duplicates IPCC 2014c, the WGII SPM, so I suggest deletion. Moreover the SPM is for the whole WGII contribution, there is not a separate one for Part A as implied by this citation. In any case the reference is incomplete; should be K.J.Mach, ... (at least 2 more lines), or shorten as in all the other IPCC references to "C.B. Field et al., eds, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. [Pauline Midgley, Germany]	Noted and corrected
15300	50	42	50	42	Not "Mastrandrea, M. D., and Co-Authors"; correct citation is IPCC 2005 [Pauline Midgley, Germany]	Noted and corrected
11493	52	6	52	14	The reference for Olsson 2014 is dupilicated [Meimalin Moreno, Venezuela]	Noted and corrected
20654	52	45	66	26	Consider drawing in IMPACTS so that these pathways after mid-century are more clear. Also, consider breaking down general characteristics including impacts along the pathways presented in chapter 1 to continue keeping the reader attuned to what deciding for one or the other pathway entails in its entirety. [Koko Warner, Germany]	Noted: unclear what actions are required here without cluttering figures excessively. Figure 1.4 (new numbering) draws attention to different timescales of impacts and commitment, for example to sea level rise.
3997	53	46	53	49	The same article is referred to twice in the citation: Schleussner, C.-F. F., and Coauthors, 2016a: Differential climate impacts for policy relevant limits to global warming: the case of 1.5°C and 2°C. Earth Syst. Dyn., 7, 327–351, doi:10.5194/esd-7-327-2016. AND Schleussner, C. F., and Coauthors, 2016b: Differential climate impacts for policy-relevant limits to global warming: The case of 1.5 ??c and 2 ??c. Earth Syst. Dyn., 7, doi:10.5194/esd-7-327-2016. This will require clean up of this duplication and other potential cases like this throughout the report. [Valentin Foltescu, France]	Noted and corrected
16154	56	29	56	29	It seems to me that the phrase "Model data" will lead to some confusion and criticism. I'd suggest saying "Results from model simulations" or something similar [Michael MacCracken, United States of America]	Text has been revised
11910	56	43	56	46	In addition to Geoffroy et al. (2013), Tsutsui (2017) is worth being cited here, which provides the thermal response parameters derived from the CMIP5 standard experiments in a more complete manner. Tsutsui, J. (2017), Quantification of temperature response to CO2 forcing in atmosphere?ocean general circulation models. Climatic Change, 140, 287-305. [Junichi Tsutsui, Japan]	Noted: this paper should have been cited in the chapter, for which apologies. It has been cited in the Supplementary information.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17862	56	45	56	53	Please include the references in the Technical Annex into the full list of references (e.g. Etminan et al 2016, Geoffroy et al 2013) [Wilfran Moufouma Okia, France]	Technical Appendix has its own reference list.
3437	57	9	57	9	INSERT "warming" as shown..... human-induced "warming" over the..... [Paul Doyle, Canada]	Text has been revised
3438	57	10	57	10	Eliminate the first "only" in.....Trends are "only" plotted only where ..... [Paul Doyle, Canada]	Text has been revised
3439	57	13	57	13	INSERT a comma between....February and respectively to read.. February, respectively. [Paul Doyle, Canada]	Text has been revised
3440	57	14	57	14	CHANGE "Whilst".....to....."While".... [Paul Doyle, Canada]	Text has been revised
6456	57	23	57	23	Regarding Technical Annex 1.A figure 1: This colour bar is unsuitable for some colour deficient readers. For example the colour representing -3 -> -2.25 appears very similar to the colour for values greater than +3. [Jonny Williams, New Zealand]	Noted for future version
2298	57	23	57	28	The same comment applies to these two figure captions as applies to the figure caption of Fig. 1 of Box 1.4. Observations allow an estimate of the net warming from 1850-1879 (or whatever else is finally chosen as a sensible pre-industrial level), but how was the human-induced component of the warmth of the period 2007-2016 calculated? To repeat, the exceptionally warm years 2015 and 2016 should not be attributed to human-induced warming without firm evidence. [Adrian Simmons, United Kingdom (of Great Britain and Northern Ireland)]	The method used to estimate human-induced warming is explained in the text.
6457	57	27	57	27	Regarding Technical Annex 1.A figure 2: This colour bar is unsuitable for some colour deficient readers. For example the colour representing -3 -> -2.25 appears very similar to the colour for values greater than +3. [Jonny Williams, New Zealand]	Noted for future version
706	58	13	58	18	This procedure consists in defining an a priori temperature evolution and finding the radiative forcing leading to the defined temperature profile. It is an example of what should not be done. The smoothness of the temperature profile is contrary to observation which shows large fluctuations (due to phenomena like El Nino, volcanic eruptions, ice melting, large forest fires etc.). The radiative forcing is directly related to GHG concentrations and easily computed from these values. Setting radiative forcing, it is then possible to obtain a temperature average evolution to which one can add variations related to previously cited phenomena. In this chapter, an important work is done mostly in order to relate GMST in a deterministic way to GHG concentration. This attempt is simply impossible, because of the stochastic nature of temperature behavior. [Herve Nifenecker, France]	Radiative forcing associated with the chosen temperature trajectories is no longer shown in the new version of the figure
6458	59	2	59	2	Regarding Technical Annex 1.A figure 3: The 2 degree line and its label are very hard to see. [Jonny Williams, New Zealand]	Figure layout has been changed
6459	59	2	59	2	Regarding Technical Annex 1.A figure 4: The 2 degree line and its label are very hard to see. [Jonny Williams, New Zealand]	Figure layout has been changed
17856	59	2	59	2	Technical Annex 1.A Figure 3: please avoid using red and green together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Colour scheme and layout of this and related figures have been changed
17857	60	2	60	2	Technical Annex 1.A Figure 4: please avoid using red and green together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Colour scheme and layout of this and related figures have been changed
3441	60	7	60	18	Fig. 4. This may be a better caption than that shown on p.24. [Paul Doyle, Canada]	Noted
17859	60	7	60	18	There is no text that refers to Technical Annex 1.A Figure 7 [Wilfran Moufouma Okia, France]	Noted - we will aim to add for the final version
7305	60	16	60	17	Figures 1.SM.5 and 1.SM.6 are not included. [Eleni Kaditi, Austria]	We believe that these figures were included in the compiled draft
17858	60	16	60	17	Please change Figure 1.SM.5 to Technical Annex 1.A Figure 5 and Figure 1.SM.6 to Technical Annex 1.A Figure 6. [Wilfran Moufouma Okia, France]	Noted for future version
20376	61		62		I am not sure about the relevance of figures 5 and 7. It is only a decade. Does it show anything else than noise? [Olivier Boucher, France]	Noted - While the period is only a decade the signal is evaluated against pre-industrial so we believe this holds informative value still
17860	61	2	61	2	Technical Annex 1.A Figure 5: please avoid using red and green together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Noted - we will improve this for the final version
4915	61	2	61	3	In the text: "Technical Annex 1.A, Figure 5: Season of greatest human-induced warming over the present decade (2007-2016) relative to 1850-1879.", since the period is from 2007 to 2016, it is in the "recent past decade", but not in the "present one". [Rubén Piacentini, Argentina]	Noted
3442	61	2	61	3	Fig. 5. Somewhat awkward and confusing for reader to go between text and Tech. Annex for these illustrations [Paul Doyle, Canada]	Noted - we are not sure what alternative we have for this as there is no space in the main chapter
4916	61	7	61	7	In the text:"Technical Annex 1.A, Figure 6: As for Figure 1 Box 1.4, but for the least warming season.", consider the same suggestion made for page 40, line 27: There are two color code bars that cannot be well recognized in the Figure. [Rubén Piacentini, Argentina]	Noted - we will intend to improve this in the final versions
6460	61	7	61	7	Regarding Technical Annex 1.A figure 6: This colour bar is unsuitable for some colour deficient readers. For example the colour representing -3 -> -2.25 appears very similar to the colour for values greater than +3. [Jonny Williams, New Zealand]	Noted - we will intend to improve this in the final versions
3443	61	7	61	7	Fig. 6. Somewhat awkward and confusing for reader to go between text and Tech. Annex for these illustrations. [Paul Doyle, Canada]	Noted - we are not sure what alternative we have for this as there is no space in the main chapter
17861	62	2	61	2	Technical Annex 1.A Figure 7: please avoid using red and green together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Noted - we will intend to improve this in the final versions
4917	62	2	62	3	The same suggestions as that made in page 61, lines 2 and 3, concerning the fact that (2007-2016) is not "present decade", but the "recent past decade". [Rubén Piacentini, Argentina]	Noted
3444	62	2	62	3	Fig. 7. Suggest that this figure should be re-located in text along with 5 and 6 and Annex be scrapped. [Paul Doyle, Canada]	Noted - we are not sure what alternative we have for this as there is no space in the main chapter
7024	62	6	62	21	This paragraph is heavy in content and repetitive language. Revise for simplification and clarifaction? [Érika Mata, Sweden]	Noted - we will try to improve in the final version
15595	11324	18	11689	32	We think the box laying out the three dimensions of feasibility as an organising principle is helpful; yet it might help the overall clarity if there was a summary table that indicates which sections and subsections touch upon this discussion of feasibility and in which way they build on the three dimensional organising principle. [Matthias Honegger, Germany]	this box was significantly revised to address this comment and other similar comments
15596	12055	1	12055	1	Several typos in the first line of the table [Matthias Honegger, Germany]	this box was significantly revised to address this comment and other similar comments
15597	12055	1	12055	1	The table itself is an excellent idea and strengthens discussion of feasibility overall. However, we strongly suggest to word every empirical measure as a question, this helps improve clarity a great deal. [Matthias Honegger, Germany]	this box was significantly revised to address this comment and other similar comments

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15598	12055	21	12055	23	This sentence is incomprehensible and overly generic. Also if certain solar radiation management strategies provide a clear example of anything, then such examples should be appropriately referenced with the corresponding literature. It has been argued that BECCS deployment strategies at scales represented in most 1.5-compatible scenarios would press much further against socially acceptable and physical limits and some have argued that some renewable energy strategies have similarly pushed such limits. Thus a generic statement about governance issues of pushing socially acceptable limits with one technological strategy does not seem very helpful. [Matthias Honegger, Germany]	Section rewritten and CDR and SRM descriptions added in different section.
15599	13150	1	13150	10	While such an illustration seems useful to illustrate the interconnectedness of climate action with all SDGs, the chosen example is debatable and a look at the illustration without reading the caption conveys the false sense that climate action is in all cases linked as illustrated by the blue and red lines. Furthermore, even for the example of land-based mitigation strategy the connections can look very different for different approaches and different choices in their implementation; if such an example is given, it would need to be clearly tied to one very specific example in the literature and captioned as well as referenced accordingly. [Matthias Honegger, Germany]	Figure removed.
15600	13150	16	13150	17	The acronym SAI is normally used to mean Stratospheric Aerosol Injection (rather than Sulphate Aerosol Injection), which is a broader and seemingly more appropriate categorisation. Sometimes Stratospheric Sulfate Aerosol Injection is used by its accronym SSI. [Matthias Honegger, Germany]	Accepted - text revised
15601	13150	20	13150	21	I don't understand this sentence; what does ‚smaller spacial footprint' mean and why is it relevant? Also I cannot seem to find this in the academic works on this subject, so if it is a novel term it would need to be properly introduced. [Matthias Honegger, Germany]	Sentence has been removed
15602	13516	1	13516	4	This discussion of local vs. global SRM does not reflect the relevant literature and use of terminologies on the subject: Local surface albedo modifications do not represent an approach that is relevant at climate scales. If surface albedo modifications were done at larger scale, they would arguably cause much greater regional disruptions to weather patterns than and stratospheric (global) SRM would and therefore such approaches have been largely disregarded in recent years as a measure to counteract climate change. The body of literature on potential impacts from regional albedo modification 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. Rather (as stated elswhere) local albedo modifications could be used as adaptation measures to e.g. counter regional heat island effects and related health issues. [Matthias Honegger, Germany]	The section on land surface albedo has been significantly shortened and we now also refer to MCB. We still think this text is necessary as it clearly defines what we mean by SRM (i.e., that it does not include land surface albedo management).
15603	13516	6	13516	7	Add: „…but could include elements of both." Suggested citation: Honegger, M.; Michaelowa, A.; Sugathapala K. (2013): Tackling climate change - where can the generic framework be located? Carbon and Climate Law Review. [Matthias Honegger, Germany]	We disagree with the suggestion and make it clear that SRM is not mitigation
15604	13516	10	13516	10	This section lacks important references; suggest to refer to at least the following: Shepherd, J., & Rayner, S. (2009). Geoengineering the Climate: Science, Governance and Uncertainty. Schäfer, S., Lawrence, M., Stelzer, H., Born, W., Low, S., Aaheim, A., ... & Devine-Right, P. (2015). The European transdisciplinary assessment of climate engineering (EuTRACE): Removing greenhouse gases from the atmosphere and reflecting sunlight away from Earth. Funded by the European Union's Seventh Framework Programme under Grant Agreement, 306993. National Research Council. (2015). Climate intervention: reflecting sunlight to cool earth. [Matthias Honegger, Germany]	The EuTRACE report is now used.
15605	13516	12	13516	12	missing word: „regarding" [Matthias Honegger, Germany]	Noted
15606	13516	28	13516	29	Add: and as discussed in chapter 13 of the IPCC fifth assessment report political resistance from vested interests in the established fossil fuel industries and connected political powers. [Matthias Honegger, Germany]	Noted
15607	13516	29	13516	29	Insert sentence: Early experience with implementing Nationally Appropriate Mitigation Actions (NAMAs) and the operationalisation of the Nationally Determined Contributions have underlined these difficulties of meeting even just the pledged reductions under the Paris Agreement. [Matthias Honegger, Germany]	Noted
15608	13881	44	13881	45	This sentence does not reflect our understanding of the literature on the subject. If it is to remain as is, please substantiate with an adequate reference. [Matthias Honegger, Germany]	Addressed, the section has been revised
15609	13881	45	13881	47	This sentence is incomprehensible. Consider splitting in two sentences. [Matthias Honegger, Germany]	Addressed, the section has been revised
15610	13881	49	13881	51	missing word: „a"; Add the following citations: Fuss, S., Jones, C. D., Kraxner, F., Peters, G. P., Smith, P., Tavoni, M., ... & Moreira, J. R. (2016). Research priorities for negative emissions. Environmental Research Letters, 11(11), 115007. Honegger, M.; Reiner, D.; Moreno-Cruz, J. (forthcoming). Political Economy and Policy Instrument Choice for Negative Emissions Technologies. Accepted for publication in: special issue of "Climate Policy" on "Policy instruments for limiting temperature rise to 1.5°C". [Matthias Honegger, Germany]	Addressed, the section has been revised
15611	13881	51	13881	53	This sentence is overly complex. Consider splitting in two sentences. [Matthias Honegger, Germany]	Addressed, the section has been revised
15612	15707	43	15707	44	Incomplete sentence [Matthias Honegger, Germany]	Text was revised
15613	16072	1	16072	8	Incorrect spelling in graph: resilient [Matthias Honegger, Germany]	Corrected
15589	42370	41	42370	41	Missing word: into account [Matthias Honegger, Germany]	Editorial. Accepted. The text is revised.
15590	42736	32	42736	33	Slightly repetitive regarding prospective or adaptive; could be merged with section 1.2.3.4. [Matthias Honegger, Germany]	Accepted. The subsection 1.2.3.4 is removed.
15591	43101	40	43101	45	It occurs to me that this is a pretty central statement, which should be reflected in the executive summary (see earlier comment). [Matthias Honegger, Germany]	Noted
15583	43191	1	43221	49	It seems counterintuitive if not counterproductive to not mention any specific measures that would be required to get to 1.5 °C such as immediate setting of an elevated carbon price, as well as the elaboration of a policy environment that is supportive of large-scale negative emissions technologies with a view to their upscaling to several GtCO2 within roughly a decade. [Matthias Honegger, Germany]	Specific policy tools are not introduced in detail in chapter 1, but rather chapter 4.
15584	43252	35	43252	38	This sentence is incomprehensible and not logical. Furthermore, the executive summary suggests the report would not present implementation strategies. [Matthias Honegger, Germany]	the text was edited

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15585	43282	49	43282	49	Given the prevalence of overshoot and decline scenarios associated with 1.5 °C this sentence should read: "Altering, slowing or even reversing the pace of current warming can be defined through mitigation pathways." [Matthias Honegger, Germany]	Noted - Amended for clarification
15586	43282	50	43282	50	Unlesse there's a reference, I'd suggest to replace "Different pathways may be more consistent than others.." [Matthias Honegger, Germany]	Accepted. Text has been revised for clarification.
15587	43344	28	43344	35	Add: While the overall intention is clear, the Paris Agreement does not specify precisely what is meant by 'global average temperature' relative to 'pre-industrial levels', nor does it specify the target year by which temperatures ought to be limited to 1.5 or well below 2°C. […] [Matthias Honegger, Germany]	Discussion of the PA has been removed.
15588	43405	7	43405	31	Add: In line with a long history of academic and political discussion of climate targets (Randals, 2010) the working definition of the time horizon extends until the end of the century (or 2100). Randalls, S. (2010). History of the 2 C climate target. Wiley Interdisciplinary Reviews: Climate Change, 1(4), 598-605. [Matthias Honegger, Germany]	Citation added.
15592	43466	1	43466	1	Replace "...would lead to cooling" with "would lead to a partial reduction of radiative forcing" [Matthias Honegger, Germany]	Sentence has been reworded.
15593	44562	50	44927	2	We would welcome a discussion of "feasibility" that consistently takes up the various types of "feasibility" (e.g. physical, technical, economic, social, political) throughout the report. The discussion of stopping time based on typical capital turnover times could crucially inform debates on feasibility of reaching 1.5 °C as one of the few fixed points in the debate: 4% annual reductions would essentially mean that all newly planned and constructed powerplants (as of today) are zero-emissions plants, and that infrastructure investments in other sectors follow at the same pace. If this were the case, the commited warming would result in at least 1.25-1.6 °C. Putting this observation in such plain language into the executive summary would in our view bring great value added. [Matthias Honegger, Germany]	Noted
15594	46388	40	46388	41	Add: "because of environmental damages, conflicting interests (e.g. over the use of land) or for other reasons, some pathways or technologies might not be socially accepted. (Note: use accepted here instead of acceptable, given there is a significant difference in meaning). [Matthias Honegger, Germany]	agreed, the text was edited to reflect this