#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1	36340	5	0	0	0	0	Thank you very much for the opportunity to comment on this chapter! Overall, I think that most elements are incorporated, except for benthic faunal communities, which are present in most coastal systems. These animals play a major role in the foodweb (e.g., filtering plankton en fueling higher trophic levels), influence erosion and sedimentation rates, and belong to the marine living resources exploited by humankind. The impacts of climate change on some other major functional groups would deserve some more attention as well, e.g., microalgae as important primary producers and sediment stabilisers, and higher trophic levels (shorebirds, sea mammals) which are targeted in many nature coastal conservation programs. To do justice to the research already done and the importance of the various key elements in coastal systems, the report could be further balanced. For example, the attention paid to impacts on fish and fisheries is underrated compared to the attention on coral reefs. Furthermore, this chapter still needs editing to reach its full potential: there is still some jargon, and overlap between the different sections. For example, many statements and citations in chapter 5.5 appear to be impacts of climate change and could, therefore, be moved to chapter 5.4. Please, find my more detailed comments below. Wishing you every success in preparing this very important document! (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Benthic faunal communities are in ocean chapters. Sections in 5.4 and 5.5 have been revised to eliminate overlap.
2	36347	5	0	0	0	0	As I understood, the IPCC sea level chapter will now also take the effects of 'gravity' on sea level into account, which might imply that sea level might locally go down as the result of climate change. Is this taken into account here? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Sea level changes are based on WG1 chaps which consider gravity in detail.
3	37111	5	0	0	0	0	Overall chapter is rather descriptive - and not real critical review and analysis of the most up-to-date information related to coastal and low lying areas. Very little information and regional examples in Africa - See following link: http://www.esalifdiop/documents/ESCO.pdf (Salif Diop, UNEP - SAB - DEWA)	Chapter has been revised to be more critical using up-to-date references and a balance of regional examples.
4	37112	5	0	0	0	0	Both Chapters on coastal and oceans should benefit from the overall global marine "assessment of assessments" report recently published by UNEP and IOC - See : http://www.unga-regular-process.org/ including analysis of several regional seas and oceans linked at time to thematic climate change assessment. (Salif Diop, UNEP - SAB - DEWA)	Chapter is using mainly WG1 chapter and SREX report than the grey literature.
5	37170	5	0	0	0	0	Reference Pérez et all is not properly quoted. It should be: Andrade Pérez, A., Herrera Fernandez, B. and Cazzolla Gatti, R. (eds.) (2010). Building Resilience to ClimateChange: Ecosystem-based adaptation and lessons from the field. Gland, Switzerland: IUCN. 164pp. (Angela Andrade, Conservation International Colombia)	Amendment made.
6	37381	5	0	0	0	0	This chapter needs a lot of work. It dies not read well at this stage. This is partly a function of poor English, but the issues go deeper than this and cannot be fixed merely by editing. I believe the authors need to step back and consider what the key issues are and prioritise the way the chapter is then presented. I know from experience that this is not easy, but at present the chapter is just a jumble of statements and does not get its key message across. Indeed, there do not yet seem to be key messages. The meaning of some important statements is confused because of poor wording, but fundamentally it seems as if the statements have not been thought through sufficiently and the present way in which they are expressed is often wrongly focused (see my comments on the first point in the executive summary, page 2, line 49). I recommend that the authors meet specifically to focus their own summary of the contents of this important chapter. I find that the text is dominated by a rather random selection of comments, in several cases repeated at more than one place in the chapter, but without making clear that these points are made as 'examples'. Of these examples, I think too many are actually marine examples which could more logically be treated in other chapters, particularly as there will be two ocean-focused chapters in AR5. If the authors reflect on what the key points are, I believe they will need to make a far clearer focus on sea-level rise and that their statement will be a much stronger one than that expressed in the executive summary, (page 2, line 49), and repeated at several points in the text. I think that a focus on which ecosystems are 'most' affected, will require redressing the balance between intertidal ecosystems (mangroves and saltmarsh) in contrast with submerged (seagrass). This would far better reflect the volume of literature on these ecosystems and their relative vulnerability. These are important decisions which can make for a much better structured chapter than the present FOD. (Colin Woodroffe, University of Wollongong)	Priority has been given to key messages, based on assessments in various sections. Marine-related aspects have been reduced. Mangroves have been included.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
7	37386	5	0	0	0	0	This chapter needs a lot of work. It does not read well at this stage. This is partly a function of poor English, but the issues go deeper than this and cannot be fixed merely by editing. I believe the authors need to step back and consider what the key issues are and prioritise the way the chapter is then presented. I know from experience that this is not easy, but at present the chapter is just a jumble of statements and does not get its key message across. Indeed, there do not yet seem to be key messages. The meaning of some important statements is confused because of poor wording, but fundamentally it seems as if the statements have not been thought through sufficiently and the present way in which they are expressed is often wrongly focused (see my comments on the first point in the executive summary, page 2, line 49). I recommend that the authors meet specifically to focus their own summary of the contents of this important chapter. I find that the text is dominated by a rather random selection of comments, in several cases repeated at more than one place in the chapter, but without making clear that these points are made as 'examples'. Of these examples, I think too many are actually marine examples which could more logically be treated in other chapters, particularly as there will be two ocean-focused chapters in AR5. If the authors reflect on what the key points are, I believe they will need to make a far clearer focus on sea-level rise and that their statement will be a much stronger one than that expressed in the executive summary, (page 2, line 49), and repeated at several points in the text. I think that a focus on which ecosystems are 'most' affected, will require redressing the balance between intertidal ecosystems (mangroves and saltmarsh) in contrast with submerged (seagrass). This would far better reflect the volume of literature on these ecosystems and their relative vulnerability. These are important decisions which can make for a much better structured chapter than the present FOD. (Colin Woodroffe, University of Wollongong)	Duplicate comment. See response to #6.
8	37642	5	0	0	0	0	With respect to Section 5.4.: Not sure where the best place to put this might be (e.g. within Section 5.4.1.2, 5.4.2.1, etc.), but perhaps it should be noted that at least along shorelines fronted by coral reefs, the impacts of sea level rise – flooding and erosion– is likely to be non-linear. That is, there may well be a threshold still water elevation beyond which the reef is no longer an effective buffer from wave attack, and as a result the shoreline will feel a relatively sudden and dramatic change in flood and erosion potential once this elevation is regularly reached. (John J. Marra, NOAA)	Observed and projected impacts on coastal systems are now discussed in section 5.4
9	38113	5	0	0	0	0	There is a great deal of excellent material in this chapter, particularly from page 35 onwards. I feel, however, that the early parts of the chapter are less sure at the present time. There is a need for a better physical basis to the text and a need for a better appreciation of nested scales (saltmarshes sit within individual deltas and individual deltas sit within a delta plain for example), of varying contexts and a need for a rather more comprehensive classification of coastal morphologies. I find it difficult that the chapter doesn't, as yet at least, engage with any debate on the rate of sea level rise as that is quite critical to how coastal systems will change in the future. It isa difficult for the chapter to ay that sea level ris eis important without telling the reader what envelope of sea level rise is envisaged. (THOMAS SPENCER, University of Cambridge)	The section has been revised to address these problems. SLR is discussed in a separate section.
10	38552	5	0	0	0	0	This chapter, and perhaps the report as a whole, tends to ignore or at the very least underemphasize the importance of interactions among species as drivers of change. For example, the effects of diseases often become more negative with warming (Harvell, C.D., Mitchell, C.E., Ward, J.R., Altizer, S., Dobson, A.P., Ostfeld, R.S. et al. (2002). Climate warming and disease risks for terrestrial and marine biota. Science, 296, 2158–2162) and warming and predation combine to have strong negative effects on mussel beds (Harley, C.D.G. 2011. Climate change, keystone predation, and biodiversity loss. Science 334:1124-1127). The effects of climate change on coastal ecosystems cannot be understood in the absence of an understanding of how the species are interacting (for an example of why climate change predictions vary for coral reefs with and without herbivorous fish, see Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, C. D., Harvell, P. F. Sale, A. J. Edwards, K. Caldeira, N. Knowlton, C. M. Eakin, R. Iglesias-Prieto, N. Muthiga, R. H. Bradbury, A. Dubi, and M. E. Hatziolos. 2007. Coral reefs under rapid climate change and ocean acidification. Science 318:1737-1742). This, in turn, has important management implications (e.g., prevent over-fishing of herbivores on reefs). (Christopher Harley, University of British Columbia)	Not applicable. Marine biota is discussed in ocean chapters.
11	38723	5	0	0	0	0	Some references to SLR included in this chapter differs from data of WG I summarised in the chapter 5. I suggest to uniformize the reference values in all Chapters of the WG to avoid misinterpretations of the readers. Also to avoid confusing signals to press or politics. I suggest that uncertainties about estimations must be referred to WG I results (Ricardo Anadon, University of Oviedo)	SLR I based on WG1 and SREX report.
12	38947	5	0	0	0	0	Throughout this chapter, more consideration could be given to providing confidence estimates on statements (eg. high certainty, low certainty etc) (Neil Saintilan, Office of Environment and Heritage)	Where possible, confidence statements are applied.
13	39274	5	0	0	0	0	GENERAL COMMENTS TO CHAP. 5 The "Chapter 5. Coastal Systems and Low-Lying Areas" is an extensive analysis of effects of climate change on coastal environments, from rocky shores to seagrass meadows. Authors did a very good job in emphasizing the role of climatic drivers and the possible repercussions also for humans and ecosystem good and services. (Gianluca SARA, University of Palermo)	Agreed – no response required.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
14	39283	5	0	0	0	0	Section 5.5.2.4 Temperate lagoons. Also this section could take advantage from a recent paper (Sarà, G 2009. Variation of suspended and sedimentary organic matter with depth in shallow coastal waters. Wetlands 29: 1234-1242). In that paper, the author investigated the relationship between the quality and quantity of available food and the depth of shallow water column of a temperate lagoon. In no part of the AR5-Chap. 5 attention is paid to the effect of changes in particulate organic matter (i.e. food availability) on ecological responses of many benthic consumers representing the most important animal component of many shallow waters worldwide. (Gianluca SARA, University of Palermo)	Not applicable – benthic fauna is in ocean chapters.
15	39407	5	0	0	0	0	General comments: A very good executive summary, and a very well-structured and readable chapter overall. In the main text, the DPSIR-type concept framing is very helpful for structuring the interrelationships between the human and biophysical components of coastal systems. However, the 'impacts on human systems' is very hard to distinguish from the 'risks and costs' material of the chapter. Formally in DPSIR-type framings, a distinction is drawn between a change of [environmental] state and the impacts (expressed in terms of risks and costs) to human systems. Using the term 'impacts' for all these aspects means that structural difficulties will arise in this chapter. (Sarah Cornell, Stockholm Resilience Centre)	DPSIR framework is not adopted in the chapter – costs are in terms of SLR impacts.
16	39414	5	0	0	0	0	A bit of a quibble with 'services are provided by functions' - better to say they 'arise from' ecosystem functions. The word provision first of all overlaps with one of the widely used categories for services, and secondly it implies a strong/direct causality (especially in the ubiquitous diagrams that have four kinds of function linked directly to four kinds of service) - better to indicate that the services arise from the complex interactions between what ecosystems are/contain and do. (Sarah Cornell, Stockholm Resilience Centre)	Revised according in Section 5.2.
17	40240	5	0	0	0	0	A "zoning" on sea level rise observed and projected impacts around the globe, would give the chapter a better strucure. Eg in the Mediterranean there are no concrete evidences on the level of sea-level-rise (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	Not applicable – such maps are in WG1 chapters.
18	40403	5	0	0	0	0	There are no figures that depict impacts on communities (e.g. human social systems) or coastal infrastructure. Adding some would help to diversify the visuals. (Laura Petes, National Oceanic and Atmospheric Administration)	Lack of space restricts the use of visuals, e.g. photographs.
19	40404	5	0	0	0	0	The chapter would be more cohesive if it listed both the observed and projected impacts within each sub-section as opposed to having 5.3 list observed impacts to each sector and 5.4 list projected impacts to each sector. For example, instead of having two sub-sections, 5.3.2.1 about observed impacts to human settlements and 5.4.2.1 about projected impacts to human settlements, there would only be one sub-section on human settlements that describes both observed and projected impacts. Otherwise, the reader loses the thread of the story, as the two sub-sections are separated in space by ~8 pages. This is even more of an issue when it comes to ecosystems, as there are 3 sub-sections (observed, projected, vulnerabilities) for each habitat type. This would improve cohesion and reduce overlap. (Laura Petes, National Oceanic and Atmospheric Administration)	Overlap is removed and a new section 5.4 provides observed and projected impacts.
20	40405	5	0	0	0	0	In general, the chapter doesn't do a sufficient job of connecting ecosystem health and human well-being. The human information and the ecosystem information are presented separately, and there is very little text describing interactions between them. (Laura Petes, National Oceanic and Atmospheric Administration)	Health section has been revised accordingly.
21	40406	5	0	0	0	0	The ecosystem descriptions tend to focus almost solely on the habitat (e.g. mangroves themselves) as opposed to the ecosystem (e.g. the mangrove ecosystem). These sections would benefit from being more holistic - to describe not just changes and vulnerabilities of rocks, mangroves, seagrasses, etc. but changes to the other species and ecosystem features that depend on them - as well as what this means for people. (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed. The section has been re-written with a more ecosystem focus. - Not applicable. Too detailed to examine at species level.
22	40407	5	0	0	0	0	There are redundancies between Section 5.5.4 and Section 5.6.3. Section 5.6.3 is cohesive and comprehensive, so perhaps Section 5.5.4 is not necessary? (Laura Petes, National Oceanic and Atmospheric Administration)	Sections 5.3 and 5.4 have been revised to eliminate overlap.
23	40648	5	0	0	0	0	It is observed that there is not much information about Latin America and the Caribbean in the report. There are several examples of other regions and particular cases studies for the rest of the world but not for Latin-America and the Caribbean. If this information is considered it is advisable to consider the region's and sub-regional diversity of coastal landscapes and geomorphology as well as the information availability that varies a lot from country to country. So a regional assessment following one unique approach or model would not really portrayed the region vulnerability to climate change or natural disasters. (Carmen Lacambra Segura, Grupo La era)	Examples are often based on what has been published.
24	40649	5	0	0	0	0	Despite there is not much information available and the scientific basis for ecosystem based adaptation in coastal areas is not deeply study, there are starting to be examples and there are several papers on the role of coastal ecosystems in coastal protection. This chapter provides an excellent summary of vulnerability assessments and adaptation needs, perhaps adding a bit more on those particular topics would help the reader to understand that despite these EBAs are only starting or we are only starting to understand this service provided by coastal ecosystems coastal, EBAs could be an effective alternative for rural areas and small settlements in coastal areas (Carmen Lacambra Segura, Grupo La era)	EBA is included in the Adaptation section.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
25	40650	5	0	0	0	0	If there is a need for data or references on those 2 topics: ecosystems and coastal protection, and on Latin America (in particular) I can send them through. (Carmen Lacambra Segura, Grupo La era)	Enough references for EBA in the adaptation section.
26	41675	5	0	0	0	0	Some overlaps are still there among CH5, CH6 and CH30. The CLAs of three chapters should sit down together and make the boundary clear. (Rui Zhang, Xiamen University)	Cross-reference has been made between these and other chapters.
27	42251	5	0	0	0	0	The part sof the chapter describing the natural system, e.g., 5.3.1 need to include short summary sections at the end of each summarizing confidence levels reagrding the information in figure 5-4. Page 21, lines 19-21 is a good example - the previous section needs these to draw conclusions from the literature summarized. (Denise Reed, The Water Institute of the Gulf)	As much as possible, a summary is provided for major sections (important for traceable accountability and for ES).
28	43131	5	0	0	0	0	Chapter 5 makes the point that the population at risk is growing. Given that this chapter includes a lot of rich detail it may help also to include a paragraph or two, drawing on recent demographic research, on the rate at which this population at risk is growing, how, and why? Why do so many people move to coastal zones, and who are they? Also relevant are the skills and other resources these population groups bring with them to the coastal zones that may be relevant to an assessment of their capacity to adapt. (Adrian HAYES, Australian National University)	Not applicable but chapter draws on various types of baseline population data.
29	43239	5	0	0	0	0	This chapter has developed nicely from ZOD but has not reached maturity. As part of a more general problem with marine chapters, in some small sections, readers would be surprised to find independent, but similar treatments of the same issues, some building on different materials, in both sectoral and the regional marine chapters. As a consequence, especially chapters 5, 6, and 30 should be cross-calibrated so that it becomes clear that regional treatments in chapter 30 build on the sectoral treatments in chapters 5 and 6. The chapter teams should make sure that all the sectoral aspects important to them show up in chapters 5 and 6 and are briefly referred to in chapter 30, cross-referencing should be improved. Last not least, page numbers might decrease in due course. In this chapter the overall balance between sections and writing styles should be improved as outlined below. The discussion of coastal ecosystems is very condensed and thereby appears fragmentary, while large sections of discursive text focus on principal issues and human systems. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Cross-reference is made between this and ocean chapters 6 and 30.
30	43695	5	0	0	0	0	This is very well balanced chapter which is having to cover a wide range of important issues. But one general point which seems to be missing is that sea level rise is likely to start affecting very wide regions over a similar time frame during the latter half of the 21st century. It now seems quite likely that there can be a period of 20 - 30 years during which coastal transitions between sustainability and unsustainability will affect a very large number of people and assets. In NZ, once SLR reaches about 0.5 m will simultaneously start to affect at least four of our major urban areas and so, unless there is an anticipatory planning process, economic constraints will limit the response options to a greater extent than they do for some other types of climate change impact. This may not be something that can be addressed in much detail in section 5.6.3, but I think that it should be mentioned somewhere. (Martin Manning, Victoria University of Wellington)	Not all details can be included. Adaptation section has discussed some of the issues.
31	44180	5	0	0	0	0	As we know, the concept of 'climate change' includes sea-level rise, sea warming and ocean acidification etc. Thus, I don't think 'climate change' and 'sea-level rise' could be balance and be put in the equal position in a setence. It would be better if the 'increased sea-level-rise' could be considered as one of the main climate dirvers for coastal system. (RONGSHUO CAI, Third Institute of Oceanography)	Not acceptable – sea-level rise differs from climate change.
32	44343	5	0	0	0	0	The content of sections 5.3 (observed impacts), 5.4 (projected impacts) and 5.5 (assessing vulnerabilities, risks and costs) is somewhat overlapping and misleading. There is not a clear difference between the analysis of impacts and the analysis of vulnerability and risks, especially in what concerns coastal systems (i.e., natural systems). Part of the content of the of section 5.5 concerning vulnerability should be rather included in section 5.4 concerning projected impacts. As well, part of the analysis and references of section 5.3 deal with projected impacts (or expected impacts) rather than with observed impacts. (Ibáñez Carles, IRTA)	Sections 5.3 and 5.4 have revised substantively to avoid repetition.
33	44344	5	0	0	0	0	The analysis of impacts and vulnerability could be expanded and improved with some relevant papers published recently. A list with some of these publications is provided in an attached file. (Ibáñez Carles, IRTA)	Thanks for your contribution

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
34	44370	5	0				References cited in Chapter 5 comments and other relevant references: Alvarado-Aguilar, D., Jiménez, J.A. & Nicholls, R.J. 2012. Flood hazard and damage assessment in the Ebro Delta (NW Mediterranean) to relative sea level rise. Natural Hazards, 62(3): 1301-1321. Anestis, A., Lazou, A., Pörtner, H.O. and Michaelidis, B. 2007. Behavioral, metabolic and molecular stress responses of marine bivalve Mytillus galloprovincialis during lon-term acclimatation at increasing ambient temperature. Am J Physiol Regul Integr Comp Physiol 293: R911-R921. Bjerstedt, T.W. 2011. Impacting factors and cumulative impacts by Midcentury on wetlands in the Louisiana coastal area. Journal of Coastal Research, 27(6): 1029-1051. Brooks, S.M. & Spencer, T. 2012. Shoreline retreat and sediment release in response to accelerating sea level rise: Measuring and modelling cliffline dynamics on the Suffolk Coast, UK. Global and Planetary Change 80-81: 165-179. Chen, C.C., McCarl, B. & Chang, C.C. 2012. Climate change, sea level rise and rice: global market implications. Climatic Change, 110: 543-560. Cinner, J.E., McClanahan, T.R., Graham, N.A.J. et al. 2012. Vulnerability of coastal communities to key impacts of climate change on coral reef fisheries. Global Environmental Change, 22: 12-20. Cloern, J.E., Knowles, N., Brown, L.R., Cayan D., Dettinger, M.D. et al. 2011. Projected evolution of California's San Francisco Bay-Delta-River system in a century of climate change. PLoS ONE 6(9): e24465, doi:10.1371/journal.pone.0024465. D'Alpaos, A., Mudd, S.M. & Carniello, L. 2011. Dynamic response of marshes to perturbations in suspended sediment concentrations and rates of relative sea level rise. Journal of Geophysical Research – Earth Surface, 116: F04020. Day, J.W., Ibáñez, C., Scarton, F., Pont, D., Hensel, P., Day, J. & Lane, R. 2011. Sustainability of Mediterranean deltaic and lagoon wetlands with sea-level rise: the importance of river input. Estuaries and Coasts 34: 483-493. Day, J. W., J. Barras, E. Clairain, J. Johnston, D. Justic, G. P. Kemp, J. Y. Ko, R. Lane, W. J. Mitsch, G. Steyer, P. Templet and A. Yáñez-Arancibia, 2005. Implications of global climatic change and energy cost and availability for the restoration of the Mississippi delta. Ecological Engineering, 24: 253-266. DeLaune, R.D. & White, J.R. 2012. Will coastal wetlands continue to sequester carbon in response to an increase in global sea level ?: a case study of the rapidly subsiding Mississippi river deltaic plain. Climatic Change, 110(1-2): 297-314. Donelson JM et al. 2012. Rapid transgenerational acclimation of a tropical reef fish to climate change. Nat Clim Chang 2:30–32. Fatoric, S. & Chelleri, L. 2012. Vulnerability to the effects of climate change and adaptation:The case of the Spanish Ebro Delta. Ocean & Coastal Management 60: 1-10. Feidantsis, K., Pörtner, H.O., Lazou, A., Kostoglou, B. And Michaelidis, B. 2009. Metabolic and molecular stress responses of the gilthead seabream Sparus aurata during long-term exposure to increasing temperatures. Marine Biology 156: 797-809. Fernández-Tejedor, L. M., E. Elandaloussi, E. Mallat, A. Cañete, P. Caillaud, B. Riobo, J. Paz, D. Franco, A. Ibarra, D. Cembella, J. Blasco and J. Diogene, 2008. The Ebro Delta coastal embayments, a GEOHAB pilot site for the study of HAB population dynamics. Proceedings of the 12th International Conference on Harmful Algae, Copenhagen, Denmark. Hare, J.A., Alexander, M.A., Fogarty, M.J. et al. 2010. Forecasting the dynamics of a coastal fishery species using a coupled climate-population model. Ecological Applications, 20(2): 452-464. Heberger, M., Cooley, H., Herrera, P., Gleick, P.H. & Moore, E. 2011. Potential impacts of increased coastal flooding in California due to sea-level rise. Climatic Change, 109(SI): 229-249. Hopkinson, C.S., Cai, W.J. & Hu, X. 2012. Carbon sequestration in wetland dominated coastal systems – aglobal sink of rapidly diminishing magnitude. Current Opinion in Environmental Sustainability, 4(2): 186-194. Ibáñez, C., Day, J.W., Mendelssohn, I. & Morris, J. In press. Coastal Wetlands. In: Estuarine Ecology (J.W. Day et al. Eds.), Wiley. Ibáñez, C., Sharpe, P.J., Day, J.W., Day, J.N., Prat, N. 2010. Vertical accretion and relative sea level rise in the Ebro Delta wetlands. Wetlands, 30: 979-988. Ibáñez, C. 2009. Impacts of climate change on Mediterranean coastal wetlands. In: Climate Change Impacts on the Coastal Zone (A. Yáñez-Arancibia Ed.), INECOL, Mexico. Jevrejeva S., Moore, J.C. & Grinsted, A. 2012. Sea level projections to AD2500 with a new generation of climate change scenarios. Global and Planetary Change 80-81: 14-20. Katsman, C.A., Sterl, A., Beersma, J.J., et al. 2011. Exploring high-end scenarios for local sea level rise to develop flood protection strategies for a low-lying delta—the Netherlands as an example. Climatic Change, doi:10.1007/s10584-011-0037-5. Kirwan, M.L. & Blum, L.K. 2011. Enhanced decomposition offsets enhanced productivity and soil carbon accumulation in coastal wetlands responding to climate change. Biogeosciences, 8(4): 987-993. Last, P.R., White, W.T., Gledhill, D.C., et al. 2011. Long-term shifts in abundance and distribution of a temperate fish fauna: a response to climate change and fishing practices. Global Ecology and Biogeography, 20: 58-72. Meynecke, J.O. & Lee, S.Y. 2011. Climate-coastal fisheries relationships and their spatial variation in Queensland, Australia. Fisheries Research, 110: 365-376. Stralberg, D., Brennan, M., Callaway, J.C., Wood, J.K., Schile, L.M., Jongsomjit, D., Kelly, M., Parker, V.T. & Crooks, S. 2011. Evaluating tidal marsh sustainability in the face of sea-level rise: a hybrid modeling approach applied to San Francisco Bay. PLoS ONE, 6(11): e27388. Todd, M.D., Muneepeeralkul, R., Mirallles.Wilhelm, F., Rinaldo, A. & Rodríguez-Iturbe, I. 2012. Possible climate change impacts on the hydrological and vegetative character of Everglades National Park, Florida. Ecohydrology, 5(3): 326-336. Traill, L.W., Perhans, K., Lovelock, C.E., Prohaska, A., McFallan, S., Rhodes, J.R., Wilson, K.A. 2011. Managing for change: wetland transitions under sea-level rise and outcomes for threatened species. Diversity and Distributions 17(6): 1225-1233. Vinagre, C., Duarte-Santos, F., Nogueira-Cabral, H.& Costa, M.J. 2009. Impact of climate and hydrology on juvenile fish recruitment towards estuarine nursery grounds in the context of climate change. Estuarine, Coastal and Shelf Science, 85: 479-486. (Ibáñez Carles, IRTA)	Useful references have been consulted??
34.2	44370	5	0					

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
35	44480	5	0	0	0	0	Executive Summary: Bullet 1 repeats SREX SLR SPM statement about mean SLR contribution to extreme SLR – Encourage authors to reconsider if the Executive Summary is an appropriate place to restate key findings from a previous, published assessment. (Thomas Stocker, IPCC WGI TSU)	Statement has been rephrased.
36	44481	5	0	0	0	0	Section 5.1: statement on semi-empirical models and projected SLR should be updated with reference to WGI AR5 Ch13; statement about ocean acidification should be updated with reference to WGI AR5 Ch3. (Thomas Stocker, IPCC WGI TSU)	Statement has been updated with WG1 Ch3.
37	44482	5	0	0	0	0	Section 5.2.2.1 Climatic Drivers: “definitions” of climatic drivers and indices should be referring to the WGI AR5 report or at least the Glossary. Consistency with WGI definitions needs to be carefully checked. More generally, many of the statements that provide the “physical science” background for this chapter are clearly linked to the WGI AR5 report or the SREX Ch3 report, however this is not the case for all instances (e.g., section 5.2.2.1.3 Wave Climate or section 5.2.2.1.7 Changes in freshwater input). Most importantly, consistency should be carefully checked when other studies are used as the basis for the statements made. (Thomas Stocker, IPCC WGI TSU)	Climate-related drivers are updated to WG1 chapters and SREX chap. 3.
38	44483	5	0	0	0	0	Section 5.2.2.1.1. Sea level incl. extremes: refer upfront to SREX Ch3 when mentioning concerns about higher extreme sea levels; reference to Ch13 to be complemented with a reference to WGI AR5 Ch3 for the observed SL part; currently there is no consistency in the usage of likelihood terminology, e.g., sentence on lines 42-44 mixes likelihood statements from IPCC assessment report with a likely based on a single study...this clearly needs to be avoided. (Thomas Stocker, IPCC WGI TSU)	SLR is updated to WG1 chapter 13.
39	44484	5	0	0	0	0	Section 5.4.1.2: Need to provide references for the basis of statements like “With projected sea-level rise approaching 1 m or more over the next century, ...”. Most of the scenario-based projections provided in TAR, AR4 and WGI AR5 Ch13, excluding the largely uncertain dynamical ice-sheet response contribution, are certainly below 1m for the 21st century. (Thomas Stocker, IPCC WGI TSU)	Statement modified to “projected sea-level rise may approach 1 m or more by 2100.”
40	44485	5	0	0	0	0	Section 5.4.1.2: The sentence “Scientists disagree on whether tropical cyclones will become more intense and/or frequent in the future, although recent, as of yet non-conclusive, evidence suggests extra-tropical storm tracks may change in a warmer future extending Atlantic winter storms eastward impacting Europe to a greater degree than present (Schwierz et al., 2010; Woolings et al., 2012.)” confusingly mixes tropical cyclone and extra-tropical cyclones. As both topics are assessed in WGI AR5 you should avoid coming up with your own assessment but better provide the conclusions in the WGI AR5 with proper cross-referencing to the relevant WGI chapters. (Thomas Stocker, IPCC WGI TSU)	Statement deleted.
41	44486	5	0	0	0	0	Section 5.5.5: long-term commitment to SLR – while AR4 is mentioned, no formal cross-reference is provided. Suggest to add a reference to Ch13 WGI AR5 as the most up to date IPCC assessment of long-term sea level commitments. (Thomas Stocker, IPCC WGI TSU)	Cross-reference is made to WG1 and SREX report.
42	44487	5	0	0	0	0	Section 5.7: statement about “projected increase in both tropical storm intensity” – check consistency with SREX and/or WGI AR5 assessment (Ch11/Ch14). (Thomas Stocker, IPCC WGI TSU)	Statement deleted.
43	44488	5	0	0	0	0	Section 5.8: concluding statement “While the observed and future increase in weather and climate extremes can be variable, the rate of sea-level rise would seem to be critical to many issues” is much too general and unclear with regard to the assessed (future) changes in extremes. A clearer statement with cross-reference to the WGI AR5 is needed. (Thomas Stocker, IPCC WGI TSU)	Statement deleted.
44	44489	5	0	0	0	0	We wonder about the title and focus of FAQ 5.4 in WGII “Is the sea level rising equally in all regions?”. This question about regional sea level rise will be covered in the WGI contribution to the AR5 as part of the dedicated Chapter on “Sea Level Change” (Chapter 13). Rather than repeating what this WGI AR5 Chapter 13 will be providing in its assessment, we suggest this FAQ to focus on the consequences of this for exposure, vulnerability, impacts, etc.. With the current focus of this FAQ, there is a serious risk here of cross-working group inconsistency and overlap that would best be avoided. (Thomas Stocker, IPCC WGI TSU)	FAQs have been revised.
45	44490	5	0	0	0	0	Table 5.1. Column “Observed Change” includes in some instances explicit attribution to physical drivers. Is this intended, and is it supported by the underlying WGII, and in many cases, WGI AR5 assessments in the relevant Chapters? (Thomas Stocker, IPCC WGI TSU)	Table 5.1 deleted and replaced by new tables.
46	44741	5	0	0	0	0	This is a well-written draft and I enjoyed reading it. It covers the impacts of climate change on most coastal systems, but the impacts on coastal freshwater forests and marshes is lacking. Replace "lidar" with "LIDAR" or vice versa for consistency. (Keqi Zhang, Florida International University)	Revised section on wetlands and seagrassess. “LiDAR” is now in use.
47	45946	5	0	0	0	0	overall Chapter 5 has markedly improved since the ZOD. The authors have made substantial progress in organizing the information in this relatively complex chapter - given the number of different subsystems and quite extensive literature. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	No response required.
48	45949	5	0	0	0	0	It would be useful to review the chapter with the definitions presented on page 5 and see which ones are needed and what is consistent or not with the text throughout the chapter (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Definitions have been straightened out in section 5.2.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
49	45950	5	0	0	0	0	While continental shelves are included in Coastal zone definition (page 5, lines 19-21) the observed or projected impacts are not included much at all in the chapter. Shouldn't continental shelves be one of the ecosystems addressed in separate sections like rocky shores, etc. are? Also, where are the changes in continental shelf ecosystems that occur or are projected to occur due to changes in estuaries and oceans from climate and non-climate drivers? (maybe this is in another chapter?) (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Not applicable – continental shelves are in ocean chapters.
50	45962	5	0	0	0	0	Comment: Arctic and Antarctic coastal natural and human systems are particularly vulnerable to climate change as noted in the regional chapter. However, some coverage of the data available for polar systems should be included in chapter 5 as well...just as you note effects in specific other areas of the world in Chpt 5 that are included in regional chapters. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Polar coasts are covered in chapter 28.
51	46765	5	0	0	0	0	All three chapters mention ocean acidification and coral reefs in varying details. It will be good to compare the relevant subsections (as for example, 5.3.1.6, 5.4.1.6.) with those of Chapter 6 and 30. (Venugopalan Ittekkot, University of Bremen (retired))	Cross-reference is made including a cross-chapter box on coral reefs which includes ocean acidification.
52	46840	5	0	0	0	0	Ensure full sentences are used throughout rather than 'note-like' sentences. 'The' is often missing, as are various prepositions. (Genevra Harker, HarmonicQuay Ltd)	Editing to take care of this.
53	47476	5	0	0	0	0	I have reviewed the IPCC's Chapter 5, on Coastal Systems and Loy-Lying Areas. I am impressed by the breadth and scope of the task at hand for the authors. It is my opinion the document at hand represents a very rough draft and substantial improvements are needed before it is presented to the public. Far too frequently, I found that the definition of technical terms are lacked specifics, the descriptions of ecosystem response to sea level rise did not adequately explain the functioning of the report failed to provide guidance about the level of sea level rise that coastal ecosystems could expect in the near, medium and long-term, and the citations used were not handled adequately. The comments I am providing relate mostly wetlands, deltas and estuaries, as those are my areas of expertise. However, since many of my comments are general, I think that they may prove useful for other sections on this chapter. (Alexander Kolker, Louisiana Universities Marine Consortium)	Due to lack of space and information chapter cannot go into details about each ecosystem's response to near, medium and long-term SLR. SLR is treated in a more general manner for both natural and human systems.
54	47477	5	0	0	0	0	One can see examples of short comings of this chapter in the section on observed impacts to deltas (5.3.1.4). This section (p 15, line 17) starts out with the phrase, "Coastal zones receive substantial amounts of nutrient and sediment from rivers, and deltas are formed at river-mouth areas influenced by a combination of river, tide and wave processes." This sentence does not adequately explain why some rivers form deltas and others do not, and thus misses a key scientific point underlying this section. The next sentence reads, "Deltas are one of the most important ecosystems and habitats, and also areas for socio-economic human activities." I know that we are not supposed to comment on minor grammatical issues, but this sentence is so poorly worded that it is not clear what the authors mean. What makes deltas important habitats and ecosystems? Why are deltas more important habitats than other systems? Why are they important for socio-economic human activities? Are they not important for other types of human activities? (Alexander Kolker, Louisiana Universities Marine Consortium)	These sentenses are re-organized and reworded.
55	47478	5	0	0	0	0	The third sentence in this paragraph is filled with inconsistencies that confuse the reader. The sentence reads, "However deltas are among the highly vulnerable and stressed coastal systems and are subjected to human and climate impacts from both drainage basins of rivers and oceans, and also within delta itself: e.g., changes in runoff, sea-level rise, as well as human activities as land-use changes, dam construction, irrigation, mining, extraction of subsurface resources, urbanization." Not only is the grammar so poor that it is hard to understand, but the technical information is presented poorly. Are the authors suggesting that changes in runoff and sea level rise are changes that occur within the delta? When they mention sea level rise, are they referring to relative sea level rise that might be influenced by subsidence, or just climatically driver sea level rise? This paragraph ends with a discussion of Asian megdeltas, and I understand why these system are important to discuss, as they are highly populated and severely threatened. However, since this is an international report, wouldn't it be worthwhile to mention that many deltas around the worlds are also threatened, including deltas in developed country? (Alexander Kolker, Louisiana Universities Marine Consortium)	These sentenses are re-organized and reworded with examples around the world.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
56	47479	5	0	0	0	0	This section is filled with examples of information that is misquoted or poorly cited. On page 15, lines 32-33, the authors write, "In particular, 25% of the wetlands of the Mississippi Delta have been lost over the last few centuries (Blum and Roberts, 2009)." Actually, most of the wetland loss has occurred in less than a century, following the levee improvements after the 1927 flood. According to Wells and Coleman (1987), the major areas of the Mississippi Delta were prograding into the 1920s. Furthermore, the Blum and Roberts (2009) paper is the wrong citation for this information. That paper examines future wetland loss in the Mississippi Delta assuming particular rates of global sea level rise, subsidence and sediment supply. If one is looking for a citation on wetland loss in the Mississippi Delta, they should include (Barras et al., 2003 or Couvillion et al., 2011). Another example of a poorly quoted paper comes from lines 4-5 of p 16. The authors write, "Thirty-three deltas in the world show that 85% of the deltas experienced severe flooding in the past decade, resulting in the temporary submergence of 260,000 km2 (Syvitski et al., 2009)." It is not clear what numbers refer to what systems. Did Syvitski find that the 33 deltas had 260,000 km2 of land submerged, or did Syvitski et al., estimate that globally deltas would have had 260,000km2 of land submerged based on an analysis of 33 representative deltas? (Alexander Kolker, Louisiana Universities Marine Consortium)	These sentenses are re-organized and reworded according to sugestions. Barras et al., 2006, 2008 are cited.
57	47480	5	0	0	0	0	I have put the above comments in the general section, since in my view they are indicative of the kind of broad scale improvements that are needed. I hope that the authors can follow the spirit of these comments and make similar improvemetns in all sections. (Alexander Kolker, Louisiana Universities Marine Consortium)	No response required.
58	47543	5	0	0	0	0	I want to thank the IPCC for allowing me to comment on this report. It was a pleasure and an honor to have the opportunity to contribute to this processs. Should the authors or editors have further comments, they are weclome to contact me. Sincerely, Alexander S. Kolker, Assisstant Professor, Louisiana Universiites Marine Consortium, Chauvin, LA 70344 akolker@lumcon.edu (Alexander Kolker, Louisiana Universities Marine Consortium)	No response required.
59	47562	5	0	0	0	0	One general criticism of the present draft is that coastal system and coastal ecosystem are used essentially synonymously. Whilst ecosystem impacts are obviously a key aspect of climate change, there are also important impacts at the coast that are not really ecological in nature - increased erosion of soft rock cliffs and the attendant risk of damage to properties is one example. Hydrodynamic changes in estuaries that translate into increased flood risk is another. I sense that some sections have been written by ecologists - who not surprisingly tend to view the world in this way, but there are other dimensions to be considered and clumsy deployment of ecological arguments can be counterproductive when it comes to getting the subtleties of climate change impacts across to a wider audience. (Jon French, University College London)	Terminology has been straightened out in section 5.2.
60	47563	5	0	0	0	0	Another general point is that quite a few of the sections - especially the earlier ones - give the impression that the text has been bolted together from a (in places rather superficial) review of very recent literature. There is certainly no sense of synthesis, with key findings assembled from multiple sources. I do not favour single sentence paragraphs that draw potentially important messages from lone sources. I think there needs to be a concerted effort to properly synthesise the material in sections 5.2, 5.3 and 5.4 in particular. Section 5.5 and 5.6 are rather different in style but much better drafted at present. (Jon French, University College London)	Good comment for 5.5 - Chapter has been completely revised to have synthesis and traceable accountability.
61	47681	5	0	0	0	0	"The chapter is quite comprehensive but I would have liked more attention given to the complexity of the interplay between human and ecological systems. In particular, the authors mention only briefly the complex internal differentiation within every society and that vulnerabilities are socially produced, making some groups or categories of people more vulnerable to climate change even if impacted by the same physical changes such as sea level rise. Paying more attention to this is especially important for policy and management, as the references to ICZM allude. Chapter 13 makes the point about social vulnerability very forcefully. Another area where there could be more discussion is the relationship between current models of economic and social development and climate change. The chapter makes reference to adaptation being improved through economic development. However, as economic development is the broad cause of climate change, does this not suggest that we need to rethink current models of economic development? The sustainable development model and its policy offshoots, which is the taken-for-granted model for change, appear to take established political and economic institutions as given. Yes, there is reference to them as being obstacles in some respects but no real engagement with the complexities here. For example, getting different departments of government to cooperate better is certainly needed but one needs to look at the distribution of political power across departments to understand why cooperation does not occur or when it does, problems arise over questions of financing, technical expertise, closeness to politicians etc.. The authors do allude to these matters but I believe the balance of the chapter would be improved by more attention to the human systems side of the equation. A final consideration is the discussion of obstacles to adaptation. The authors refer to culture and values as possible obstacles to taking adaptation measures. This observation should be balanced with a reference to how local knowledge and practices can assist in making adaptation decisions. There is a growing literature on this now . (Bob Pokrant, Curtin University)	Attention is given to the human systems (see sections) and also in the section on adaptation.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
62	47974	5	0	0	0	0	Most of the forecasts made in particular cases are based in hypothetical projections with a high degree of uncertainty. Climate change will have consequences but we cannot predict, accurately, when or the magnitude of these. Thus, these predictions are "expected". This must be taken into account in the "Executive Summary" as in the rest of the document. In assessing vulnerability, risks and costs, most of the situations exposed have been abovementioned. We suggest integrating both points into one. In section relating to Deltas, references to vulnerabilities of these ecosystems could be extended, having in mind their importance within the coastal system and, in the case of Venezuela, this will be the most affected by the increase of the sea level. It is important to highlight a large number of studies, more detailed, of the impacts to this ecosystem for the sea level rise. (Sergio Castellari, Centro Euro-Mediterraneo sui Cambiamenti Climatici)	Chapter is based what we know as published in the scientific literature – on 'interpretations' of observed and projected changes.
63	48108	5	0	0	0	0	Chapter 5: I have the impression that the role of mitigation in reducing impacts beyond the 21st century could be assessed in more detail and summarised in a subsection that can be easily identified (even though there is existing material in 5.5.5. and others, and limitations of the available literature are also noted). A possible additional reference in this regard: Jevrejeva, Moore and Grinsted, Sea level projections to AD2500... Global and Planetary Change 80–81 (2012) 14–20 (some attention is given to adaptation in this paper). (Philippe Marbaix, Université catholique de Louvain)	The role of mitigation with reference to the coastal zone is discussed in section 5.5.6.
64	49256	5	0	0	0	0	5.3.1, 5.4.1 and 5.5.2 are composed of corresponding sections with each other, but with minor mismatches. "Estuaries, Tidal Flats and Lagoons" in 5.3.1.3 and 5.4.1.3 are split into "Estuaries" and "Temperate Lagoons" in 5.5.2.3 and 5.5.2.4. "Submerged Vegetation" in 5.3.1.7 is changed its title to "Seagrasses and Algae" in 5.4.1.7, and to"Seagrass Meadows" in 5.5.2.7. "Mangroves and Salt Marshes" in 5.3.1.5 and 5.4.1.5 is split into "Salt Marshes" and "Mangroves" in 5.5.2.5 and 5.5.2.7. "Deltas" in 5.3.1.4 and 5.4.1.4 and "Coral Reefs" in 5.3.1.6 and 5.4.1.6 are missing in 5.5.2 at laest from the section titles, despite their importance in assessment of vulnerabilities, risks and costs. The section titles should be common among 5.3.1, 5.3.1 and 5.5.2 for easy understanding. (Hajime Kayanne, University of Tokyo)	Correct - needs to be addressed urgently - The section has been thoroughly re-written to address these problems - Substantive reduction has been made to the sections to avoid overlap and repetition and to have consistency in terminology.
65	50195	5	0	0	0	0	1) Overall -- In preparing the 2nd-order draft, the chapter team should prioritize making each section of the chapter a polished, comprehensive treatment of topics considered. From these sections, the chapter team is then encouraged to maximize the utility of its findings, ensuring that they are robust, compelling, and nuanced. Themes to consider informing in constructing findings include decisionmaking under uncertainty, risks of extreme events and disasters, avoided damages, and limits to adaptation. To these ends, the chapter team has prepared a solid 1st-order draft. To inform further chapter development, I provide general and specific comments below. (Katharine Mach, IPCC WGII TSU)	SOD has been revised substantively to include the points mentioned above and below.
66	50196	5	0	0	0	0	2) Highlighting key findings -- In developing the 2nd-order draft, the chapter team should continue presenting key findings throughout the sections of the chapter, using calibrated uncertainty language to characterize its degree of certainty in these conclusions. In this way, a reader of the chapter will be able to understand how the literature reviews and syntheses in the chapter sections--the traceable accounts--support the conclusions of the chapter, especially those presented in the executive summary. Additionally, continued identification of key findings throughout the chapter will enable the author team to increase specificity in characterizing key trends and determinants in the context of the executive summary. (Katharine Mach, IPCC WGII TSU)	Traceable account from ES is made to various sections which have their summaries.
67	50197	5	0	0	0	0	3) Usage conventions for calibrated uncertainty language -- Where used, calibrated uncertainty language, including summary terms for evidence and agreement, levels of confidence, and likelihood terms, should be italicized. In addition to incorporating these terms directly into sentences, the author team may continue to find it effective to present them parenthetically at the end of sentences or clauses. Casual usage of the reserved uncertainty terms should be avoided, as has been flagged in some specific comments throughout the chapter. (Katharine Mach, IPCC WGII TSU)	In the SOD, calibrated uncertainty language is italicized, livelihood terms are in parentheses and casual usage is avoided.
68	50198	5	0	0	0	0	4) Comprehensiveness of assessment -- In further revising the chapter, the chapter team should ensure that all key findings are robustly supported through evaluation of the body of relevant literature. (Katharine Mach, IPCC WGII TSU)	Key findings are supported by evaluation of relevant literature in the text first.
69	50199	5	0	0	0	0	5) Regional balance of examples -- In some sections of the chapter, the author team may wish to consider and improve the regional balance of examples used. (Katharine Mach, IPCC WGII TSU)	More examples have been provided to improve the regional balance.
70	50200	5	0	0	0	0	6) Specificity of described observations and projections -- The chapter team has done a nice job of ensuring specificity in describing observed and projected impacts, while still presenting information concisely. The chapter team is encouraged to continue the following practices: indicating relevant time periods, geographic areas, etc. for observations; indicating relevant time frames, scenarios for climate change or socio-economic development, geographic regions, or other assumptions for projections; and characterizing key driving factors where ranges of outcomes are presented. (Katharine Mach, IPCC WGII TSU)	Where possible, specificity of observations and projections are stated in clearer terms.
71	50201	5	0	0	0	0	7) Conditional constructions -- The chapter team has also done a nice job of using conditional constructions that explicitly separate a given physical change from its corresponding conditional impact. The chapter team is encouraged to continue using such constructions, also separately characterizing the degree of certainty for the physical change and conditional impact where appropriate. (Katharine Mach, IPCC WGII TSU)	Conditional constructions and degree of certainty are used where possible.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
72	50202	5	0	0	0	0	8) Coordination across the Working Group 2 contribution -- In developing the next draft of the chapter, the author team should consider treatment of topics not only in this chapter, but also across the report as a whole. For each topic, the chapter team should ensure that treatment here is reduced to the essence of what is relevant to the chapter, with cross-references made to other chapters as appropriate, also minimizing overlap in this way. In particular, the author team should continue to coordinate with chapters 6, 28, 30, etc. to ensure harmonized assessment, with logical handoffs between sectoral and regional treatment, with consistency in findings presented, and with overlap reduced wherever possible. (Katharine Mach, IPCC WGII TSU)	Cross-reference has been made to other chapters and overlap has been minimized.
73	50203	5	0	0	0	0	9) Harmonization with the Working Group 1 contribution to the AR5 -- At this stage of chapter drafting, the author team should carefully consider the working group 1 contribution. Wherever climate, climate change, climate variability, and extreme events are discussed, the chapter team should ensure that their treatment is harmonized with the assessment findings of working group 1. (Katharine Mach, IPCC WGII TSU)	The chapter has been substantially restructured and section 5.3.2 and 5.3.3 largely deal with a summary of relevant climate change, variability and extreme events material from WG1 - All climate-related materials are made traceable to WG1 chapters and SREX Report.
74	50204	5	0	0	0	0	10) Figures -- Figures represent an important and effective vehicle for clear communication of assessment and corresponding key findings. The chapter team is very much encouraged to continue developing figures to complement the assessment in the chapter text. (Katharine Mach, IPCC WGII TSU)	New figures have been developed for terminology, various boxes, and on other aspects.
75	52633	5	0	0	0	0	Generally there is very little actual information and discussion on biological systems and the effects on them. A positive general point is the attempt to estimate costs and risks for these systems, but without the biological base/context for this it becomes difficult to evaluate how appropriate these costs and risks are. A biological understanding of the system is also necessary for development and evaluation of adaptation and management strategies. (Else Marie Løbersli, Norwegian directorate for nature management)	Not applicable – no space to cover biological base.
76	54405	5	0	0	0	0	GENERAL COMMENTS: I would like to thank the authors for their work on the FOD. When considering the expert review comments received on your chapter and the next round of revisions, I suggest several overall priorities. (1) Keep in mind that the preparation of the SOD is the time to ensure that each section of the chapter presents a comprehensive treatment of relevant literature, and that the Executive Summary presents findings that capture the key insights that arise from the chapter assessment. (2) This is also the time to focus on distilling the chapter text, not just fine-tuning wording but editing with a critical eye to improving quality by making discussions succinct and synthetic, while still being comprehensive. (3) Cross-chapter coordination is also important at this stage, as it should now be possible to identify topics that overlap with other chapters and to coordinate with other chapter teams to minimize that overlap. (4) Cross-Working Group coordination is important as well, and relevant chapter sections should cross-reference chapters from the other Working Groups, particularly in the case of statements about changes in mean or extreme climate conditions that are assessed in the contribution of Working Group I. (5) Continue to look for opportunities for the creation of figures that synthesize across results from the literature. (Michael Mastrandrea, IPCC WGII TSU)	SOD has been revised with all points taken onboard.
77	54406	5	0	0	0	0	EXECUTIVE SUMMARY: The author team has made a good start on the Executive Summary, including clear attention to providing traceable accounts (see separate comment on this) and calibrated uncertainty language. For the SOD, please consider the overall use of calibrated uncertainty language in the Executive Summary. Currently, the confidence statements included in the Executive Summary link to specific nonbold statements, whereas it should be linked to each bold finding as well as the corresponding nonbold text as a whole (see specific comments on findings as well). In addition, please consider ways to more clearly distinguish between conclusions that apply to past changes and those that are forward-looking. Currently, several findings bridge across these contexts, and while bridging is fine, statements are often mixed such that the points made are unclear. For example, in the third paragraph on the variation of impacts across developed and developing countries with specific reference to tourism, the various statements in the paragraph seem to mix information about past changes, current vulnerability, and risks of future impacts. Attention to making such distinctions clear would improve the clarity of communication across the Executive Summary findings. (Michael Mastrandrea, IPCC WGII TSU)	Revised key messages have traceable accounts and calibrated uncertainty language.
78	54407	5	0	0	0	0	TRACEABLE ACCOUNTS: The author team has made a good start to providing traceable accounts for assessment findings and highlighting the location of those traceable accounts in the Executive Summary. There are some cases where improvements could be made, which I have included in comments associated with specific findings and chapter sections. In general, I would recommend the author team continue to strengthen the linkages between the Executive Summary findings and the corresponding chapter text. One approach would be providing some explanation of the calibrated uncertainty language used in the Executive Summary in the corresponding chapter section(s) where the traceable account appears for each finding. For example, in situations where confidence in a finding is not very high, it would be useful to understand why the author team has made this judgment--what are the factors that limit confidence. In situations where confidence is very high, what is the evidence that forms the basis for these assignments. Succinct descriptions in the chapter text of this type will both highlight the basis for ES findings and help explain the author team's assessment of the literature. We in the TSU are also available to discuss these issues if that would be of use. (Michael Mastrandrea, IPCC WGII TSU)	Revised key messages have traceable accounts and calibrated uncertainty language.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
79	54909	5	0	0	0	0	The author team should update the reference list and remove citation inconsistencies between in text citations and full citations given in the reference list. Please see supplementary document named WG2AR5-Chap5_Reference Checks.pdf at https://ipcc-wg2.gov/AR5/author/FOD/SuppMat (Monalisa Chatterjee, IPCC WGII TSU)	References updated and inconsistencies removed.
80	49777	5	2	0	3	0	The 6 messages in the executive summary do not a) speak to the new, strengthened or critical insights since 2009; b) sound interesting for decision-makers; and c) reflect adequately in the chapter as a whole. I don't get a clear sense of what the key vulnerabilities in coastal areas of the world, the messages do not reflect the many pages on impacts; the message on coastal zone management pproaches does not reflect what that section actually says; and nothing here reflects the real challenges and barriers to adaptation. These need some significant work to better convey how serious things are in the coastal zone (and will be in the future). I am sending a review paper to the TSA for consideration (Moser, Williams, Boesch, in press in Annual Reviews) (Susanne Moser, Susanne Moser Research & Consulting)	Key messages have been revised.
81	46392	5	2	20	0	0	I raised this in the review of the zero order draft and raise it again here. The use of "Temperate" lagoons is in my opinion used to describe lagoons in climates with milder temperatures. There exist many lagoons in tropical locations…are these excluded?. In my opnion I would rename this section "Coastal lagoons" as the text in the subsection talks about coastal lagoons . (Andrew Mather, eThekwini Municipality)	Revised as in the text.
82	50205	5	2	44	0	0	Executive Summary -- In subsequent work on the executive summary, there are several aspects of development for the author team to consider further: 1st, it would be preferable to indicate clearly the calibrated uncertainty language assigned to each key finding in bold text. For example, do the parenthetical levels of confidence provided at the end of each paragraph pertain equally to each statement of the paragraph? 2nd, as can be supported by the assessment in the underlying chapter sections, the chapter team should aim to increase specificity and nuance for key findings presented. For example, in some cases it may make sense to more clearly indicate outcomes or conclusions that have been observed and that are projected--instead of simply providing a statement that spans the full range of time frames. As another example, there may be further opportunity to indicate where, when, and why particular conclusions are relevant. (Katharine Mach, IPCC WGII TSU)	Calibrated uncertainty language has been used.
83	40787	5	2	44	3	32	The executive summary is correctly balanced (Michel Petit, CGIET rue de Bercy)	No response required.
84	50206	5	2	46	2	51	Considerations for this paragraph include the following. 1st, it would be helpful if the chapter team clarified further the relevance of the described "main climate drivers"--"the main climate drivers affecting coasts and associated social-ecological systems," etc.? 2nd, "very likely" on line 49, as calibrated uncertainty language, should be italicized. 3rd, the last 2 sentences of the paragraph are adopted from the special report on extremes, and this overlap should be acknowledged. (Katharine Mach, IPCC WGII TSU)	Amended as in the text. Calibrated uncertainty language has been italicized.
85	54374	5	2	46	2	52	Regarding the traceable account for this finding, precipitation changes are not discussed in the referenced chapter section, although they are identified here as a main climate driver. In addition, the "very high confidence" statement applies only to the last nonbold sentence of the finding in the chapter text (5.2.2.1.1). As mentioned in my general comment, calibrated uncertainty language should be linked to each bold finding, as well as the corresponding nonbold text. (Michael Mastrandrea, IPCC WGII TSU)	Amended with proper use of calibrated uncertainty language.
86	45861	5	2	47	2	49	Should also include acidification here (Laurens Bouwer, Vrije Universiteit Amsterdam)	Amended with acidification as one of the key messages.
87	44181	5	2	47	3	37	As the above mentioned, no matter the use of climate change and increased sea-level-rise, or climate change and sea -level rise in a sentence is not so good. Actually, the section 5.1 introduction in Page 4, line40-41`has given the right description, i.e., 'climate change impact arising from weather and climate extrems and sea-level rise would.....' (RONGSHUO CAI, Third Institute of Oceanography)	Not applicable. Climate change is a separate phenomenon from SLR.
88	37387	5	2	49	0	0	This first point of the executive summary needs to be a confident statement. The sentence in bold that starts the report is difficult enough to understand and appears to be so broad as to have little specific meaning, but I particularly disagree with the poor wording on the sentence in line 49; surely there can be no doubt that if there is an increase in the mean sea level that there also has to be an increase in the extreme upper levels that are experienced. This statement implying some slight doubt about this re-appears elsewhere in the report. However, a much stronger statement is made on page 6 in section 5.2.2.1.1 and on page 20, line 43, citing the Menendez and Woodworth reference. (Colin Woodroffe, University of Wollongong)	SLR has been crossed referenced to WG1 and SREX report.
89	38724	5	2	49	0	0	Acidification must be included in this phrase. Is widespread used in all chapter and could one of the main drivers of change for shellfish and acuacultures as well as for ecosystem structure maintenance in coastal waters. Recent references i.e. Gruber, N. Hauri, C. Lachkar, Z. Loher, D. Frölicher, T.L. Plattner, G.-K. 2012 Rapid Progression of Ocean Acidification in the California Current System. Science (in press), was a clear reference of their importance as driver. As example was included in the third bloc of the executive summary p. 3 l. 12) (Ricardo Anadon, University of Oviedo)	Amended with acidification as one of the key messages.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
90	44743	5	2	49	2	49	"It is very likely the mean sea-level rise will contribute upward trends in extreme coastal high water levels." I think that "very likely" should be removed because the mean sea-level rise will for sure contribute upward trends. (Keqi Zhang, Florida International University)	This is a calibrated uncertainty statement.
91	37388	5	2	50	0	0	This important statement about coastal erosion is poorly worded. Locations that presently experience coastal erosion and inundation will continue to do so whether or not the sea rises (in all but the most exceptional circumstances, presumably). The statement makes it seem as if the rise in sea level is going to be the factor that ensures that both erosion and inundation continue. At the very least, one would imagine that a rise in sea level will exacerbate inundation; to word that as to continue inundation effectively implies no change. In the case of erosion, I am sure that there is no study that says erosion will decrease under a higher sea level. (see also my comment, page 13, lines 48-50). On the other hand, erosion might be the result of some other factor such as longshore drift, and so there is probably not enough evidence to indicate that erosion (if by that we mean the volume of sand removed from a beach by a storm of a particular size) will increase, but the scarp that is cut at the back of the beach is presumably likely to be in a more landward location, given that almost every approach to beach response to sea-level rise sees some landward retreat, whether that uses the Bruun method, or any alternative, such as that discussed by Wolinsky, or that by Ranasinghe. [Wolinsky, M.A., 2009. A unifying framework for shoreline migration: 1. Multiscale shoreline evolution on sedimentary coasts. Journal of Geophysical Research, 114: F01009. Ranasinghe, R., Callaghan, D. and Stive, M.J.F., 2012. Estimating coastal recession due to sea level rise: beyond the Bruun rule. Climatic Change, 110: 561-574. (Colin Woodroffe, University of Wollongong)	Amended at in the text to include landward retreat and exacerbation of inundation.
92	54375	5	3	1	3	6	Regarding the traceable account for this finding, it is not completely clear where the first nonbold statement is discussed in the chapter text. Similar statements in 5.5.3 do not seem to match up in terms of the increase in population (and 200 million is not mentioned explicitly as the current exposed population). It would also be useful to specify what is meant by extreme water levels in this context (e.g., 1 in 100 year event). Also, although not referenced here, section 5.4.2.1 includes projections of exposed populations. In addition, "very high confidence" to a statement in 5.3.2.1 related to current exposure and the contribution of urbanization to date, but is not directly linked to forward-looking statements like the last sentence of the paragraph. As mentioned in my general comment, calibrated uncertainty language should be linked to each bold finding, as well as the corresponding nonbold text. Finally, section 5.5.3 discusses reductions in projected population displaced through adaptation, and it would be worth considering inclusion here, as well as greater specificity regarding what adaptation means in this context. (Michael Mastrandrea, IPCC WGII TSU)	For all key messages, traceable accounts have been made to the text
93	42626	5	3	2	3	3	"people are already exposed to flooding by extreme water levels worldwide" - is this specifically coastal flooding? (Erin Coughlan, Red Cross / Red Crescent Climate Centre)	Amended with reference to coastal flooding.
94	45862	5	3	2	3	4	By which date? (Laurens Bouwer, Vrije Universiteit Amsterdam)	Amended with date stated.
95	50207	5	3	3	3	3	It would be beneficial to specify the timeframe relevant to a potential fourfold increase. (Katharine Mach, IPCC WGII TSU)	Amended with timeframe stated.
96	37389	5	3	4	0	0	Why is the range being quoted up to 2 metres? And surely this should not be worded, as "assuming a SLR" (Colin Woodroffe, University of Wollongong)	SLR has been revised to cross-reference with WG1.
97	38725	5	3	4	0	0	In relation with my global comment of the chapter a SLR of 0,5 to 2,0 were referred, but WGI (in Chapter 1) projections for different RCPs are below of the above values. (Ricardo Anadon, University of Oviedo)	Projections are cross-referenced to different RCPs in WG1.
98	38587	5	3	4	3	5	In the Executive Summary, it is not prudent to highlight exposure/ vulnerability for scenarios of climate change where sound scientific basis is lacking. For example, the Executive summary of Chapter 5 highlights the potential displacement of population from submergence and erosion from a sea –level rise (SLR) and justification for adaptation under the assumption of 0.5m-2.0 m SLR by 2100 . The scientific basis of 2.0 m sea-level rise by 2100 is not clear. (Susmita Dasgupta, The World Bank)	SLR has been cross-referenced to WG1 and SREX report.
99	38588	5	3	4	3	5	In this context, please note that the IPCC AR4 presented model-based range (0.18 m-0.59m) of projections for sea-level rise by 2100 excluding future rapid dynamical changes in ice flow by 2100. An alternative to the IPCC AR4 SLR approach pioneered by Rahmstorf (2007) estimates sea level rise indirectly from changes in global average near surface temperature. This semi-empirical technique resulted in a projected SLR in 2100 of 0.5 to 1.4 meters above the 1990 level. Using a wider range of CGCM models, Horton et al. (2008) updated Rahmstorf's results and produce a broader range of sea level rise projections, especially at the higher end than outlined in the IPCC AR4. They predict sea level rise increases between 0.54 – 0.89m with a mean of 0.71m by 2100, however they admit that this does not include possible dynamic changes in the ice sheets. Pfeffer et al. (2008) explored kinematic scenarios of glacier contributions to sea level rise in the 21st century by setting 2m and 5m SLR targets and compared current loss rate evidence to see whether these objectives can be achieved. They find that a total SLR of about 2 meters by 2100 could occur under physically possible glaciological conditions but only if all variables are quickly accelerated to extremely high limits. (Susmita Dasgupta, The World Bank)	SLR has been cross-referenced to WG1 and SREX report.
100	38589	5	3	4	3	5	For a review of this literature, please see Dasgupta, S. and C. Meisner 2009: Climate Change and Sea Level Rise: A Review of the Scientific Evidence". The World Bank at http://documents.worldbank.org/curated/en/2009/05/10567848/climate-change-sea-level-rise-review-scientific-evidence-climate-change-sea-level-rise-review-scientific-evidence (Susmita Dasgupta, The World Bank)	Not acceptable – grey literature.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
101	38590	5	3	4	3	5	References: Horton, R., C. Herweijer, C. Rosenzweig, J. Liu, V. Gornitz, and A. C. Ruane, 2008: Sea level rise projections for current generation CGCMs based on the semi-empirical method Geophysical Research Letters 35: L02715. Otto-Bliesner, B., S. Marshall, J. Overpeck, G. Miller, A. Hu, CAPE Last Interglacial Project members, 2006: Simulating Arctic Climate Warmth and Icefield Retreat in the Last Interglaciation Science 311:1751-1753. Overpeck, J., B. Otto-Bliesner, G. Miller, D. Muhs, R. Alley, J. Kiehl, 2006: Paleoclimatic evidence for future ice-sheet instability and rapid sea-level rise Science 311: 1747-1750. Pfeffer, W. T., J. T. Harper, S. O'Neel, 2008: Kinematic constraints on glacier contributions to 21st-century sea-level rise Science 321: 1340-1343. Rahmsdorf, S., 2007: A semi-empirical approach to projecting future sea-level rise Science 308: 368-370. (Susmita Dasgupta, The World Bank)	SLR has been cross-referenced to WG1 and SREX report.
102	42776	5	3	4	3	6	Specify whether this assumes population in-migration or not. Also, check SLR assumptions stated in Chapter 1 for consistency (Sofia Bettencourt, World Bank)	Coast-ward migration is specified.
103	50208	5	3	8	3	12	Potential considerations for this paragraph include the following. 1st, for the finding in bold text, it would be helpful to specify what "impacts of climate change" are relevant here--presumably those relevant in the context of coastal systems? 2nd, for "affected" on line 9, it would be preferable to clarify what is meant--affected by what? 3rd, for "vulnerable" on line 10, is it possible to specify further what vulnerabilities are meant here--vulnerable to what? Finally, is it possible to indicate more precisely how the factors described in the last sentence have evolved and are projected to change through time? (Katharine Mach, IPCC WGII TSU)	Amended as in the text.
104	54379	5	3	8	3	12	Regarding the traceable account for this finding, the vulnerability of the poorer sectors in developing countries is not discussed in 5.4.2.1, although it is cited here as support. Section 5.3.2.4 does contain discussion of the issues in the final sentence of the paragraph, but "high confidence" is assigned there rather than "very high confidence." Please also see my comment on this section regarding the support for the confidence assignment. (Michael Mastrandrea, IPCC WGII TSU)	Text has been amended for traceable account.
105	37390	5	3	9	3	12	More assets of developed countries are increasingly affected. This is poorly worded. Does it mean that more assets of developed than of undeveloped countries. Or does it mean more assets are affected because of the increase (if so we would need to be told an increase in what)? Or is it that assets are increasingly affected, that is that as time goes on, any one asset gets affected more (this could be more often, or affected to a greater extent). This key point ends with a mixed bag of impacts. I urge the authors to prioritise the impacts. I believe that when they do this sea-level rise will be seen to be the most important of the climate drivers, and that it would be good practice to order a list like that in lines 11-12 with SLR ahead of extremes, and other less pervasive impacts. (Colin Woodroffe, University of Wollongong)	Amended as in the text.
106	48109	5	3	10	3	12	"reduction in tourist flows from mid-latitudes" is not explained and supported with references in the quoted section (5.3.2.4). Please check with authors of sections 10.6.1.2 (tourism) and 10.6.2. (Philippe Marbaix, Université catholique de Louvain)	Amended to "reductions in tourist flows from other regions".
107	50209	5	3	14	3	15	For a few terms used in these sentences, it would be preferable to indicate more specifically what is meant, such as for "diverse goals" (of what forms?), "greater integration" (across what levels or bodies?), and "smoother governance" (in what context?). (Katharine Mach, IPCC WGII TSU)	Amended as in the text.
108	42777	5	3	14	3	18	You may want to qualify this sentence as it gives the impression that coastal management always achieves multiple goals. This is not always the case - in fact coastal management is a complex, lengthy process that often yields winners and losers. Qualify the sentence accordingly. (Sofia Bettencourt, World Bank)	Amended as in the text.
109	43696	5	3	14	3	18	This statement is not entirely consistent with the earlier points being made in the Executive Summary or covered in much of the chapter and that is because it is not being clear about what constitutes a range of diverse types of adaptation. It would be better to reframe this point by shifting its focus to being clearer about the benefits of integration across governance structures which cover economic and social aspects of the changes. Also it needs to be consistent with the opening statement in section 5.6.4 which notes that there are limits to adaptive capacity. (Martin Manning, Victoria University of Wellington)	Amended as in the text.
110	45863	5	3	14	3	18	I doubt whether there is evidence that this has actually been achieved. While the literature cited in Table 5-6 describes various (potential) approaches as well as actual implementation, I do not think that there is "very high confidence" that this level of integration and achievement of diverse goals is actually taking place. This ES text should be adjusted on the basis of the available evidence. Also the SREX report provides ample support for the sometimes more modest progress that has been achieved. (Laurens Bouwer, Vrije Universiteit Amsterdam)	ES adjusted according to calibratetd uncertainty language in various sections.
111	52842	5	3	14	3	18	The statement describes the potential; there should also be a statement regarding the reality (John Hay, University of the South Pacific)	Amended as in the text.
112	54381	5	3	14	3	18	This finding is currently very general, and it would be useful to consider ways to be more specific regarding the important characteristics of the approaches mentioned (e.g., what does greater integration mean, what does smoother governance mean, etc.) and what the diverse goals of coastal regions are. (Michael Mastrandrea, IPCC WGII TSU)	Amended as in the text.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
113	38239	5	3	20	3	21	Executive Summary. “While cost of adaptation to sea-level rise is high, the costs of inaction are larger than the sum of adaptation and residual damage costs for the 21st century and the global scale.” Question: How is this cost of adaptation to sea-level rise varying for both developed and developing countries? (Abdalah Mokssit, Direction de la Météorologie Nationale (DMN))	Amended as in the text.
114	43697	5	3	20	3	21	The first sentence of this statement should be more consistent with significant uncertainties in both adaptation and damage costs. I would suggest that it starts "While the cost of adaptation to sea level rise can be high, it is also (very?) likely that .... " (Martin Manning, Victoria University of Wellington)	Amended as in the text.
115	42600	5	3	20	3	25	The paper mentioned that the mean sea-level rise would reach 2 m by 2100 and under medium socio-economic development assumption, the sea-level rise could under 1.26 m. These data need to be provided a reliable basis. Refer to the Cose-benefit Analysis of Adaptation to Sea Level Rise by Yi-qiu Yang. Reference: ''Yi-qiu YANG, et al. Cose-benefit Analysis of Adaptation to Sea Level Rise in Major Vulnerable Regions along the Coast of China. ISOPE-2012 conference. RHODES. Greece, June17-22, 2012, 1522-1528' (Juncheng Zuo, Hohai university)	SLR is based on WG1 and SREX report.
116	42627	5	3	20	3	25	The rates of sea-level rise quoted here (2m or 1.26m) are drastically higher than those mentioned from WGI. On page 26 of WGIIAR5 Chapter 1 it says " For the period 2081 to 2100 compared to 1986 to 2005, GMSL rise is projected to lie in the range 0.27–0.50 m for RCP2.6, 0.32–0.56 m for RCP4.5 and RCP6.0, and 0.41–0.71 m for RCP8.5 [WGI-13]. Under RCP 8.5, the likely range reaches 0.84 m in 2100, but larger values than these ranges cannot be excluded [WGI-13]." Many of the studies cited in this chapter cite rates of sea level rise that are higher than WGI is predicting. (Erin Coughlan, Red Cross / Red Crescent Climate Centre)	SLR is based on WG1 and SREX report.
117	42778	5	3	20	3	25	Suggest modifying this sentence. I understand it summarizes a study in Section 5.5, but as it reads (in an Executive Summary format) it gives the impression that coastal protection is the most advisable adaptation option. In many cases, retreat or accomodation are more cost effective. Perhaps you should restate "adaptation is considered economically rational" instead of "protection is considered...."? (Sofia Bettencourt, World Bank)	Amended as in the text.
118	47481	5	3	20	3	25	This seems paradoxical to me. The bolded text suggests that the effects of SLR will be too costly to adapt to, while the unbolded text suggests that most nations can do so. I suggest rewording and/or clarifying this statement. (Alexander Kolker, Louisiana Universities Marine Consortium)	Amended as in the text.
119	54382	5	3	20	3	25	Regarding the traceable account for this finding in section 5.5.4, it would be useful to discuss the basis for the assignment of high confidence, given the statements in the section that while a small number of global assessments of the costs of sea-level rise have been conducted, some robust findings emerge. Explanation of the basis for this robustness would help in understanding the author team's assessment of this literature. (Michael Mastrandrea, IPCC WGII TSU)	Despite a small number of global assessments on costs of SLR the developing countries will incur higher adaptation costs.
120	52843	5	3	20	3	32	Both statements refer to the cost of adaptation; it is preferable that discussion of such costs be in one statement, including a comment on the estimated actual costs, rather than just saying "high"; the second statement can then deal exclusively with policy making and decision support (John Hay, University of the South Pacific)	One key message is on costs and the other is on improved coastal adaptation.
121	38591	5	3	21	3	22	See my comment for Page 5 line 4-5. (Susmita Dasgupta, The World Bank)	The comment should be page 3 line 4-5. Not acceptable – grey literature.
122	42779	5	3	27	3	32	Rephrase: "A wide range of adaptation measures is available,such as beach nourishment, population and assets retreat, coastal defense strutures, etc. With additional accessible information available for assessment, e.g. LIDAR (Light Detection And Ranging) and high resolution satelite data, and knowledge sharing platforms, decision makers should be in a better position to assess local adaptation options" (Sofia Bettencourt, World Bank)	Paragraph deleted as it refers to technical details and replaced by a more general paragraph for a resilient and sustainable coast.
123	41676	5	3	35	0	0	Section 5.1. People may want to see how important the coast is to human and environment. I do find lots of introduction of the importance of coast in the chapter but they should appear in the Section 5.1. (Rui Zhang, Xiamen University)	The human systems are included in the third paragraph of Section 5.1.
124	44345	5	3	37	3	37	The first sentence of the introduction is a bit confusing. Sea-level rise is a consequence of clime change and not an independent issue, like could be interpreted du to the way the sentence is constructued. Suggestion of an alternative sentence: "This chapter presents an updated picture of the impacts, adaptation and vulnerability of coastal systems to climate change, with emphasis on sea-level rise". (Ibáñez Carles, IRTA)	The first sentence has been amended accordingly.
125	37391	5	3	37	3	39	This statement is surely wrong. AR4 did not focus on oceans in chapter 6 the coast chapter. Coasts and marine were combined in TAR, but there was no real focus on marine issues in AR4, and not in the coastal chapter; hence the significance of the new chapters in AR5 (Colin Woodroffe, University of Wollongong)	Amended and reflected in the new text.
126	38116	5	3	47	3	49	The text switches between the use of 'coastal systems' and 'coastal ecosystems'. Not all coastal systems could be deemed ecosystems. I'm a little unclear how physical processes fit into the division between ecosystems and human systems. (THOMAS SPENCER, University of Cambridge)	Coastal systems are now deemed to consist of natural and human systems – see Section 5.2.
127	47482	5	3	51	4	10	The definition of coastal systems seems to leave out rocky shores, dunes, bluffs, and other high relief coastal systems. (Alexander Kolker, Louisiana Universities Marine Consortium)	Amended as in section 5.2.
128	42009	5	3	54	0	0	This sentence seems out of place or out of context. (Liette Vasseur, Brock University)	This sentence refers to the AR4 and is now reflected in the text.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
129	42780	5	3	54	3	32	The chapter needs some consistency between the SLR scenarios cited and the impact studies quoted. For example, if only AR4 assumptions are used (SLR up to 0.6 m) and not subsequent analyses, readers will be left wondering why on the same page studies are quoted that assume SLR of 1.26 m, or even up to 2 m. Please explain which assumptions are used (Sofia Bettencourt, World Bank)	The SLR numbers refer to those in the AR4 and are now reflected in the text.
130	38117	5	3	54	3	54	This goes without comment. Would it be helpful at this point to say that sea level scenario/s were being used in AR5 by comparison? (THOMAS SPENCER, University of Cambridge)	SLR values in the AR5 are given in the paragraph after the AR4.
131	45864	5	3	54	3	54	Please include the new WG1 projections here, and compare these against the AR4 assessment (Laurens Bouwer, Vrije Universiteit Amsterdam)	SLR values for the AR5 are based on WG1 and given in the paragraph after the AR4.
132	42228	5	4	1	4	44	This text is extremely general in nature - too much so to be useful Suggest including specific consideration of developments since AR4 within each of the main sections of the chapter. (Denise Reed, The Water Institute of the Gulf)	The text has been revised to include major developments from various sections of the chapter.
133	38547	5	4	2	4	3	In terms of adding variables of import for AR5, I would add elevated carbon dioxide concentration (independent of pH), which increases growth rates in macroalgae and phytoplankton (see Kroeker, K. J., R. L. Kordas, R. N. Crim, and G. G. Singh. 2010. Meta-analysis reveals negative yet variable effects of ocean acidification on marine organisms. Ecology Letters 13:1419-1434). Come to mention it, the next iteration of the Kroeker et al. meta-analysis may be available in time for AR5, and I believe the conclusions regarding CO2 enhancing growth remain the same. It may also be worth considering eutrophication and subsequent deoxygenation, which is due to a combination of changing patterns of precipitation (a climate change factor) and land use (a human system factor). (Christopher Harley, University of British Columbia)	Not considered – too detailed to be in the text.
134	42781	5	4	2	4	3	They are also affected by storm surges and wave heights (Sofia Bettencourt, World Bank)	Amended as in the text.
135	50210	5	4	2	4	5	It would be helpful to clarify if these statements reflect findings from the 4th assessment report. Additionally, it may be preferable to use the word "changes in" instead of "increased" in describing extreme events on line 3. (Katharine Mach, IPCC WGII TSU)	Clarification made and amended as in the text.
136	39408	5	4	2	4	8	There are some changes in tense in this paragraph that make it unclear whether the information relates to AR4 analysis or the current real-world state and changes since then. (Sarah Cornell, Stockholm Resilience Centre)	Amended as in the text as this is still part of the AR4 results.
137	44143	5	4	6	4	6	what is ICZM? (Anne Holsten, Potsdam Institute for Climate Impact Research)	Amended as in the text.
138	52845	5	4	7	4	7	References required (John Hay, University of the South Pacific)	Not required as this is part of the paragraph that refers to the AR4.
139	42010	5	4	10	0	0	Same with this sentence that should be connected to the next paragraph. (Liette Vasseur, Brock University)	Amended and linked to the paragraph.
140	44346	5	4	10	4	44	Another key issue that should be highlighted is the increase in temperature in shallow coastal waters (including bays and coastal lagoons) and their potential effects on the biota (Ibáñez 2009). The increase in Tº in shallow waters is much more pronounced than offshore, and the increase of magnitude and frequency of extreme events (i.e., summer Tº up to 30 ºC) may cause relevant detrimental effects on coastal ecosystems, such a increased fish and bivalve mortality. For instance, in the Estuary of San Francisco several studies indicate that mean daily Tº of 25 ºC ia a threshold for high mortality of delta smelt, and under the scenario A2 of AR4 it is expected that the number of days above 25 ºC would increase from 50 to 1000 days per decade (Cloern et al. 2011). The years 2003 and 2006 showed very high maximum temperatures in the Bays of the Ebro delta, up to 30 ºC, which produced mortalities of bivalves. In 2003 there was a total mortality of mussels in both bays likely due to the persistence of high water temperature and low oxygen. In both bays Tº was higher than 28 º C during 42 consecutive days, with a maximum of 30.9 º C in the Alfacs bay and a maximum of 29.9 º C in the Fangar bay (Fernández-Tejedor et al., 2008). (Ibáñez Carles, IRTA)	Not considered – too detailed to be in the text.
141	39409	5	4	12	0	0	functions and services' - we all know what this means, of course, but still best to be complete - 'ecosystem or ecological functions', and 'the services and benefits that these confer to humanity'. Then to make the sentence flow better, remove the passive tense: There is now better understanding of coastal systems, their ecosystem functions...' (Sarah Cornell, Stockholm Resilience Centre)	Amended as in the text.
142	38118	5	4	14	4	15	Following on from comment page 3, line 54, I find this too vague. (THOMAS SPENCER, University of Cambridge)	Sentence deleted.
143	35288	5	4	14	4	16	Statement should be better aligned with Chapter 13 of WGI, which separates projections from process-based models and semi-empirical models; the upper bounds of projections using both methods will exceed those in AR4 but by quite different figures. (Patrick Nunn, University of New England)	SLR values for the AR5 are cross-reference to WG1, chapter 13.
144	37282	5	4	14	4	16	Please add: "Other studies demonstrate substantial differences on sea level rise and associated rates of change on regional scale, e.g. in the German Bight from long-term coastal observation stations by means of non-linear smoothing techniques and linear trend estimations for different time spans. Results for the Southern North Sea reveal a weak deceleration of SLR since 1844 with a strong acceleration at the end of the 19th century, to a period of almost no SLR around the 1970s with subsequent positive acceleration and to highest rates of change in the last decade (Wahl et al., 2011 and Albrecht et al., 2011).", Full citation 1: Wahl, T., Jensen, J., Frank, T., Haigh, I.D.: Improved estimates of mean sea level changes in the German Bight over the last 166 years, (2011), Ocean Dynamics, 61 (5), pp. 701-715. Full citation 2: Albrecht, F., Wahl, T., Jensen, J., Weisse, R.: Determining sea level change in the German Bight, (2011), Ocean Dynamics, 61 (12), pp. 2037-2050 (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	Not considered – too detailed to be in the text.
145	50211	5	4	14	4	16	The author team should also consider and cross-reference the findings of the working group 1 contribution to the 5th assessment report for this statement. (Katharine Mach, IPCC WGII TSU)	SLR values for the AR5 are cross-referenced to WG1, chapter 13.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
146	37392	5	4	16	4	18	Poorly worded. 'Erosion from a higher sea-level rise' does not make sense, or is ambiguous and needs rewording. Is it erosion at a higher sea level, or is it intended to refer to the rate of erosion associated with the rate of rise. Of course erosion needs to be addressed at a local scale. This could be a key point at which to emphasise the need for local studies to consider what the pattern of sea-level rise is at regional and local scales, because very few places are going to experience the global average rate. But this statement is meant to have a broader meaning I think. It needs rewording. (Colin Woodroffe, University of Wollongong)	Amended as in the text.
147	46703	5	4	16	4	18	If discussing coastal cities, it may be worth mentioning that salt water intrusion into the aquifers is also a large concern for many cities. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Not considered here but in table 5.6.
148	40342	5	4	20	4	26	This paragraph starts with an introductory sentence on ocean acidification but ends up having a lot of non-acidification information included. Should be better separated out. (Laura Petes, National Oceanic and Atmospheric Administration)	Last sentence has been deleted to eliminate the confusion.
149	38945	5	4	24	4	24	Add saltmarshes to this summary (Neil Saintilan, Office of Environment and Heritage)	Amended as in the text.
150	40343	5	4	28	4	30	This paragraph is confusing. Vulnerability assessments don't inherently include adaptation actions, so perhaps it should be worded about advances in both vulnerability assessments and the identification of potential adaptation actions, costs, benefits, and tradeoffs. (Laura Petes, National Oceanic and Atmospheric Administration)	Amended as in the text.
151	39410	5	4	28	4	44	These three final paragraphs 'jump around' more than the previous scene-setting ones, both in terms of time-frame and of concept/responses. Suggest the line 'human drivers continue... should move up to line 29, then 'future [decisions about] land use will be dominated by climate change...' Then move onto the changes in vulnerability assessment, the growing emphasis on adaptation, and finally the geographical differences -developed/developing countries. Also, 'Adaptation has been accepted' - by whom? Better to say 'The need for adaptation...'? (Sarah Cornell, Stockholm Resilience Centre)	Paragraphs moved and revised as in the text.
152	37393	5	4	30	0	0	Estimates of inaction. What does that mean? Reword. Presumably it means estimates of the cost of doing nothing (Colin Woodroffe, University of Wollongong)	Amended to "cost of inaction".
153	44144	5	4	32	4	37	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	Reference (Hadley 2009) provided.
154	38119	5	4	36	4	37	The counter argument could be made that over the 50 year timescale, human impacts may still outweigh climatic impacts on land use which may become more important after 50 years. It is not clear on what evidence this staement is made. (THOMAS SPENCER, University of Cambridge)	Amended to include other socio-economic processes to drive land-use changes.
155	44347	5	4	36	4	37	The citation stating that "future land-use in the coastal areas will be dominated by climate change effects..." may be too strong if we refer to the present century. Other opinions and projections suggest that human impacts other than climate change may have stronger effects on land-use. (Ibáñez Carles, IRTA)	Amended to include other socio-economic processes to drive land-use changes.
156	45865	5	4	36	4	37	This seems too strong wording, as other (socio-economic) processes likely drive land-use change to a much larger extent (Laurens Bouwer, Vrije Universiteit Amsterdam)	Amended to include other socio-economic processes to drive land-use changes.
157	52844	5	4	39	4	39	Also true for the coasts of develping countries (John Hay, University of the South Pacific)	Amended to include both "developed and developing countries".
158	46808	5	4	39	4	44	The paragraph seems to want to contrast the development between south east England and developing countries, but talks about development in a different way, and therefore doesn't achieve this. Make the point of this contrast clearer, or rearrange so it is a general description and not a comparison. (Genevra Harker, HarmonicQuay Ltd)	Paragraph amended to compare coasts of developed and developing countries.
159	37394	5	4	40	0	0	on SE England? Reword (Colin Woodroffe, University of Wollongong)	Deleted.
160	42011	5	4	40	0	0	Since SE (in SE England) was not used before, it may be better to put it in length first. In fact interesting that in other places it is in length like earlier with Asia. (Liette Vasseur, Brock University)	Length was not given.
161	38946	5	4	40	4	42	Continental shelf breaks will vary more widely than this- maybe state the range as up to 170 metres (Neil Saintilan, Office of Environment and Heritage)	Not considered – NA.
162	46807	5	4	41	4	41	Use 'occur' rather than 'occurred'. (Genevra Harker, HarmonicQuay Ltd)	Amended.
163	38120	5	4	42	4	43	There is a danger that storminess impacts get simply associated with developing country coasts. But storminess impacts could be equally devastating (but perhaps measured in different terms) on developed coasts (THOMAS SPENCER, University of Cambridge)	Amended and ambiguity removed.
164	41677	5	4	49	0	0	Section 5.2.1. The definition of "coast" should be moved to the "introduction". (Rui Zhang, Xiamen University)	The definition of "coasts" is now evident in section 5.2.
165	41678	5	4	49	0	0	Section 5.2.1. The definition of "coast" is still not clear. Maybe a figure will help? (Rui Zhang, Xiamen University)	The definition of "coasts" is now evident in section 5.2
166	38121	5	4	51	4	51	The emphasis on 'soft rock' and low-lying coasts here should be tempered with a reference to rocky coasts too (THOMAS SPENCER, University of Cambridge)	Rocky coasts are considered.
167	37395	5	4	51	4	52	This is a poor definition of coastal systems (Colin Woodroffe, University of Wollongong)	The definition of coastal systems is made clear in Figure 5.1 and accompanying text.
168	44182	5	4	51	4	52	It seems that coastal seas and human-built system could be balance? For instance, coastal lands could be balanced to coastal seas. (RONGSHUO CAI, Third Institute of Oceanography)	The coastal systems now include both natural systems and human systems.
169	44747	5	4	51	4	52	"Coastal systems include estuaries, coastal plains dominated by mangrove forests and salt marshes, coastal seas and human-built systems." I think that "For purpose of this assessment," started at line 18 on page 5 should be placed in front of the coastal system definition. (Keqi Zhang, Florida International University)	Section 5.2 defines coastal systems and what are included in coastal systems.
170	44145	5	4	51	4	54	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	This is self-evident in section 5.2.
171	44745	5	4	52	4	52	I think that "purely" should be remove. (Keqi Zhang, Florida International University)	Deleted.
172	38122	5	4	54	4	54	spatial heterogeneity in what? (THOMAS SPENCER, University of Cambridge)	Deleted.
173	38124	5	5	1	5	2	A more up to date reference would be to the UK National Ecosystem Assessment. NEA 2011. UK National Ecosystem Assessment Technical Report (THOMAS SPENCER, University of Cambridge)	MEA 2005 is used as a standard reference for ecosystem services.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
174	39411	5	5	2	0	0	Suggest adding the Fisher and Turner reference on ecosystem services as well as De Groot's initial classification article, because it has been so influential in current framings of ecosystem services - Fisher B, Turner RK (2008) Ecosystem services: classification for valuation. Biol Conserv 141:1167–1169. (Sarah Cornell, Stockholm Resilience Centre)	MEA 2005 is used as a standard reference for ecosystem services.
175	45947	5	5	9	0	21	Coastal zone and coastal system definitions are not consistent. Coastal systems as defined in lines 9-10 wouldn't include continental shelves (exept those in coastal seas e.g., Baltic Sea, Mediterranean, etc.), whereas Coastal zone is defined as extending to shelf break - line 20 - but then on line 18 it indicates that coastal systems (Its) boundary extends to edge of continental shelf. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Box deleted. Figure 5.1 and accompany text provide the definitions used in this chapter.
176	37904	5	5	9	5	9	Too narrow a definition of lowland coastal system, which appears to exclude areas composed of prograded beach and eolian sedimentation. They may well be associated with tidal domianted deposition but they are not dominated by tidal marsh deposition. Thre seems to be a perception that endangered coasts are dominated by tropical coasts. This need to be supported by empirical evaluation. Likewise the areas of mangrove deposition are not per se dominating tropical lowland coasts where deltas are concerned eg Bangladesh. (Julian Orford, Queen\\\'s University, Belfast)	Box deleted. Figure 5.1 and accompany text provide the definitions used in this chapter.
177	42229	5	5	9	5	9	The use of the terms 'coastal seas; in unclear. It is included within the coastal zone definition as extending to the edge of the shelf. Suggest an additional defintion for coastal seas and/or clarification here. (Denise Reed, The Water Institute of the Gulf)	Box deleted. Coastal sea is not considered in this chapter.
178	44748	5	5	9	5	9	ditto (Keqi Zhang, Florida International University)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
179	38127	5	5	9	5	10	This is a very small subset of what might be included under coastal system (THOMAS SPENCER, University of Cambridge)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
180	38548	5	5	9	5	10	Coastal seas need to be defined. Presumably, this means waters overlying continental shelves. Ah, I see this definition appears on lines 19-20, but there is redundant text here. (Christopher Harley, University of British Columbia)	Box deleted. Coastal sea is not considered in this chapter.
181	40344	5	5	9	5	10	This is not a true definition and should be better clarified/defined. (Laura Petes, National Oceanic and Atmospheric Administration)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
182	44348	5	5	9	5	10	In the definition of coastal systems I suggest to include explicitely deltas and coastal lagoons too. (Ibáñez Carles, IRTA)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
183	47544	5	5	9	5	10	Definition of coastal system is not very clear. Not clear if list is exhaustive (in which case there are other environments not covered - such as cliffs and even beaches!) or if the inlcuded items are intended to define the scope (i.e. into estuaries and offshore into coastal seas). Why are mangroves (which seem to feature rather prominently in this chapter) and saltmarshes specifically mentioned? Suggest that this needs tightening up and the relation between coastal system and coastal zone articulating more explicitly. (Jon French, University College London)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
184	36342	5	5	9	5	21	Difference between coastal zone and coastal systems is unclear, e.g., within the 'coastal zone' paragraph the term 'coastal system' is used (line 18) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Box deleted. Figure 5.1 and accompany text provide the definitions used in this chapter.
185	37396	5	5	9	5	26	The box also does a poor job of outlining coastal systems, and the figure seems rather disappointing too. Are all these definitions on the remainder of this page needed in the chapter, would they not be more appropriate in a glossary, as in past assessments? (Colin Woodroffe, University of Wollongong)	Box deleted. Figure 5.1 and accompanying text provide the definitions used in this chapter.
186	42230	5	5	12	5	12	The defintion of coastal zone needs to be more specific about the inshore boundary (Denise Reed, The Water Institute of the Gulf)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
187	42012	5	5	12	5	13	The zone cannot be subject to very large environmental gradients; coastal zones are highly diverse and dynamics with an environmental gradients varying over time and space. (Liette Vasseur, Brock University)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
188	44746	5	5	12	5	21	ditto (Keqi Zhang, Florida International University)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
189	47173	5	5	12	5	21	Some small islands are considered all coastal particularly those of the Eastern Caribbean. But for the purposes of administration a narrower band is defined as the area on which coastal resources management will be effected. (e.g. Saint Lucia's Coastal Zone Management Policy and Action Plan). The real issue is that for small islands these shore areas are impacted by all anthropogenics activities in from upper watersheds to and including these shore and marine areas in temporal scales that are much shorter that for larger islands or continental land masses. To effectively treat these externalities, the source of these impacts must be addressed, which requires an integrated approach to the management of the use of resources. (see the 'Islands Systems Management' approach defined by Nichols et al (not peer reviewed).) (PS. Nichols et al here refers to Keith E. Nichols and not the Nicholls in the references). (Keith Nichols, Caribbean Community Climate Change Centre)	Box deleted. Noted but small islands are under chapter 29.
190	48704	5	5	12	5	21	In definition for Coastal Zone, outer limits are given but no clear terrestrial limit is provided, which is important given sea-level rise of 1+ m will affect increasing tracts of low-lying coastal margin. A useful policy-driven definition for coastal environment in the 2010 New Zealand Coastal Policy Statement (Policy 1), with two of the relevant characteristics being areas at risk from coastal hazards and physical resources and built facilities, including infrastructure, that have modified the voastal zone. Policy can be found at: http://www.doc.govt.nz/conservation/marine-and-coastal/coastal-management/nz-coastal-policy-statement/ (Robert Bell, NIWA)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
191	38128	5	5	18	5	19	Repetition. This is a very small subset of what might be included under coastal system (THOMAS SPENCER, University of Cambridge)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
192	44146	5	5	18	5	19	redundant (Anne Holsten, Potsdam Institute for Climate Impact Research)	Box deleted.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
193	44749	5	5	18	5	19	“Coastal systems include estuaries, coastal plains dominated by mangrove forests and salt marshes, coastal seas and human-built systems.” I think that “For purpose of this assessment,” started at line 18 on page 5 should be placed in front of the coastal system definition. (Keqi Zhang, Florida International University)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
194	44750	5	5	18	5	19	The sentence “For the purpose of this assessment, coastal systems and low-lying areas include estuaries, coastal plains dominated by mangrove forests and salt marshes, and coastal seas.” should be removed for avoiding repetition. (Keqi Zhang, Florida International University)	Box deleted.
195	46809	5	5	18	5	19	Don't need to redefine 'coastal systems', just refer to the definition in the paragraph above. It has already been defined in the text on page 4 and again within the definitions box. This sentence also brings in 'low-lying areas' as part of the 'coastal system' term, whereas it is included as making up part of the coastal system in Figure 1. Need to be clear whether 'low -lying areas' are part of 'coastal systems' or in addition to them. (Genevra Harker, HarmonicQuay Ltd)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
196	44751	5	5	19	5	21	Where is the landward boundary of the coastal zone? (Keqi Zhang, Florida International University)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
197	44183	5	5	20	5	20	Where is the boundary of coastal system? Between 110 and 146 m depth? The cited reference is too old? (RONGSHUO CAI, Third Institute of Oceanography)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
198	38123	5	5	20	5	21	I have difficulty with water depths in excess of 100 m being 'coastal' - and widths of 34 km. Might not a better definition be the limit of the influence of freshwater plumes and sediment discharges from major rivers? That seems to link the watersheds to the oceans in a process definition rather than one determined by structural geology / plate tectonics (THOMAS SPENCER, University of Cambridge)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
199	47483	5	5	20	5	21	The report mentions the average width of the coastal zone, but does not provide a range. It is probably worth pointing out that the marine boundary of the coastal zone can vary substantially, and the authors should include the distance over which the coastal zone varies, and not just the depth. The report also does not provide complementary information on the landward extent of the coastal zone. Many low gradient rivers can experience tidal effects 100s of km landward, and this is worth pointing out. This has implications for ecosystems, such as tidal freshwater forest, and implications for infrastructure, such as the, “Tidal Basin,” in Washington, DC where the Jefferson Memorial is located. (Alexander Kolker, Louisiana Universities Marine Consortium)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
200	42231	5	5	21	5	21	Marine part of the coastal zone' seems contradictory. This last clause provides little value added and is confusing. Suggest eliminating (Denise Reed, The Water Institute of the Gulf)	Box deleted. Marine part is not considered in this chapter.
201	36360	5	5	23	0	0	Figure 5-3: The lower panel shows three solid lines instead of 2 solid and 1 broken line (in a B&W hard copy). (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Figure 5.1 has been revised for clarity and be consistent with the text.
202	46810	5	5	26	5	26	Should 'coasts' refer to just 'coastal systems' or include 'low-lying areas'? Same issue as referred to in lines 18 and 19. (Genevra Harker, HarmonicQuay Ltd)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
203	45948	5	5	28	0	30	Ecosystems - the main coastal environments (which are stated to include coastal lakes and ice shelfs) are also somewhat inconsistent with the Coastal systems definition - I suggest making the wording more consistent across these definitions (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
204	47484	5	5	28	5	30	If the coastal zone extends to edge of the continental shelf, then these open water environments should be included in the list of coastal ecosystems. Also, the authors should keep construction parallel- are they referring to coastal, “environments” or coastal, “ecosystems?” (Alexander Kolker, Louisiana Universities Marine Consortium)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
205	49778	5	5	28	5	30	This definition is confusing. Ecosystems and coastal environments seem to be equated, which is inappropriate. (Susanne Moser, Susanne Moser Research & Consulting)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
206	46811	5	5	28	5	53	Be consistent with use of capital letters at the beginning of the definitions. (Genevra Harker, HarmonicQuay Ltd)	Box deleted.
207	52122	5	5	28	5	53	For the terms "ecosystem" and "ecosystem services," the author team should consider cross-referencing the glossary for the report, which also contains these terms. (Katharine Mach, IPCC WGII TSU)	Box deleted. Terms from the glossary are essentially from MEA 2005.
208	41679	5	5	28	6	10	I do not think the definitions of "ecosystem, ecosystem functions, etc." should appear here.They are for coast, ocean and other chapters dealing with encironmental issues. (Rui Zhang, Xiamen University)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
209	37905	5	5	29	5	30	This is missing a substantial ecosystem related to coastal dunes (Julian Orford, Queen\\\'s University, Belfast)	Box deleted. Coastal dunes are included under “Beaches, barrier and sand dunes”.
210	38129	5	5	29	5	30	The chapter now introduces some new environments. I think there needs to be a general tightening up of the text in this first part of the chapter to make for a more consistent list of what is included and why. (THOMAS SPENCER, University of Cambridge)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
211	38549	5	5	29	5	30	This misses a lot of important (and extensive) coastal ecosystems, such as the soft-sediment subtidal benthos. Also, if coral reefs merit inclusion as an environment, why not include other biogenic environments like mangroves and kelp forests? (Christopher Harley, University of British Columbia)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
212	40636	5	5	29	5	30	Coastal wetlands? (mangroves, saltmarshes, seagrasses, etc)? (Carmen Lacambra Segura, Grupo La era)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
213	42013	5	5	29	5	30	I would remove the sentence on coastal environments as the list is not complete and right. You're missing huge parts such as mangroves, salt marshes, etc. (Liette Vasseur, Brock University)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
214	44349	5	5	29	5	30	The inclusion of the cittion of Whitfield and Elliot (2012) in the definition of ecosystem is somewhat misleading, since the sentence refer to "coastal environments", which may be different form "coastal ecosystems". For instance, the intertidal flats may be considered an habitat rather than an ecosystemm as well as the rocky shores, that may also be considered as ecotones. I suggest to eliminate this citation from the definition. (Ibáñez Carles, IRTA)	Box deleted. Section 5.2 defines coastal systems and what are included in coastal systems.
215	37906	5	5	30	5	30	Missing reference Whitfield and Elliot 2012. (Julian Orford, Queen\\\'s University, Belfast)	NA – box deleted.
216	42014	5	5	32	0	0	ecosystem functions do not only satisfy human needs but also ALL organisms. I would change this. (Liette Vasseur, Brock University)	Box deleted. Ecosystem functions defined according to MEA 2005.
217	38130	5	5	32	5	53	The final line here says that ecosystem services are defined by ecosystem functions. But the list of functions given are not the standard ecosystem services terms that are normally used. These would be regulating; provisioning; supporting and cultural ecosystem services. I would prefer the use of these standard Millennium Assessment terms. Also, this text should be revised to give an overtly coastal focus to this point. This, for example, coral reefs provide REGULATION of incident oceanographic swell conditions to control reef and lagoon circulation, reduce shoreline erosion, protect beaches and coastlines from storm surges, and control beach and island formation; PROVISION of food resources (fisheries) and aggregates for building (coral and sand), as well as the provision of land surface area and associated subsurface water resources, especially through reef island construction; SUPPORT nutrient cycling and active carbonate production to build reef and reef island structures, and; CULTURAL benefits that include spiritual identity for indigenous communities and potential for tourism and recreation-based income (THOMAS SPENCER, University of Cambridge)	Box deleted. List of standard ecosystem functions are stated and defined according to MEA 2005.
218	40345	5	5	32	5	53	This re-categorizing and primary emphasis on ecosystem "functions" as opposed to ecosystem services will be confusing to readers. Most people are familiar with (and have been applying) the Millennium Ecosystem Assessment categories of services (provisioning, regulating, supporting, cultural). Would recommend focusing on these as opposed to the "functions" categories. (Laura Petes, National Oceanic and Atmospheric Administration)	Box deleted. Ecosystem functions are listed and defined according to MEA 2005.
219	39413	5	5	33	0	0	These *may be* classified into four categories', or 'these *have been* classified into four categories for many global and national assessments:' (There is no absolute reason why there are four categories, nor why they must be these specific ones - the de Groot et al typology has not exactly been totally non-problematic....) (Sarah Cornell, Stockholm Resilience Centre)	Box deleted. Ecosystem functions are listed and defined according to MEA 2005.
220	42015	5	5	44	0	0	Why not putting reference functions are defined in the text instead of information function which sounds weird? (Liette Vasseur, Brock University)	Box deleted. Ecosystem functions are listed and defined according to MEA 2005.
221	43132	5	5	44	5	47	The mention of "reference function" is stimulating, but is there really any evidence that this exists "Because most of human evolution took place within the context of undomesticated habitat"? (Adrian HAYES, Australian National University)	Box deleted. Ecosystem functions are listed and defined according to MEA 2005.
222	38125	5	5	49	5	53	A more up to date reference would be to the UK National Ecosystem Assessment. NEA 2011. UK National Ecosystem Assessment Technical Report (THOMAS SPENCER, University of Cambridge)	Box deleted. Ecosystem functions are listed and defined according to MEA 2005.
223	39412	5	5	49	5	53	Better to work with the TEEB framing of ecosystem services. See also Fisher and Turner 2008 for explanation of need to distinguish benefits from services. Also - 'as well as non-material cultural services such as *opportunities for* spiritual enrichment...' (Sarah Cornell, Stockholm Resilience Centre)	Box deleted. Ecosystem functions are listed and defined according to MEA 2005.
224	39418	5	5	51	6	3	This introductory paragraph repeats content in the box - perhaps rewrite to explain briefly why clear definitions are needed, where these definitions have come from and how they relate to other key global policy discourses. Perhaps indicate that this chapter also relies on core definitions (vulnerability etc) described in chapter 1. (Sarah Cornell, Stockholm Resilience Centre)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
225	47546	5	6	0	0	0	Section 5.2.2.1.2 comment: The McInnes et al 2011 paper is cited here but one of its key points - that the effect of wind climate changes on coastal floodin is likely to be less significant than the effect of sea-level rise on extreme water levesls is missed. Also, other studies point to the senstivity of estuary sediment budgets (and possibly whether particular systems may continue to import or shift to net sediment export). One of of these is French JR, Burningham H & Benson T (2008) Tidal and meteorological forcing of suspended sediment flux in a muddy mesotidal estuary. Estuaries and Coasts 31, 843-859. DOI: 10.1007/s12237-008-9072-5 - which demonstrates the strong sensitivity of the sediment flux in muddy estuaries to small changes in the frequency of extreme winds. So not just open coasts that are obviously dominated by waves are affected. Wind direction changes are also important. A recent paper by Bruneau N, Fortunato AB, Dodet G, Freire P, Oliveira A & Bertin X (2011) Future evolution of a tidal inlet due to changes in wave climate, sea level and lagoon morphology (Óbidos lagoon, Portugal). Continental Shelf Research, 31: 1915-1930. DOI:doi:10.1016/j.csr.2011.09.001 makes this point rather well and shows how it is not significant wave height but rather wave direction that drives coastal change. There are probably other papers that make a similar point though the Brunneau et al study is one of the best, I think. (Jon French, University College London)	A new Section 5.4.3.3. on climate related drivers has been drafted. Consistency with the findings and references used in WG1 has been the main objective. Most of your comments area covered in the new draft. The effect of wave direction has been included in section 5.4.2.1. on beacher, barriers and sand dunes.
226	47547	5	6	0	0	0	Section 5.2.2.1.2 comment: The sub-section from lines 4 to 16 on p 7is perhaps a bit too focused on oceans now that these are considered separately (ch 6). I wonder if more coastal/ studies could be included. On line 18, limitations of the length of historical wind records are alluded to, with a citation of McInnes et al 2012. I'm not sure that this is quite correct - McInnes et al rightly argue that one of the main problems is the large uncertainty around the predictions of wind climate change, and I don't think they explicity comment on a lack of historical wind data (which would not seem to be any more of an issue than a lack of historic sea-level data). (Jon French, University College London)	New Section 5.4.3.3. on climate related drivers has been drafted. Consistency with the findings and references used in WG1 has been the main objective.
227	39415	5	6	1	0	0	Number mismatch: Habitat should be single to match 'environment' (Sarah Cornell, Stockholm Resilience Centre)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
228	42016	5	6	1	0	0	add "an" before assemblage (Liette Vasseur, Brock University)	Box deleted.
229	44350	5	6	1	6	1	The definition of habitat also includes biotic factors, such as dominant vegetation. I suggest to eliminate "physical" from the definition. (Ibáñez Carles, IRTA)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
230	46812	5	6	1	6	1	Would be useful to cross-reference habitats with ecosystems given both refer to the 'environment' in which things live (or refer to habitats with the ecosystems definition). (Genevra Harker, HarmonicQuay Ltd)	Box deleted. The definitions have been revised to be also self-evident in section 5.2.
231	39416	5	6	3	0	0	Low-lying areas - should mention land somewhere… (Sarah Cornell, Stockholm Resilience Centre)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2.
232	38131	5	6	3	6	3	Mean High Water Springs? The limit of salt spray? The tidal limit in estuaries? The limit of the saltwater wedge? (THOMAS SPENCER, University of Cambridge)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2 – areas near to mean sea level.
233	44752	5	6	3	6	3	"Low-lying areas: Area or range where…" I think that "Low elevation" should be added in front of "Area or range…". (Keqi Zhang, Florida International University)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2 – areas near to mean sea level.
234	36343	5	6	3	6	4	Definition of 'low-lying' areas is puzzling, should it not simply be "area or range that is situated close or under the mean sea level"? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2 – areas near to mean sea level.
235	40346	5	6	3	6	4	Need a stronger definition for low-lying areas. Does this refer to a specific elevation? Area or range of what? In many areas (not just low-lying areas), coastal processes and climate-related factors interact to affect impacts. (Laura Petes, National Oceanic and Atmospheric Administration)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2 – areas near to mean sea level.
236	44351	5	6	3	6	4	The definition of "low-lying areas" is confusing. The definition of the Cambridge Dictionary says that a the adjective low-lying describes "land that is at or near the level of the sea". (Ibáñez Carles, IRTA)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2 – areas near to mean sea level.
237	46813	5	6	3	6	4	Don't 'low-lying areas' have a geographical necessity to be, at most, only a few metres above sea level? The existing definition implies that low-lying areas can be at sea - is this intentional? The definition of 'low-lying areas' needs to be much clearer. (Genevra Harker, HarmonicQuay Ltd)	Box deleted. "Low-lying areas" is made clear in the first sentence of section 5.2 – areas near to mean sea level.
238	39417	5	6	5	0	0	Any factor *causing change in the system* that exceeds natural levels of variation. Also repeated in 5.2.2.1 page 6 line 19 - not ideal. (Sarah Cornell, Stockholm Resilience Centre)	NA - Box deleted.
239	42232	5	6	6	6	6	Unclear what is meant by 'natural levels of variation'. Does this mean 'historic' or natural vs anthropogenic. The implication is that only extreme conditions produce or drive change. This is an unusual defintion of the term 'driver' and requires clarification. (Denise Reed, The Water Institute of the Gulf)	NA – Box deleted.
240	44753	5	6	6	6	6	"Drivers: Any environmental or biotic factor that exceeds natural levels of variation." I think that this definition is somewhat indirect and difficult to grasp. The driver is a factor or force that has effect on the changes of a system. Why don't you define the climate driver directly such as "a factor or force that has effect on Earth's climate changes"? (Keqi Zhang, Florida International University)	Box deleted. Drivers are considered in section 5.3.
241	36344	5	6	6	6	10	Find the term 'driver' a bit confusing and cannot find the reference to check this definition (is also not in the list of references). For example, light can be 'driving' primary production within its natural levels of variation. Looking at other papers by Breitburg, I find her term 'stressor' much more approriate here (see also: Busch D.E. & J.C. Trexler (2003) Monitoring Ecosystems. Island Press) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Box deleted. Drivers are considered in section 5.3.
242	46814	5	6	6	6	10	The definitions should be in alphabetical order. (Genevra Harker, HarmonicQuay Ltd)	NA - Box deleted.
243	46815	5	6	6	6	10	Doesn't a 'driver' also have a functional definition that is results in changes in other parameters? The existing definition purely states that drivers exhibit a wide range of variation, but this need not induce changes in other factors. Aren't they forcing phenomena that create change? (Genevra Harker, HarmonicQuay Ltd)	Box deleted. Drivers are considered in section 5.3 and definition is in 5.3.1.
244	49779	5	6	6	6	10	What about social drivers? And if not included here, where ddo they fall and should they not also be explicitly defined. (Susanne Moser, Susanne Moser Research & Consulting)	Box deleted. Human drivers are considered in section 5.3.4.
245	40347	5	6	6	6	23	This paragraph/definition is basically repeated twice. (Laura Petes, National Oceanic and Atmospheric Administration)	Box deleted. Drivers are considered in section 5.3 and definition is in 5.3.1.
246	47682	5	6	6	6	29	"The discussion of drivers could be revised to make it clear if a driver is a cause or in what ways the concept can be distinguished from a cause in the sense of a necessary and/or sufficient condition for some consequence. (Bob Pokrant, Curtin University)	Box deleted. Drivers are considered in section 5.3 and definition is in 5.3.1.
247	35615	5	6	6	19	29	The definition provided for drivers is confusing: according to the definition of Breitburg, teleconnection patterns would be exceeding natural levels of variation ? (Goneri Le Cozannet, BRGM)	Box deleted. Drivers are considered in section 5.3 and definition is in 5.3.1.
248	36341	5	6	12	0	0	Box 5-1: Because these definitions form the backbone of the line of reasoning, they should be fully clear and non-overlapping. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Box deleted. Figure 5.1 and accompany text provide the definitions used in this chapter.
249	36345	5	6	12	0	0	Box 5-1: Add 'climate indices' to the box (Catharina Philippart, Royal Netherlands Institute for Sea Research)	NA – box deleted.
250	36346	5	6	12	0	0	Box 5-1: You might consider to add 'climate indicators' as well (assuming that you will refer to this later on) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	NA – box deleted.
251	43266	5	6	15	9	8	In this interesting section on physical changes I missed reference to the respective WGI chapters? (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The topics covered in these sections in the FOD have been moved to new sections 5.3 in the SOD and substantially rewritten with appropriate referencing to WGI chapters
252	49780	5	6	15	11	52	This entire section should be carefully cross checked against the relevant chapters in WR1; also seems like a lot of recent refs missing (cited in Moser,Williams and Boesch, in press; submitted to the TSU) (Susanne Moser, Susanne Moser Research & Consulting)	This section has been substantially revised and cross-referencing to WG1 chapters has been included

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
253	42730	5	6	17	0	0	Comment on Section 5.2.2.1: Please distinguish clearly (1) mean sea level rise, (2) increase in storm surges due to cyclone intensification, and (3) increase in storm water levels due to mean sea level rise and/or storm surge intensification. (Hiroyasu Kawai, Port and Airport Research Institute)	This section has been substantially revised and distinguishes between sea level rise and changing storm surges
254	44754	5	6	19	6	20	ditto (Keqi Zhang, Florida International University)	Not sure what 'ditto' is referring to in this sentence
255	47485	5	6	19	6	23	. I don't like this definition of a driver. It suggests that processes with low levels of variability are not drivers. This definition suggests that the sun is not a driver of photosynthesis, since it's brightness rarely exceeds its natural level of variability. Obviously, this wouldn't make sense, and as such, this definition should be changed. (Alexander Kolker, Louisiana Universities Marine Consortium)	in th SOD a specific section 5.3. on drivers is included. A broad general definition is given and each of the different of driver is given and each of the different drivers considered are described next
256	47486	5	6	19	6	23	I suggest changing the definition of a driver into something like a forcing function. A physical, chemical, geological or biological process or action is a process that forces another process or action (Alexander Kolker, Louisiana Universities Marine Consortium)	See response to comment #255.
257	44352	5	6	19	11	52	In section 5.2.2 the definition of "drivers" is not clear. In the environmental terminology a driver is the underlying cause or driving force leading to an environmental change. I suggest to use the DPSIR framework of the European Environmental Agency (EEA) to clarify the issue. The EEA assesses the "state" (S) of the environment using the "DPSIR methodology". Namely, the state (S) is the result of specific drivers (D) and pressures (P), positive or negative, which impact (I) the environment. The responses (R) represent the solutions (e.g. policies, investments) for what should then be done to improve or maintain that state. According to this, "climatic drivers" would be "greenhouse gas emissions", "land-use changes", etc., whereas pressures would be changes in "temperature", "sea-level", "wind", "acidification", etc., and "impacts" would be "erosion", "flooding", "vegetation changes", etc. The considered drivers are actually (climatic and non-climatic) are actually "pressures" according to the DPSIR framework. (Ibáñez Carles, IRTA)	The terminology used here is consistent with the IPCC glossary. Please, see new section 5.3.
258	42783	5	6	21	6	26	This section needs to be made consistent with the SREX conclusions on tropical cyclone intensity trends (Sofia Bettencourt, World Bank)	Done
259	42906	5	6	21	6	26	Please consider including discussion on the combined effect of projected changes in tropical cyclone activity and sea level rise on the severity of storm surge impact in the 21st century. This could echo the discussion in 5.4 on "Projected Impacts". References : - Knutson, T. R., J. McBride, J. Chan, K. A. Emanuel, G. Holland, C. Landsea, I. Held, J. Kossin, A. K. Srivastava, and M. Sugi, 2010: Tropical cyclones and climate change. Nature Geoscience, 3, doi: 10.1038/ngeo779. - Brecht, H., S. Dasgupta, B. Laplante, S. Murray, and D. Wheeler, 2012: Sea-level rise and storm surges: high stakes for a small number of developing countries. J. Environment and Devel., 21, 120-138. - Hoffman, Ross N., Peter Dailey, Susanna Hopsch, Rui M. Ponte, Katherine Quinn, Emma M. Hill, Brian Zachry, 2010: An Estimate of Increases in Storm Surge Risk to Property from Sea Level Rise in the First Half of the Twenty-First Century. Wea. Climate Soc., 2, 271–293. doi: 10.1175/2010WCAS1050.1 - Mousavi, M. E., J. L. Irish, A. E. Frey, F. Olivera, and B. L. Edge, 2010: Global warming and hurricanes: the potential impact of hurricane intensification and sea level rise on coastal flooding. Climatic Change, doi:10.1007/s10584-099-9790-0. - Lin, N., K. Emanuel, M. Oppenheimer, and E. Vanmarcke, 2012: Physically based assessment of hurricane surge threat under climate change. Nature Clim. Change, doi:10.1038/NCLIMATE1389 (Sai-ming Lee, Hong Kong Observatory)	A discussion on the combined effect of SLR and cyclone intensity changes is provided in section 5.3.3.2
260	39419	5	6	22	6	23	This last sentence is a great introductory sentence for the section… rather dilutes the impact of the sub-section where it is, though. (Sarah Cornell, Stockholm Resilience Centre)	Does not apply. New section drafted
261	37397	5	6	26	6	29	I find this an odd statement. Indices such as ENSO do tell us about climate variability, but do the indices themselves tell us about ecological effects? Reword (Colin Woodroffe, University of Wollongong)	Deleted. New section drafted
262	42233	5	6	27	6	29	I disagree that indices are useful to investigate the ecological effects of climate change. They might demonstrate that change is occurring but the mass of potentienal processes encompassed within the indices reduces their explanatory power in understanding change. (Denise Reed, The Water Institute of the Gulf)	Deleted
263	38726	5	6	28	0	29	The use of Climate indices has some utilities but has some problems related with uncertainties at local or regional scales. I suggest changing the reference of Stenseth 2002 by this new of the same author: Nils Chr. Stenseth, Geir Ottersen, James W. Hurrell, Atle Mysterud, Mauricio Lima, Kung-Sik Chan, Nigel G. Yoccoz and Bjørn Ådlandsvik 2003 Review article. Studying climate effects on ecology through the use of climate indices: the North Atlantic Oscillation, El Niño Southern Oscillation and beyond. Proc. R. Soc. Lond. B 2003 270, 2087-2096. This paper reviews the utilities, the advantage and disadvantages about the use of Climatic index, and not always or not in all analysis their use are really useful; in some cases their use obscure a good interpretation (Ricardo Anadon, University of Oviedo)	Deleted
264	50212	5	6	28	6	29	It would be beneficial to clarify further how these indices are useful to investigate the effects of climate change. (Katharine Mach, IPCC WGII TSU)	Deleted
265	41680	5	6	32	0	0	The title of 5.2.2.1.1. is not understandable. (Rui Zhang, Xiamen University)	The section has now been restructured under the heading 'relative sea level rise'

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
266	37641	5	6	32	6	47	With respect to Section 5.2.2.1.1: The text states that “Current observations show large regional variability around the global mean trend on interdecadal periods.” (Line 39-40). Perhaps the implications of this could be highlighted through the addition of a line or two following the statement made in Lines 46-47? That is, that owing to natural variability the impacts will be somewhat incremental (non-steady), there will be an “ebb and flow” so to speak as the sea level rises but rises and falls in response to natural variability. This also means that impacts will be non-uniform, (for this and other reasons) they will vary in scope and timing. (John J. Marra, NOAA)	This point is now made in section 5.3.2
267	45866	5	6	32	6	47	Please include the latetst WG projections here, possible including regional variations (Laurens Bouwer, Vrije Universiteit Amsterdam)	Section 5.3.2 includes WG1 projections and discusses regional variations
268	38126	5	6	34	6	34	I think it would be helpful here also to draw attention to variability in sea level as well as long-term trends. Thus equatorial Pacific ENSO-related sea level variations can be of the order of 40 cm - very similar to the lower end of sea level rise predictions. (THOMAS SPENCER, University of Cambridge)	Variability in sea level is now discussed in section 5.3.2
269	50213	5	6	34	6	35	It would be preferable to indicate more specifically the nature of risks posed by the sea level rise and extreme sea levels, to complement and explain "major threat" and "major concern." (Katharine Mach, IPCC WGII TSU)	These are now mentioned in the first sentence of 5.3.2
270	37398	5	6	34	6	47	The first three statements, until line 44 are good and well considered (the third statement presenting a more understandable point than the way this is expressed on page 2, line 49). But the final two lines repeat the vague comment I have criticised above (page 2, line 50). (Colin Woodroffe, University of Wollongong)	These lines are now removed
271	47488	5	6	34	7	2	I think that it is worth noting that winds can play an important role in the year-to-year variability in sea level. This is important because year-to-year variability is often 1-2 orders of magnitude greater than the trend (cm scale vs mm scale), and thus has implications for our interpretation of sea level records and our understanding of coastal impacts. (Alexander Kolker, Louisiana Universities Marine Consortium)	This point is similar to comment 268 and is now addressed in section 5.3.2
272	47489	5	6	34	7	2	The authors may want to review the following citations for the above comment: Hong, B. G., W. Sturges, and A. J. Clarke. 2000. Sea level on the US East Coast: Decadal variability caused by open ocean wind-curl forcing. Journal of Physical Oceanography 30:2088-2098. Kolker, A. S., S. L. Goodbred, S. Hameed, and J. K. Cochran. 2009. High resolution records of coastal systems responses to short-term sea-level variability. Estuarine, Coastal and Shelf Science 84:493-508. Kolker, A. S. and S. Hameed. 2007. Meteorologically driven trends in sea level rise. Geophysical Research Letters:DOI:2007GL021814. Sturges, W. and B. C. Douglas. 2011. Wind effects on estimates of sea level rise. Journal of Geophysical Research - Oceans 116:C06008. Woodworth, P. L., N. Pourveau, and G. Woppelman. 2010. The gyre-scale circulation of the North Atlantic and sea level at Brest. Ocean Science 6:185-190. (Alexander Kolker, Louisiana Universities Marine Consortium)	Due to space constraints, the section on winds has been shortened and combined with wave climate changes, referring now to just mainly the synthesis statements from WGI and SREX. A number of the references mentioned here are discussed in Chapter 3 of WGI
273	46704	5	6	35	6	36	It has also been recently discussed that increased RSL will increase the expected flood zone areas resulting from a tsunami. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Section 5.3.2 now makes reference to this point
274	47545	5	6	38	6	39	Uncertainties should be specified here, I think. (Jon French, University College London)	Section 5.3.2 quotes the ranges of observed sea level rise
275	50214	5	6	38	6	43	As calibrated uncertainty language, "virtually certain," "likely" and "very likely" on lines 38, 42, and 43 should be italicized. (Katharine Mach, IPCC WGII TSU)	Uncertainty language has been italicised
276	37283	5	6	40	6	40	Please add: "This variability is reflected in an investigation on improved estimates of mean sea level changes in the German Bight over the last 166 years that have been analyzed from records of 13 tide gauges covering the entire German North Sea coastline to derive high quality relative mean sea level time series. The analysis reveals two periods of accelerated SLR commencing at the end of the nineteenth century and from the 1970s on with a post-1990 intensification but with significant deviations among the depicted stations (Wahl et al., 2011).", Full citation: Wahl, T., Jensen, J., Frank, T., Haigh, I.D.: Improved estimates of mean sea level changes in the German Bight over the last 166 years, (2011), Ocean Dynamics, 61 (5), pp. 701-715. (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	Due to space constraints, we are not able to provide a detailed discussion of this paper
277	38727	5	6	42	0	44	I suggest to include the idea that uncertainties about the impacts of SLR was in a great part related with uncertainties in forecast SLR. See the chapter 1. (Ricardo Anadon, University of Oviedo)	Done to substantial revisions to the original
278	37912	5	6	42	6	42	There is a case to be made concerning extreme HW annual rate changes operating at different rates to MSL due to anthropogenic impacts of polderisation of deltas. Contribution of MSL is only a minority contribution to HW rate increase in a Bangladesh estuary (work in progress- Pethick & Orford). (Julian Orford, Queen\\\'s University, Belfast)	Due to space limitations, we are not able to mention all factors operating to change high waters. Furthermore, the points we make need to be backed up by appropriate peer reviewed literature
279	44184	5	6	42	6	42	extreme sea levels' could be replaced by 'extreme sea level events'? (RONGSHUO CAI, Third Institute of Oceanography)	We choose to retain the term extreme sea levels in the newly revised section, because the extremes that are being referred to in these studies may be as a result of a discrete event such as a tropical cyclone but they may also be due to other contributions to extremes such as tides for which the term 'events' is not appropriate

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280	35289	5	6	42	6	47	In the first paragraph, it may be important to reflect the conclusion of Chapter 13 of WGI that mean sea-level rise will be the principal contributor to increases in extreme sea levels (Chapter 13 has made the decision NOT to use the term "water level" in this context). In the second paragraph, there is reference to locations "currently experiencing coastal erosion and inundation", with which I agree, but there should be a supplementary remark about how those locations NOT currently experiencing coastal erosion and inundation are highly likely to do so in the next few decades. It may also be worth making comments in this section about (a) the effects of 21st-century sea-level acceleration and (b) the effects of subsidence (cf. section 5.2.2.2.4) in amplifying the relative sea-level rise locally. (Patrick Nunn, University of New England)	Conclusions of Chapter 13 are now summarised in a new section 5.3.2. the term 'water level' is not used in the redrafted section.
281	44744	5	6	43	6	44	ditto (Keqi Zhang, Florida International University)	Not sure what 'ditto' is referring to in this sentence
282	39420	5	6	44	0	0	Parentheses on (Seneviratne (Sarah Cornell, Stockholm Resilience Centre)	Done
283	50215	5	6	47	6	47	A reference here should also be provided for chapter 3 of the special report on extremes. (Katharine Mach, IPCC WGII TSU)	This section has been rewritten and appropriate references included
284	37399	5	6	50	6	53	This is an example where I think the writing team needs to consider its priorities and organise accordingly. I agree that 5.2.2.1 should have sea level as the key point, but I think the second point, 5.2.2.1.2 ought to be storms, not wind alone. Wind has not featured prominently in the literature on coastal vulnerability, except in the context of storms. (Colin Woodroffe, University of Wollongong)	This section has been reorganised. Tropical and extra tropical cyclones are discussed in the one section and a discussion of winds is combined with that of waves
285	45867	5	6	50	7	33	This section should have many more X-references to AR5 WG1, and be brought in line with their statements, rather than being a stand-alone piece on TCs (Laurens Bouwer, Vrije Universiteit Amsterdam)	This section has been substantially revised and provides a brief cross-reference to the key AR5 WG1 assessments
286	46387	5	6	50	7	33	There is some research on western indian ocean cyclones trends Mavume et al 2009 Climatology and landfall of tropical cyclones in the south west Indian Ocean, Western Indian Ocean J Mar Science vol 8, no 1, pp 15-36 (Andrew Mather, eThekwini Municipality)	Thanks for the reference. We have forward it to WGI relevant chapter since assessing ocean cyclone trends is part of their work.
287	42782	5	6	52	7	2	Extreme winds can also exacerbate drought conditions on crops - in Southern Madagascar, for example, stronger winds dry up the already scarce rainfall. (Sofia Bettencourt, World Bank)	This is an interesting point but not one which immediately fits in to the restructured chapter
288	39422	5	6	52	7	33	Guide the reader through the structure more clearly here - the issue of changing patterns of storminess appears in various places, and it is not clear what the punchline really is. Lines 5-6 are just plain confusing - 'report declining or increasing trends'... How about 'Most of these studies report trends on continental areas.' Then move lines 18-19 here, along with the other text on divergent findings. Lines 9-16 are very detailed and technical in tone compared to the rest of the section, leaving the key findings not that clear in that paragraph I think they should also follow directly from the sentence lines 6-7, rather than the paragraph break between them. Then in the later end of the sub-section, the use of extreme events now as analogues for future changes needs to be spelled out less ambiguously. (Sarah Cornell, Stockholm Resilience Centre)	This section has been substantially reorganised to make the punchlines clearer with more referencing to AR5 WGI assessments on past and projected changes.
289	46816	5	6	53	6	53	'and' to navigation rather than 'or'. (Genevra Harker, HarmonicQuay Ltd)	Noted
290	47487	5	6	53	7	1	The document states that long-term changes in winds can affect dune stability. While this is certainly true, it might be worth noting that short-term changes in winds, particularly wind-driven storm surge, can also affect dune stability. (Alexander Kolker, Louisiana Universities Marine Consortium)	Wording has been changed to reflect that storm surges play a role. Note that this revised material now appears in section 5.3.3.2
291	37400	5	7	1	0	0	Alterations to dune stability because of wind is a very minor point, and reinforces my suggestion that this section should be on storms, rather than wind. If it continues to discuss wind, then surely the effect of sea breezes should be considered. (Colin Woodroffe, University of Wollongong)	Restructuring has led to the discussion of winds together with waves and attention has been given to the balance of the discussion in the context of other important coastal drivers
292	46705	5	7	1	7	1	I would proposed replacing "the stability of sand dunes, or the wave climate" with "sediment dynamics and shoreline processes" to reflect that changes in prevailing winds do not just impact the sediments that make up dune systems. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Wording has been changed as suggested. Note that the sentence now appears in section 5.3.3.2
293	42017	5	7	4	7	7	This paragraph is very weak and contradicts other chapters and papers. There is a need to add references and make it clearer. For example, the paper of Young et al. (2011) should be cited here, although it is in the next paragraph. It might be better to integrate these two paragraphs. (Liette Vasseur, Brock University)	This paragraph has been removed and the discussion on winds is discussed more briefly in a combined section on wind and waves
294	50216	5	7	4	7	16	The author team should consider and cross-reference the findings of the working group 1 contribution to the 5th assessment report for these statements. Additionally, citations should be provided for the paragraph on lines 4-7. Also, for the database described on line 10, what years/decades did this 23-year database span? (Katharine Mach, IPCC WGII TSU)	These sentences have either been deleted or revised with appropriate citing of WG1
295	36348	5	7	4	7	19	You are referring to changes in wind fields in the oceans: does this mean that there is no specific information on (changing) wind fields in coastal zones available? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	We have strengthened the link between the wind changes by discussing them together with wave climate. The text related to winds has also been shortened
296	41681	5	7	4	7	19	It seems they are data from ocean, not coast. (Rui Zhang, Xiamen University)	Trends in ocean winds is now linked to the discussion around ocean waves and has also been shortened
297	44185	5	7	4	7	19	What is the paragraph purpose for the introduction of wind stress in the ocean? There are also some studies on the wind stress in the ocean based on the reanalysis data, not only based on the in situ observation. In additon, it should be paid attention on that East Asian monsoon and wind stress fileds in East Asian seas exhibit a decreasing after the East climate jumpt around 1976/77, if the chapter 5 wants to discuss the wind stress in the ocean again. (RONGSHUO CAI, Third Institute of Oceanography)	The discussion on winds and wind stress in the ocean has been modified to make its relevance to coastal systems clearer.
298	39421	5	7	6	0	0	Only a limited number of studies - not 'limited studies' (Sarah Cornell, Stockholm Resilience Centre)	This has been corrected
299	37907	5	7	9	7	9	Missing ref Xue 2012 (Julian Orford, Queen\\\'s University, Belfast)	This reference is no longer cited.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
300	37401	5	7	9	7	16	This is more marine than coastal. I do not think this belongs here. Coasts may have their own wind climate (sea breezes). Comments like these belong in one of the ocean chapters rather than here (Colin Woodroffe, University of Wollongong)	The discussion on winds has been shortened and combined with the section on waves
301	45951	5	7	12	0	16	appears to be inconsistency in statements - if the mean increase for oceans is 0.25% (line 12) then the central north Pacific at 0.25% (line 15) isn't a "significant exception" (line 14) (Sybil Seitzinger, International Geosphere-Biosphere Programme)	The discussion on this study has been shortened and caveated
302	50217	5	7	18	7	30	Calibrated uncertainty language on these lines should be italicized; please check line 18, 24, 29, 30. Also, it could be helpful to clarify on line 26 that the major threat exists, independent of climate change. (Katharine Mach, IPCC WGII TSU)	We have checked for and italicized calibrated uncertainty language
303	37402	5	7	21	7	26	This paragraph needs re-structuring. Its first sentence is back to front in my view. This whole section should be on storms, and winds discussed as a component of storms, rather than storms being discussed as a component of a section on winds. The relative size of 5.2.2.1.1. on sea level and 5.2.2.1.2 on 'storms' is a little surprising as one would expect that there had been much more written on sea-level rise than on storm impact (related to climate change). (Colin Woodroffe, University of Wollongong)	Winds are no longer discussed in the section but rather more briefly together with waves due to the strong linkage between the two
304	36349	5	7	21	7	33	Would it be possible to include a map of the areas with a high probability of tropical cyclones to indicate where the 'high risk' areas are? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Such a map cover ocean areas and is not considered for this chapter.
305	41682	5	7	21	7	33	I think we should cross cite CH6 and CH30 here and save some words. (Rui Zhang, Xiamen University)	For completeness we have elected to retain a brief synthesis of the key findings regarding observed trends and future projections of climate drivers relevant to the coastal zone here in this chapter
306	37908	5	7	23	7	23	Need to decompose impacts of cyclones and associated surges: immediate effects and subsequent effects, the latter includes salinisation of soils which can lead to destabilisation of subsitence farming: re longterm impact of Aila in West Bengal leading to destabilisation of subsistence-dependent families. (Julian Orford, Queen\\\'s University, Belfast)	The subsequent effects of salinisation from from cyclone surge and wave overwash are now discussed in the first paragraph of the box
307	38728	5	7	24	0	25	In chapter 1 (from WG I) is referred that cyclone activity are increased in intensity with high confidence, but not in number. I suggest to introduce this aspect in the paragraph (Ricardo Anadon, University of Oviedo)	The section on cyclones now cross references WG1 and SREX findings
308	42018	5	7	25	0	0	Remove the word "still": this sentence is weak but the still does not add to it. (Liette Vasseur, Brock University)	Winds are no longer discussed in the section but rather more briefly together with waves due to the strong linkage between the two
309	46817	5	7	26	7	26	Is the statement that about 90 tropical cyclones occur each year saying that there has not been any detectable change in the number occurring each year since the mid-1970s? This needs to be clearer given the rest of the paragraph is talking about the uncertainty of the observations, but also about whether there has been an increase in cyclones. (Genevra Harker, HarmonicQuay Ltd)	This statement is now referenced and is made in the introductory section to provide broad context.
310	44186	5	7	28	7	33	The impacts of cyclones variation on coast system should be focus on, not the cyclone itself. (RONGSHUO CAI, Third Institute of Oceanography)	Since cyclones are relevant to the coastal zone, the purpose of these section is to summarise their likely observed and their projected future changes so we do to some extent focus on the cyclone itself, although the coastal conext is mentioned at the outset
311	38132	5	7	37	0	0	Box 5-2. This may not be the best place to make this comment but there needs to be care as 'a one size fits all' argument does not apply to tropical hurricane and cyclone impacts. There is a strong interaction between storm track orientation, regional bathymetry and nearshore hydrodynamics. Thus, for example, the south to north track of Hurricane Donna (1960) produced a 4m storm surge in the Middle Florida Keys as water was driven north across Florida Bay; by comparison, the east to west track of the similar strength Hurricane Betsy (1965) across the bay resulted in a lower storm surge at Key Largo (Perkins and Enos, 1968). Second, in coral reef environments there are non-linear relationships between storm intensity, storm type and geomorphic damage. Whereas hurricanes with typical windspeeds of 120 – 150 km h-1 result in a patchwork of impacted and non-impacted areas, determined by water depth, reef front aspect and reef topography in relation to storm direction, severe storms, with windspeeds in excess of 200 km h-1, may overcome the structural resistance of the reef as a whole, reducing 3-D complexity to an unstable rubble plain, unconducive to coral re-establishment, and producing a hiatus to reef recovery lasting for up to 50 years. Hurricanes with slow forward speeds result in prolonged coastal wave attack and beach scouring which is felt for hours to days in advance of the wind stress; these systems can be large in extent and be accompanied by high rainfall and extensive flooding of low-lying areas. By comparison, compact, fast moving and intense hurricanes (such as Hurricane Andrew (1992)) generate little wave scour but rather brief but extremely strong unidirectional currents and onshore surges, particularly where enhanced by wave shoaling or funnelled through narrow passes between islands. Such storms leave beaches and coastal barriers relatively intact but do great damage to subtidal seagrass meadows (Tedesco et al., 1995). Third, hurricanes are often only the trigger for ongoing biogeomorphological response: thus Knowlton et al. (1981) document ongoing coral mortality following Hurricane Allen (1980), an order of magnitude more severe than the impact of the storm itself, and more than two years after Hurricane Donna, storm-damaged mangrove was still dying in the Florida Keys (Craighead and Gilbert, 1962). Craighead, F.C. and Gilbert, V.C. (1962). The effects of Hurricane Donna on the vegetation of southern Florida. Quarterly Journal of the Florida Academy of Sciences, 25, 1-28. Tedesco, L.P. et al. (1995). Impact of Hurricane Andrew on South Florida's sandy coastline. Journal of Coastal Research, Special Issue, 18, 59-82. Perkins, R.D. and Enos, P. (1968) Hurricane Betsy in the Florida-Bahama area – geologic effects and comparison with Hurricane Donna. Journal of Geology, 76, 710-7. And see my earlier comment on page 4, line 32. I think it would be helpful to have some discussion of developed country impacts too. A useful reference would be Pielke, R.A. Jr. et al. (2008). Normalized hurricane damage in the United States: 1900 – 2005. Natural Hazards Review, 9, 29-42 (THOMAS SPENCER, University of Cambridge)	Agreed and in the newly structured section 5.3.3.1 on severe storms makes this point in the opening paragraph. We also refer to recent storm surge modelling studies in section 5.3.3.2 such as Mousavi et al (2012) and Smith et al (2010) that also have similar conclusions regarding areas of larger and smaller impact and the non-linear nature of the response

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
312	41683	5	7	37	0	0	Box 5-2. Setting a box here about tropical cyclones is fine but I suggest we should focus on the impact of cyclones to coast, not cyclone itself. (Rui Zhang, Xiamen University)	This box mainly focuses on the coastal impact by contrasting the fatalities from storm surge inundation arising from similar strength cyclones in coastal regions of 2 countries with very different levels of preparednes
313	50218	5	7	37	0	0	Box 5-2. For this box overall, it would be helpful to cross-reference the discussion above in the chapter section and also findings from the working group 1 contribution to the 5th assessment report regarding understanding of trends in cyclones and any linkages to climate change. (Katharine Mach, IPCC WGII TSU)	We have revised the structure of the chapter so that 5.3.3.1 summarises the key findings regarding observed and future cyclone changes from WG1 and SREX and the embedded box on tropical cyclone impacts is more to contrast the effect of different levels of preparedness on cyclone impacts
314	42907	5	7	39	0	0	Please consider revising the statement “Tropical cyclones, called also typhoons and hurricanes,”. Typhoon and hurricane is only one of the categories in the classification of tropical cyclone. Ref: http://www.wmo.int/pages/prog/www/tcp/operational-plans.html (Sai-ming Lee, Hong Kong Observatory)	We have reviewed this website and find no conflict in mentioning the alternative names for tropical cyclones (i.e. typhoons and hurricanes) that are often used to describe tropical cyclones in different regions. Indeed documents on the website also use the alternative names depending on region
315	47490	5	7	39	8	1	The authors should discuss whether there has been an increase in the frequency and severity of tropical cyclones that is associated with climate change. (Alexander Kolker, Louisiana Universities Marine Consortium)	A summary of the key findings from WGI with respect to observations of cyclone change is now given in section 5.3.3.1
316	47491	5	7	39	8	1	I think it would be worthwhile to mention the impacts of Hurricane Katrina on New Orleans and the surrounding regions of the gulf coast. This event led to the death of about 1,800 people, and caused between $80-150 billion in damages. It is worth noting that the impacts of this event were linked to both the severity of the storm surge in Mississippi and poor infrastructure in New Orleans (which was on the weak side of the storm). This event demonstrates that climate-driven events can be very powerful and that the response of human systems to these events depends strongly on preparation and infrastructure. (Alexander Kolker, Louisiana Universities Marine Consortium)	This discussion has been done in the AR4 chapter 14 on North America.
317	40348	5	7	40	7	40	Should insert the word "can" before "have major impacts." (Laura Petes, National Oceanic and Atmospheric Administration)	This has been done
318	52846	5	7	41	7	42	References required for statement on line 41; statement on line 42 is not an example of the preceding point (John Hay, University of the South Pacific)	The last 2 sentences have been reversed so that the example follows the relevant statement and a reference to Murray (2012) has been added since it tabulates impacts most of which are from cat 3-5 cyclones.
319	46818	5	7	42	7	43	Need to relate the 86% mortality to Category 3, 4 and 5 storms, not just geographical area. (Genevra Harker, HarmonicQuay Ltd)	We have reversed the order of the sentences so that the 86% mortality is an example of the (now) previous sentence about impacts on people
320	47683	5	7	46	0	0	“The following statement needs clarification: The estimated population density is 1,000 people/km2 for nine megadeltas in Asia in 2015... Is this an estimation of what might be the case in 2015 or is there a misprint as to date? (Bob Pokrant, Curtin University)	The paragraph has been shortened to a sentence that now comprises the first sentence of the next paragraph
321	50219	5	7	47	7	47	It would be helpful to specify the timeframe relevant to the population density given on this line. (Katharine Mach, IPCC WGII TSU)	The point has been simplified and used as a lead-in sentence to the following paragraph
322	38729	5	7	53	0	0	The name of the river Irrawady was used in different forms like in this line: Ayeyarwady. Coul be a confusing problem for many readers, and I suggest to homogenice the name in all chapter (and probably in other chapters) (Ricardo Anadon, University of Oviedo)	Instances of Ayeyarwady have been changed to Irrawaddy to avoid confusion.
323	41684	5	8	1	8	2	I do not think this figure is necessary. (Rui Zhang, Xiamen University)	We have elected to retain this figure since it demonstrates the large affected region by this storm surge
324	47492	5	8	6	8	8	This statement seems to discount the studies mentioned earlier in this section. Are all of those sections for areas located in deepwater? The study location should be described in appropriate detail where the study findings are presented. (Alexander Kolker, Louisiana Universities Marine Consortium)	It is not clear which studies mentioned earlier in the section are being referred to here and so no change has been made
325	35290	5	8	9	8	16	This paragraph does not successfully distinguish the nature or effects of climate-change adaptation from those of disaster-risk reduction. It is quite possible that the same initiative (eg multi-storied cyclone shelters) serves both purposes, but that does not then mean that climate change adaptation efforts are effective in disaster-risk reduction or vice versa. There is a fair amount of literature arguing that there are synergies between CCA and DRR that make them worth pursuing jointly, but also others who argue that keeping them separate makes better sense (given that CCA is not mostly about extremes). Maybe there is reference to this discussion elsewhere in the WGII report that could be cross-referenced here (that on p 46 [35-38] is a start but is better earlier in the chapter). But I think what is written needs clarification here, else it will leave readers questioning the relationship between CCA amd DRR. (Patrick Nunn, University of New England)	Concluding sentences have been added to this box to highlight some of the challenges that may also be faced in attempting to address CCA through DRR
326	50220	5	8	9	8	16	It may be beneficial to provide additional citations for this paragraph, in addition to chapter 9 from the special report. (Katharine Mach, IPCC WGII TSU)	Some additional citations have been added
327	39423	5	8	11	8	13	Move this key-message sentence to the start of the paragraph: 'Climate change adaptation efforts can be effective in limiting the impacts from extreme tropical cyclone events. Murray et al...' ... 'The use of disaster risk reduction methods such as the construction ...' (Sarah Cornell, Stockholm Resilience Centre)	This has been done

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
328	46819	5	8	15	8	16	Is this last sentence saying that Bangladesh had put in place risk reduction methods, learning from previous cyclones, but that Myanmar did not? Please clarify this in the text. (Genevra Harker, HarmonicQuay Ltd)	This sentence has been modified to make this point more clearly
329	36272	5	8	15	8	17	This sentence is not clear to me. I do not see the logic. (Déborah Idier, BRGM)	This paragraph has been modified to make the points clearer
330	38133	5	8	21	0	0	section 5.2.2.1.3 I think it would be helpful to start this section with WHY changes in Hs (odd to use SWH to describe significant wave height…) are important. Rather more than just port activities. (THOMAS SPENCER, University of Cambridge)	We have included a broader discussion on why wave climate changes are important. Also we use SWH to be consistent with WGI chapter 13
331	41685	5	8	21	0	0	The title of 5.2.2.1.3. is not understandable. (Rui Zhang, Xiamen University)	The title of this section is now 'wind and waves'
332	42731	5	8	21	0	0	Comment on Section 5.2.2.1.3: This section describes "ocean" wave climate rather than "coastal" one. It is difficult to find the relation between the trend in meteorological forces and that in "coastal" waves from observed data and to predict the future "coastal" wave climate using numerical models, because coastal waves are affected by "local" islands and capes. I mean that a prediction of future coastal wave climate needs numerical models with a high spatial resolution and that the change in coastal wave climate may have a wider range at some locations than that in ocean one. (Hiroyasu Kawai, Port and Airport Research Institute)	This point is made now in the section on winds and waves
333	44187	5	8	21	8	21	Wave climate? Or wave changes? (RONGSHUO CAI, Third Institute of Oceanography)	The title of this section is now 'wind and waves'
334	37910	5	8	21	9	8	The following discussion about wave climate is at times justified by the impact on beaches per se, rather than on the lowlands directly. Is this a mis-emphasise: we should be concerned on how the extremes may be varying rather than SWH. Yes you can argue that SWH is a mean characterise of energy, but this assumes that extremes will increase pro rata. Has this assumption be verified? (Julian Orford, Queen\\\'s University, Belfast)	SWH is more commonly discussed in the literature and is assessed in WG1 chapter 13. therefore we discuss SWH here as well. Peak wave height at the coast will vary according to offshore wave height and the degree of shoaling which in turn relates to bathymetric slope.
335	47548	5	8	21	9	8	Section 5.2.2.1.3 comment: Not alll studies show a trend of inreasing wave height. For example, there is a nice paper by Charles E, Idier D, Delcluse P, Deque M & le Cozannet G (2012) Climate change impacts on waves in the Bay of Biscay, France. Ocean Dynamics 62, 831-848. DOI 10.1007/s10236-012-0534-8 that points to a decrease in coastal waves, with implications for a reduction in sediment flux along the strongly wave-dominatedcoasts in the region. (Jon French, University College London)	The discussion around wave climate has been revised. Several regional wave modelling studies are mentioned briefly including Charles et al, 2012
336	37403	5	8	23	8	24	Is the connection between SWH and extreme wave height or both of these with climate variability. It isn't clear, and what does connection mean anyway? Reword. (Colin Woodroffe, University of Wollongong)	The section on waves has been revised to make clearer
337	35619	5	8	23	8	29	There are many studies adressing the issue of wave heigths, their trends and the connection with climate variability, particularly in North eastern Atlantic. The SREX report and the WG1 Chapter 3 include a review in this domain. One would expect to find here either an update or a connection to another part of the IPCC reports adressing this domain in deep. Since the WG2-5 report adresses coastal changes, I recommend highligthing the fact that the trends provided here are relate to the offshore and that this can be significantly different in nearshore (See Charles et al., 2012). Elodie Charles, Déborah Idier, Jérôme Thiébot, Gonéri Le Cozannet, Rodrigo Pedreros, Fabrice Ardhuin, Serge Planton. (2012) Present Wave Climate in the Bay of Biscay: Spatiotemporal Variability and Trends from 1958 to 2001. Journal of Climate 25:6, 2020-2039 (Goneri Le Cozannet, BRGM)	We now provide a summary of the WGI and SREX findings. Regional studies such as Charles et al 2012 are also discussed.
338	36273	5	8	23	8	29	The reference to the work of Charles et al. (2012) is missing. This modeling study provide trends in Wave height, period and direction over the period 1958-2001, not only in the biscay bay (offshore), but also closer to the coast. Furthermore, this study provide statistically significant trends, and also analyse the reasults by seasons. It shows for instance an increase of summer significant wave height, a southerly shift of autumn extreme wave direction, and a northerly shift of spring extreme wave direction. Few studies analysed the trend in wave directions whereas, at least for coastal sediment fluxes, the wave direction is ana important paramater. For these reasons, I think that this paragraph should completed with some of the results of this paper. Reference : Charles E., Idier D., Thiébot J., Le Cozannet G., Pedreros R., Ardhuin F., Planton S. (2012) Wave climate variability and trends in the Bay of Biscay from 1958 to 2001, Journal of Climate, 25, 2020-2035. (Déborah Idier, BRGM)	This is now noted
339	37909	5	8	23	8	29	But is increase assumed to be due to CC or natural variability? Or is this just a statement of fact for which the reader supplies the driver? (Julian Orford, Queen\\\'s University, Belfast)	The contributions of CC and Climate variability are now more clearly discussed
340	50221	5	8	24	8	24	As calibrated uncertainty language, "likely" should be italicized. (Katharine Mach, IPCC WGII TSU)	We have italicised the calibrated uncertainty language
341	38550	5	8	24	8	28	I do not find this North Pacific reference in Chapter 3. Regardless, there is evidence that some of the apparent increase in wave heights in the North Pacific may be due to changes in instrumentation. Once these biases have been corrected for, both increases and decreases in wave heights are observed in the North Pacific, depending on location. See Gemmrich, J., B. Thomas, and R. Bouchard. 2011. Observational changes and trends in northeast Pacific wave records. Geophysical Research Letters 38, L22601, doi:10.1029/2011GL049518. Projected changes in northern Europe also include both increases and decreases in wave height, depending on location and season (Zacharioudaki, A., S. Q. Pan, D. Simmonds, V. Magar, and D. E. Reeve. 2011. Future wave climate over the west-European shelf seas. Ocean Dynamics 61:807-827.) (Christopher Harley, University of British Columbia)	This text has been substantially revised and mainly references the conclusions of WGI
342	39424	5	8	28	0	0	SWH is intuitively comprehensible to non-experts, but peak period is much less so - and without a benchmark value, the significance of a change of 0.1 s per decade is not easy to gauge. All the rest of the section relates to height, so this periodicity change needs a bit more explanation/context. (Sarah Cornell, Stockholm Resilience Centre)	The section has been shortened and there is no longer a reference to peak period

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343	42019	5	8	28	0	0	Dodet et al. (2010) and Wang et al. (2009) and et al. in italics. : I know it is editorial but it gets me. Same with sometimes seeing report and other places reported: past or present? Consistency. (Liette Vasseur, Brock University)	The findings regarding past and future changes is more clearly separated
344	42234	5	8	31	6	44	This discussion of wave heights needs to be linked to a climate 'driver' - which aspect of climate change is producing the changes described and why? How do we explain these apparent trends? (Denise Reed, The Water Institute of the Gulf)	Winds and waves are now discussed together since wind is the driver for wave climate
345	38714	5	8	31	8	39	Work at the project MICORE (FP7 - EU) demonstrate that there is no evidence of clear storminess increase at European level based on several drivers (wind, wave, surge) analysed for more than 30 years (with both measurements and hindcast - for waves). A total of 54 proxies analyses were made, using surge/water levels, wave height and wind above a defined threshold for the 12 considered coastal regions.The main conclusion derived is that a clear trend of storminess change at European level is not evident. Most of the used proxies (62%; 36 in 58) showed ''no trends''. About 19% (11 in 58) showed an increasing trend on storminess with only 3 proxies (5%) having a statistically significant increase (for $p < 0.05$). Circa 19% (11 in 58) of the proxies showed a decreasing storminess trend, although none of them were statistically significant. Detrailed data analysis can be accesses at Deliverable D1.4. from Project MICORE (www.micore.eu). The main results were published at Reference: Storm impacts along European coastlines. Part 1: The joint effort of the MICORE and ConHaz Projects. E n v i r o n m e n t a l s c i e n c e & P o l i c y, 1 4 (2 0 1 1) 9 1 2 – 9 2 3. Paolo Ciavola, Oscar Ferreira, Piet Haerens, Mark Van Koningsveld, Clara Armaroli, Quentin Lequeux. The authors also concluded that the "no trend" means that so far there is no evidence of a clear storminess change in Europe which doesn't mean that will not occurr as a consequence of climate change. (Oscar Ferreira, University of Algarve)	The detailed assessment of storminess changes is made in chapter 2 of WGI. Here we provide only a brief synthesis of their findings
346	48705	5	8	36	8	36	There is also the more detailed Young et al (2012) paper on trends in extreme waves Citation: I. R. Young, J. Vinoth, S. Zieger, and A. V. Babanin 2012: Investigation of trends in extreme value wave height and wind speed. JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 117, C00J06, doi:10.1029/2011JC007753. (Robert Bell, NIWA)	This paper is discussed
347	37404	5	8	37	0	0	What is meant by neutral? Reword (Colin Woodroffe, University of Wollongong)	The discussion has been shortened and reference to neutral no longer appears
348	37284	5	8	37	6	37	Please add the full conclusion of Young et al., 2011: "(...) analysis does, however, indicate that over the past two decades there has been a consistent trend toward increasing wind speeds. For wave height, the results are more complex, with no clear statistically significant trend for mean monthly values. At more extreme conditions, there is a clear statistically significant trend of increasing wave height at high latitudes and more neutral conditions in equatorial regions." - moreover, there's been an important comment with direct response in SCIENCE on references and the methodology of Young et al., 2011 which should be mentioned, Full citation 1: F.J., Ricciardulli, L. Comment on "global trends in wind speed and wave height" (2011) Science, 334 (6058), pp. 905-b and Full citation 2: Young, I.R., Babanin, A.V., Zieger, S. Response to comment on "global trends in wind speed and wave height" (2011) Science, 334 (6058), pp. 905-c. (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	Both these papers are discussed
349	36350	5	8	37	8	37	Please, explain 'more neutral conditions'. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The discussion has been shortened and reference to neutral no longer appears
350	36351	5	8	37	8	38	What does "no clear statistically significant trends for mean monthly values" mean? Is is not clear or statistically not significant? Are you still citing Young et al. here, implying the absence of a long-term trend in 23 years? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	See response to comment #351.
351	46820	5	8	37	8	38	Sentence beginning 'More neutral conditions...' is not a complete sentence. (Genevra Harker, HarmonicQuay Ltd)	This sentence has been modified
352	36352	5	8	38	8	39	Please, expail if you doubt the conclusions on the observed long trends, or that you warn that the observed trends cannot be extrapolated (used as a prediction for future wave heights) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	We provide further dicussion.
353	46386	5	8	41	8	44	There has been some recent research regarding wave climate in South Africa. See: Corbella and Stretch 2012 Decadal trends in wave climate and beach erosion on the east coast of South Africa (in press) Nat. Hazards Earth System Science (Andrew Mather, eThekwini Municipality)	Example is too localized to be quoted.
354	36353	5	8	46	8	50	This paragraph is difficult to read for a non-specialist. Please, explain all the jargon such as 'port activities', 'significant wave height', 'beach profile', 'potential erosion', 'mean energy flow direction', and 'pocket beach planform rotation'. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	This paragraph has been removed
355	37405	5	8	46	8	50	Given all the controversy about the Bruun concept, this statement about closure depth seems inappropriate here. It is out of context and would need a more recent reference to be relevant to the topic of wave climate at this point (Colin Woodroffe, University of Wollongong)	This paragraph has been removed
356	44755	5	8	48	5	48	"...linked to the depth of closure of the beach profile (Birkemeier, 1985)." Add Hallermeier's paper to the citation in "...linked to the depth of closure of the beach profile (Birkemeier, 1985; Hallermeier, 1981)." (Keqi Zhang, Florida International University)	This paragraph has been removed
357	50222	5	8	48	8	48	For a reader unfamiliar with the term, it could be helpful to indicate further what "depth of closure" is. (Katharine Mach, IPCC WGII TSU)	This paragraph has been removed
358	38730	5	8	54	0	0	1 cm-1 must be 1 cm yr-1 (Ricardo Anadon, University of Oviedo)	This paragraph has been removed
359	46821	5	8	54	8	54	Change in Chile needs clarifying, should this be 1 cm yr-1? (Genevra Harker, HarmonicQuay Ltd)	This paragraph has been removed
360	36355	5	9	0	0	0	Within all Large Marine Ecosystems (LMEs) of the world, the most rapid warming (satellite-derived SST) was observed in the land-locked or semi-enclosed European and East Asian Seas (Baltic Sea, North Sea, Black Sea, Japan Sea/East Sea, and East China Sea) and also over the Newfoundland–Labrador Shelf(Belkin, I.M., 2009. Rapid warming of large marine ecosystems. Progress in Oceanography 81, 207–213) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	This is discussed in the temperature section.

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361	36354	5	9	3	9	3	Please, explain 'mean energy flux direction' (Catharina Philippart, Royal Netherlands Institute for Sea Research)	This detail is no longer mentioned
362	37406	5	9	6	9	8	This is a good point, which applies to several other aspects of the text (see my comment on page 7 line 9). Coastal climates differ from open marine. In view of this comment perhaps the wave section should be cut down in length. (Colin Woodroffe, University of Wollongong)	This point is now made in the opening paragraph.
363	39425	5	9	6	9	8	This paragraph would be better earlier in the section - before the other mentions of studies relating to coasts, so that the narrative starts with general open-ocean studies and focuses on the specifics of coasts and (infrastructure) impacts. (Sarah Cornell, Stockholm Resilience Centre)	This change has been made earlier in the section
364	38134	5	9	6	9	9	this could be move up to the strat of the section and made more explicit with reference to wave shoaling, wave refraction processes and inshore bathymetry (THOMAS SPENCER, University of Cambridge)	This change has been made earlier in the section
365	46823	5	9	8	9	8	Correct punctuation around reference. (Genevra Harker, HarmonicQuay Ltd)	Done
366	38135	5	9	11	0	0	section 5.2.2.1.4 In many subtidal, intertidal and supratidal environments the relationships between climate and substrate are mediated by either a vegetation or benthic invertebrate communities. For these communities, alterations in air temperature and water temperature become significant. As community structure changes in response to these climatic shifts so earth surfaces can cross thresholds being biostabilized to being bioerosional and vice versa. See Widdows, J. et al. (2004). Role of physical and biological processes in sediment dynamics of a tidal flat in Westerschelde Estuary, SW Netherlands. Marine Ecology Progress Series, 274, 41–56. (THOMAS SPENCER, University of Cambridge)	Agreed but the space available for this paragraph being limited to address the link between temperature and sediment stability.
367	38551	5	9	11	0	0	Section 5.2.2.1.4. There are good coastal sea surface temperature data / trends from 1950-2000 in British Columbia, Canada, as well (British Columbia Coast and Marine Environment Project 2006: Climate Change). For the report, see www.env.gov.bc.ca/soe/bcce/05_biodiversity/.../biodiversity.pdf (Christopher Harley, University of British Columbia)	We agree that there are many other local or regional examples of increased sea temperature in the coastal ocean. Due to the limited space available, only one can be mentioned here and preference is given to a paper in a peer-reviewed journal.
368	42235	5	9	11	9	11	It needs to be clear in this section whether changes in air temperature or water temperature are being considered. (Denise Reed, The Water Institute of the Gulf)	Agreed. The text has been modified to make it clear that seawater temperature is discussed.
369	37911	5	9	13	9	13	70% of world's coastlines ? Do you mean coastline AIR or SEA temperatures? (Julian Orford, Queen\\\'s University, Belfast)	Agreed. See reply to comment #368.
370	42236	5	9	13	9	25	Dessication stress in intetidal organisms should be considered, as should the effects of temperature on the distribution of emegent macrophytes. The switch in distribution of salt marshes and mangrives is alluded to later and should be set up here. (Denise Reed, The Water Institute of the Gulf)	The aim of this paragraph is to briefly describe the observed changes in temperature. Dessication stress cannot be discussed here.
371	50223	5	9	14	9	15	For the averages presented on these lines, it could be helpful to clarify their geographic extent--are they global values? (Katharine Mach, IPCC WGII TSU)	Yes, these are global estimates. The text has been revised accordingly.
372	40349	5	9	15	0	0	Does this correspond to air or water temperature? (Laura Petes, National Oceanic and Atmospheric Administration)	See reply to comment #368.
373	42020	5	9	15	0	0	It is written: -3.3 ± 4.4 days? Meaning that some place are slowed and some are faster? Can this be confirmed? Especially that in the next sentence the shift is negative. (Liette Vasseur, Brock University)	That is correct as shown by the uncertainty. Unfortunately, space is at premium and this should be obvious to the readership, with no need to further detail.
374	38731	5	9	16	0	18	The comparison between coastal and oceanic waters must be confusing. The indicated value of 0.1 ºc per decade for the whole upper 75 m of the ocean is not directly comparable with the data of Lima and Whethey). We use a similar methodology in a recent published paper on all North Atlantic Basin and adyecent Seas [González-Taboada, F. y Anadón, R. online. Patterns of change in sea surface temperature in the North Atlantic during the last three decades: beyond mean trends. Climatic Change. http://www.springerlink.com/content/n1171w7628217167/?MUD=MP] and our results shows a high heterogeneity between areas. We can talk about higher increses in oceanic waters than in coastal; specifically in some coastal areas are reducing trends (like in Lima paper) whereas in oceanic we obtained the higher SST increases.I suggest to compare the data of Lima and Whetey with our result for a more homogeneous comparison (Ricardo Anadon, University of Oviedo)	The goal here is to compare data collected in the global coastal zone with data collected in the global ocean. The suggested paper, although very interesting, is regional and, unfortunately, cannot be used.
375	50224	5	9	18	9	19	It would be helpful to clarify why this example in particular is given here, as its specificity jumps out. (Katharine Mach, IPCC WGII TSU)	We understand that a regional example is not deemed necessary. It has been deleted.
376	46824	5	9	19	9	19	Is this sentence saying that the coastal waters of France have warmed by 0.12 degC per decade, but those at the Iberian peninsula have warmed by 0.35 deg C per decade? Not sure how this is incorporated in the annual warming. Please clarify in the text. (Genevra Harker, HarmonicQuay Ltd)	This citation has been deleted. See reply to comment #375.
377	43268	5	9	21	9	25	These wide sweeping statements on biochemical principles of temperature effects are distant to actual climate effects and not very useful in an IPCC assessment. I suggest reference to the executive summary of chapter 6 for climate effects on marine ecosystems. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	A link is now made to chapter 6.
378	36356	5	9	27	0	0	Table 5-1:Please, be careful in generalizing the long-term field observations, e.g. not all fish species are moving polewards! (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The table has been deleted.
379	36357	5	9	27	0	0	Table 5-1: Benthic organisms such as bivalves are of major importance in coastal food webs (e.g., filtering phytoplankton and fueling shorebirds) and as ecosystem service (e.g., shellfish fisheries & aquaculture). Why are they not addressed in this table? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The table has been deleted.
380	42237	5	9	27	9	29	Unlcear why the table is inserted here. It should be intriduced at the start of this section and described in relation to the text. (Denise Reed, The Water Institute of the Gulf)	The table has been deleted.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
381	40645	5	9	28	0	0	Table 5.1. Increasing intensity in storms can directly damage mangrove ecosystems by defoliation, uprooting, sediment burying, changing prevailing hydrological dynamics. They can also affect coral reefs by damaging reefs. However storms can also promote dispersion, it is a natural dispersion mechanism. For more information see -Lacambra, C., Spencer, T., Moeller, I., 2008. Literature review: tropical coastal ecosystems as coastal defences. The Role of Environmental Management in Disaster Risk Reduction and Climate Change Adaptation Annex 1 Case studies. ProAct Network (Carmen Lacambra Segura, Grupo La era)	The table has been deleted.
382	43267	5	9	28	9	29	Wouldn't reading and reference to the WGII marine chapters be the most appropriate here? This table is not well integrated into the text. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The table has been deleted.
383	50225	5	9	28	9	29	For the placement of this table, the author team may wish to consider if this insertion place is the most logical. Additionally, upon further revision, the table must be shortened substantially. It perhaps would make sense to move some of the references into the chapter itself. (Katharine Mach, IPCC WGII TSU)	The table has been deleted.
384	42021	5	9	39	0	0	Changes due to changes: can this be more precise: decline or increase? (Liette Vasseur, Brock University)	Agreed. We know use “variability”.
385	38732	5	9	45	0	0	In a very recent paper [Kevin J. Flynn, Jerry C. Blackford, Mark E. Baird, John A. Raven, Darren R. Clark, John Beardall,Colin Brownlee, Heiner Fabian and Glen L. Wheeler. 2012. Changes in pH at the exterior surface of plankton with ocean acidification. Nature Climate Change, http://www.nature.com/doifinder/10.1038/nclimate1489] shows a more complicated behavior of phytoplankton in relation with seawater pH. I suggest a cautionary reference to it. (Ricardo Anadon, University of Oviedo)	We agree that biology modifies the seawater chemistry in the boundary layer which surrounds organisms. In addition to the example provided for phytoplankton, Hurd et al. Have shown similar changes in benthic organisms. Since this section addresses changes
386	40350	5	9	46	0	0	Need to add "acidification" before "time series." (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed. The SOD has been revised accordingly.
387	44353	5	9	48	10	14	The mention to the references of Provoost et al. (2010) and Cai et al. (2011) may seem contradictory if not interpreted properly. In the first case authors found in the north Sea an increase in pH as a consequence of eutrophication, whereas in the second case a decrease in pH was found in the Gulf of Mexico. The main reason is that eutrophication may increase or decrease dissolved oxygen depending on the propeties of the water column (depth, stratification, etc.), and accordingly pH increases or decreases as a function of the metabolic balance between photosynthesis and respiration plus the mixing of the water column. (Ibáñez Carles, IRTA)	We agree that this sentence is confusing. It has been re-written in order to make the point much clearer.
388	50226	5	9	49	9	52	It would be helpful to clarify what "phosphorus removal policy" is meant here. Additionally, the variable symbol provided on line 52 should be clarified. (Katharine Mach, IPCC WGII TSU)	See reply to comment #390.
389	42022	5	9	50	0	0	invasion??? Uptake remains a more appropriate term. (Liette Vasseur, Brock University)	Agreed. The SOD has been revised accordingly.
390	36358	5	9	52	0	0	Please, explain pH NBS. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	“National Bureau of Standards” is mentioned in full in the SOD.
391	36362	5	10	0	0	0	It would be most helpful to include a map here showing the major upwelling areas and indicating for which ones there is an indication that their intensity has changed as the result of climate change. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Such a map would have indeed been useful but, space being limited, it is felt that it is not important enough to delete another figure to make space available for it.
392	36364	5	10	0	0	0	Again, a map with the major freshwater inputs into the world's coastal systems might be helpful here. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	See reply to comment #391.
393	36367	5	10	0	0	0	Again, a map with the major hypoxia/anoxia zones within the world's coastal systems might be helpful here. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	See reply to comment #391.
394	36368	5	10	0	0	0	Aha, this is where your refer to the influence of channels, etc (see remark on 5.2.2.1.7). You might consider to restrict 5.2.2.1.7 to rainfall, and move all non-climatic factors in this paragraph to 5.2.2.2 (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The chapter has new distribution. The new distribution is in line with this comment.
395	50227	5	10	2	10	6	For this figure caption, it would be helpful to clarify that the symbol used on line 3 corresponds to pH on the total scale (as introduced on line 4). Additionally, it would be beneficial to clarify what is meant by "broken line"--as the only broken line appears to be vertical. (Katharine Mach, IPCC WGII TSU)	The pH scale has been clarified and the broken line fixed.
396	43269	5	10	2	10	14	The treatment of coastal variability in ocean acidification would benefit from mentioning the hypotheses why changes are different from expectations following CO2 entry. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The SOD as been modified to incorporate this perspective.
397	36359	5	10	3	0	0	Please, explain pH T. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Done.
398	36361	5	10	8	0	0	Please, explain 'IS92a scenario'. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	This is a quite standard scenario used in climate research. Hopefully it will be included in the glossary.
399	37407	5	10	8	0	0	IS92a? This seems rather out of date (Colin Woodroffe, University of Wollongong)	Yes, but this is the scenario used by the papers cited. We are not aware of similar papers using more recent scenarios.
400	49048	5	10	8	10	14	There are some unclearities in this paragraph; in line 12-13 is stated that "atmospheric CO2-invasion contributes with 24 % of the 0.45 decline in pH in the Northern Gulf of Mexico". What causes the other 76 % ?. In line 13-14 the expression "overall decline" needs to be more precise; does it apply for the Northern Gulf of Mexico for the period from preindustrial time to 2100? (Oyvind Christophersen, Climate and Pollution Agency)	We agree that this was confusing. The other contributions are mentioned in the SOD and the period referred to by Cail et al. (2011) is mentioned.
401	50228	5	10	8	10	14	Several clarifications will be helpful for this paragraph. 1st, are the pH declines described on lines 8-9 and 13-14 of average global values (for surface waters)? Also, how does the value provided on line 14 compare to the decrease described on lines 8-9? For the statement on line 12, it would be helpful to clarify the other relevant drivers, given the characterization here. (Katharine Mach, IPCC WGII TSU)	Done. See the reply to comments #400.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
402	44188	5	10	17	10	21	Coast upwelling issue has been much more discussed in chapter 30 (Open Oceans) than that in chapter 5, which extends beyond the boundary of chapter 5's definition. It may be better to be discussed mostly in chapter 30? (RONGSHUO CAI, Third Institute of Oceanography)	Coastal upwelling has been deleted from this chapter.
403	37408	5	10	17	10	22	Surely 5.2.2.1.6 could be left out it does not seem relevant. The relative length and content of these sections does not seem well thought out. The freshwater section could be synthesised and much shorter (Colin Woodroffe, University of Wollongong)	Coastal upwelling has been deleted from this chapter.
404	42213	5	10	17	10	22	The increase or decrease of upwelling intensity in respose to global change is still controversial. For examaple, in the Iberian upwelling, several authors have described decline of the extension and intensity of the upwelling season over the last 50 years (Lemos and Sansó, Journal of Geophysical Reserach 111, doi.org/10.1029/2005JC003051, 2006; Alvarez-Salgado et al., Harmful Algae 7, 849–855, 2008; Pérez et al., Global Change Biology 16, 1258–1267, 2010) (X. Anton Alvarez-Salgado, CSIC Instituto de Investigaciones Marinas)	NA - coastal upwelling has been deleted.
405	42023	5	10	19	0	0	There is a need to add a little more here in what you mean by upwelling and if it is constant everywhere, etc. It has been done with most other topics but not this one and it is unclear why. (Liette Vasseur, Brock University)	NA - coastal upwelling has been deleted.
406	38733	5	10	19	0	22	The idea about increasing upwelling intensity due to upwelling-favourable winds (Bakun, 1990) can nor be sustained for all coastal areas. In fact in some areas decreased and in many other regions changed time and frecuency with observable impacts on pelagic and benthic communities. Llope, M., Anadón, R., Viesca, L., Quevedo, M., González-Quirós, R., Stenseth, N.C. 2006 Hydrography of the Southern Bay of Biscay shelf break region: integrating the multi-scale physical variability over the period 1993-2003. J. Geophys. Res. 111, C0921 (doi:10.1029/2005JC002963). F I Z F. PÉ REZ*, XOSE A . PADÍN, YOLANDA PAZOS, MIGUEL GILCOTO, MANUEL CABANAS, PAULA C. PARDO, Maria DOLORES DOVALand LUIS FARINA-BUSTO. (2010) Plankton response to weakening of the Iberian coastal upwelling. Global Change Biology 16, 1258–1267, doi: 10.1111/j.1365-2486.2009.02125.x ALISON C . ILES, TARIK C. GOUHIER, BRUCE A. MENGE, JULIA S . STEWART, ALISON J . HAUPT and MARGARET C. LYNCH. 2012. Climate-driven trends and ecological implications of event-scale upwelling in the California Current System. Global Change Biology (2012) 18, 783–796, doi: 10.1111/j.1365-2486.2011.02567.x As these last athors coment in their abstract "changes in coastal upwelling that are consistent with climate change predictions are altering the tempo and the mode of environmental forcing in near-shore ecosystems, with potentially severe and discontinuous ramifications for ecosystem structure and functioning". Probably there are other papers related with the effects on changes in seasonality, frecuancy and intensity of coastal upwellings; for these reasons I suggest a more affordable writting about upwelings, due to the severe influnece of these observed changes (Ricardo Anadon, University of Oviedo)	NA - coastal upwelling has been deleted.
407	47493	5	10	19	10	22	This information on wind-driven upwelling should probably be mentioned in the section on winds. This section also suggests that long-term changes in winds are occurring, while p 7, lines 18-19 state that the authors have low confidence that long-term changes in wind are occurring. Which is correct? (Alexander Kolker, Louisiana Universities Marine Consortium)	Wind-driven upwelling is now mentioned in the section on winds and waves with a cross reference to the relevant chapter
408	39426	5	10	21	10	22	The phrase 'has recently gained support' needs a bit of explanation about why this is the case eg '(observational evidence is reviewed in Narayan et al)' The rest of the paragraph looks weak - either explain why this one study is globally significant (Peruvian waters as one of the strongest upwelling systems), or put with temperature change section (also the nutrient changes link to later text on non-climate drivers, eg hypoxia). It could also be clearer about how these changes are 'climatic drivers'. (Sarah Cornell, Stockholm Resilience Centre)	NA - coastal upwelling has been deleted.
409	41686	5	10	21	10	22	I am sure there are some references about the upwelling OA impacts on the continental shelf of western North America. (e.g. Feely et al., 2008, Science, 320, 1490-1492) (Rui Zhang, Xiamen University)	NA - coastal upwelling has been deleted.
410	40351	5	10	22	0	0	Due to increases in the intensity of upwelling? Need to clarify for the Peru example. (Laura Petes, National Oceanic and Atmospheric Administration)	NA - coastal upwelling has been deleted.
411	38136	5	10	25	0	0	section 5.2.2.1.7 In some coastal systems, sediment supply may be in the form of pulsed inputs related to short-lived flood events which may in turn be storm or cyclone-generated and thus related to changes in storminess. In estuaries, changes in freshwater runoff (in both overall magnitude and seasonal variation) and changes in salinity become important because these boundary conditions affect estuarine mixing characteristics, circulation patterns and sediment transport, deposition and entrainment processes. (THOMAS SPENCER, University of Cambridge)	A new section 5.3.3.6 has been drafted with important cross-references to findings in Chaps. 3 and 4. Sediment delivery (mostly focused on human action) is covered in new section 5.3.4.4. The role of sudden pulse discharges are included in new section 5.3.3.6.
412	42024	5	10	25	10	47	This section should emphasize the issue that non-climate changes may be as important if not more than climate because of changes in coastal watershed (agriculture, forestry and especially changes in cities inlcuding transprotation, anitation etc.). It seems for now that this was left quite superficial but they are crucial in affecting the capacity for adaptation of these communities and for the capacity of resilience of the coastal ecosystem. (Liette Vasseur, Brock University)	Done. However, this issues are extensively addressed in chapters 3 and 5 of AR5
413	46388	5	10	25	10	47	It would be useful to give some guidance on the relative impact of human induced change and climate change on river run off. (Andrew Mather, eThekwini Municipality)	Done. However, this issues are extensively addressed in chapters 3 and 5 of AR5
414	39427	5	10	27	10	33	Both climatic and anthropogenic drivers are discussed here. It might be useful to be explicit about these complex water system interlinkages in this section, as a bridge to the next section. (Sarah Cornell, Stockholm Resilience Centre)	A paragraph has been included accordingly in section 5.3.4.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
415	42784	5	10	27	10	33	Be careful not to mix climate change drivers (the subject of section 5.2.2.1) with non-climate drivers which are dealt with in section 5.2.2.2 - land clearing and deforestation are clearly non-climate drivers. (Sofia Bettencourt, World Bank)	The new section 5.3. on drivers makes a clear distinction between climate and non-climate drivers.
416	40352	5	10	27	10	47	This should also address impacts of reduced freshwater flow from drought and upstream water withdrawals on coastal systems. (Laura Petes, National Oceanic and Atmospheric Administration)	Done (see new section 5.3.3.6)
417	36363	5	10	32	0	0	What is the influence of channels, sluices, dams, artifical freshwater lakes, etc.? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Part of this comment is addressed in new section 5.3.4.4. However, this topic is mostly covered in Chapters 3 and 4 of AR5
418	50229	5	10	35	10	37	For the cross-references flagged here, the author team should consider cross-referencing chapter 3 in particular, as well as the findings of the working group 1 contribution to the 5th assessment report. (Katharine Mach, IPCC WGII TSU)	Done
419	39360	5	10	39	10	41	No. Far too definitive, implies GHGs cause all change in frequencies in flood., the study is much more careful with its claims. (Gareth S Jones, Met Office)	Deleted
420	36365	5	10	43	10	47	Please, supply references with these statements. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Deleted
421	36366	5	10	44	0	0	Please, explain "freshet". (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Deleted
422	45952	5	10	47	0	0	do you mean ….delivery of riverine nutrients "to coastal systems" (not open sea systems).....? (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Deleted
423	36370	5	11	0	0	0	What about dredging activities (e.g., to maintain navigable waterways), has this influenced the transit rates of sediment through coastal systems? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	It does indeed. New section 5.3.4.4 refers to sand mining.
424	36371	5	11	0	0	0	In soft-sediment coastal systems, the impacts of subsidence on local sealevel may also depend on the 'refill' capacity as the result of potential sediment accumulation rates. This should be mentioned here. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Sediment delivery section is limited. Only the most relevant aspects have been included
425	45966	5	11	0	0	0	Section 5.2.2.2. It appears that there is a section missing - that specifically on Nutrient delivery. Increased nutrient input to coastal systems systems is a much more pervasive driver of change in coastal ecosystems than hypoxia (which is a second order effect of nutrient inputs), water diversion, sediment delivery, subsidence, etc. For example, eutrophication resulting from increased nutrient loading has been identified as affecting more estuaries in the US than any other driver (e.g., Bricker et al. 2007) (two-thirds of the 141 estuaries analyzed exhibited moderate to high levels of eutrophication). Increased river nutrient loading to coastal systems around the world has been shown which is due to fertilizer use in agriculture, llivestock production, sewage and atmospheric deposition (Seitzinger et al. 2010; Boyer and Howarth 2008; etc.). The effects on ecosystems include changes in community composition, primary production, loss of seagrasses, etc. (Howarth et al. 2009). In the projected impacts section - section 5.4 - a section on nutrients should also be included - with projections of N, P and Si inputs to coastal systems in 2030, 2050 (Seitzinger et al. 2010) under a range of scenarios and effects on increased harmful algal blooms also projected around the world due to changing nutrient input ratios (Garnier et al. 2010). (References: ----Bricker, S., B. Longstaff, W. Dennison, A. Jones, K. Boicourt, C. Wicks, and J. Woerner. 2007. Effects of Nutrient Enrichment In the Nation's Estuaries: A Decade of Change. NOAA Coastal Ocean Program Decision Analysis Series No. 26. National Centers for Coastal Ocean Science, Silver Spring, MD. 328 pp.http://ccma.nos.noaa.gov/publications/eutroupdate/ ---- Boyer EW & RW Howarth (2008). Nitrogen fluxes from rivers to the coastal oceans. Chapter 36, p. 1565-1584, in: Capone DG, DA Bronk, MR Mulholland, and EJ Carpenter (eds.), Nitrogen in the Marine Environment, 2nd edition, Academic Press, San Diego, 1668 p. ---- Josette Garnier, Arthur Beusen, Vincent Thieu, Gilles Billen, Lex Bouwman 2010. N:P:Si nutrient export ratios and ecological consequences in coastal seas evaluated by the ICEP Approach. Global Biogeochemical Cycles, vol. 24, 2010 (Sybil Seitzinger, International Geosphere-Biosphere Programme)	We agree that nutrients exert a significant forcing on coastal ecosystems. However, the goal of the AR5 is not to review all human-induced changes, but those associated with impacts to the climate system
426	38137	5	11	2	0	0	section 5.2.2.2.1 Define hypoxia? (less than 2 ppm dissolved oxygen). Needs a Rabalais / Turner reference for the Gulf of Mexico. Perhaps Rabalais, N. N. and R. E. Turner (eds.). 2001. Coastal Hypoxia: Consequences for Living Resources and Ecosystems. Coastal and Estuarine Studies 58, American Geophysical Union, Washington, D.C. (THOMAS SPENCER, University of Cambridge)	This section has been cut and it was not possible to provide a great amount of detail. We now provide a simple definition, without giving a threshold value.
427	50230	5	11	2	0	0	Section 5.2.2.2.1. For this section, the chapter team should consider and cross-reference chapter 6 and 30. (Katharine Mach, IPCC WGII TSU)	This comment was unfortunately missed. Links will be added in the next version.
428	45868	5	11	2	11	13	There is some evidence that climate change may lead to increases in mixing due to changes in wind-speeds, that actually may counteract the formation of hypoxia. See for instance Vermaat, J.E., & Bouwer, L.M. (2009). Less ice on the Baltic reduces the extent of hypoxic bottom waters and sedimentary phosphorus release. Estuarine, Coastal and Shelf Science, 82(4), 689-691. (Laurens Bouwer, Vrije Universiteit Amsterdam)	This information could not be added due to the very tight space available.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
429	38734	5	11	4	0	13	Hypoxia can not only be related with Cultural eutrophication. Oceanic processes are related with coastal acidification and reducing dissolved oxygen as demonstrated in several papers. Nicolas Gruber, Claudine Hauri, Zouhair Lachkar, Damian Loher, Thomas L. Frölicher, Gian-Kasper Plattner. 2012. Rapid Progression of Ocean Acidification in the California Current System. http://www.sciencemag.org/content/early/recent / 14 June 2012 / Page 1 / 10.1126/science.1216773 Richard A. Feely, Christopher L. Sabine, J. Martin Hernandez-Ayon, Debby Ianson, Burke Hales. 2007. Evidence for Upwelling of Corrosive “Acidified” Water onto the Continental Shelf. Science 320: 1490-1492. F. Chan, J. A. Barth,J. Lubchenco, A. Kirincich, H. Weeks, W. T. Peterson, B. A. Menge. 2008. Emergence of Anoxia in the California Current Large Marine Ecosystem Science 319, 920. I suggest to introduce this ideas in the Hypoxia references. (Ricardo Anadon, University of Oviedo)	Agreed, but note that this chapter is about nearshore systems where eutrophication is by far the main driver. Anyway, the revised text is more balanced.
430	44354	5	11	4	11	13	Although hypoxia may increase in coastal waters due to eutrophication in many areas of the world (i.e., developing countries), there is an increasing evidence that in developed countries eutrophication is decreasing (Ibáñez et al. 2012) and this trend may accentuate in the future due to economic constraints and higher efficiency. (Ibáñez Carles, IRTA)	True but eutrophication is still a major cause of hypoxia in nearshore systems, as shown by the increase in the number and extent of dead zones.
431	45953	5	11	5	0	0	I suggest adding …..matter (can) lead to a decrease in …… as excessive nutrients do not necessarily lead to hypoxia (in most cases it does not) (Sybil Seitzinger, International Geosphere-Biosphere Programme)	The revised version addresses this comment.
432	39428	5	11	7	0	0	cultural eutrophication'??? Anthropogenic is better, or human-induced. Also, ocean warming as a secondary driver is already mentioned in line 6 - rationalise the argument. (Sarah Cornell, Stockholm Resilience Centre)	Agreed, the SOD does not refer to cultural eutrophication.
433	47497	5	11	7	11	15	These statements need to be cited. (Alexander Kolker, Louisiana Universities Marine Consortium)	This section has been drastically cut and every statement is now supported by a citation.
434	47494	5	11	16	11	37	It may be worth mentioning that the diversion of sediment and water in river deltas has been proposed as a means of ecosystem restoration, and as a way to allow these low-lying systems to respond to relative sea level rise (Alexander Kolker, Louisiana Universities Marine Consortium)	Here we show only sediment discharge from rivers to oceans. Sedimentation in inter-distributary is partly shown in new 5.4.2.7 deltas.
435	47495	5	11	16	11	37	The authors may want to review the following citations for the above comment: Allison, M. A. and E. A. Meselhe. 2010. The use of large water and sediment diversions in the lower Mississippi River (Louisiana) for coastal restoration. Journal of Hydrology 387:346-360. LACPRA. 2012. Louisiana's Comprehensive Master Plan for a Sustainable Coast. Louisiana Coastal Protection and Recovery Authority, Baton Rouge. Paola, C., R. R. Twilley, D. A. Edmonds, W. Kim, D. Mohrig, G. Parker, E. Viparelli, and V. R. Voller. 2011. Natural Processes in Delta Restoration: Application to the Mississippi Delta. Annual Review of Marine Science 3:67-91. (Alexander Kolker, Louisiana Universities Marine Consortium)	Here we show only sediment discharge from rivers to oceans. Sedimentation in inter-distributary is partly shown in new 5.4.2.7 deltas.
436	47684	5	11	18	0	0	“The following statement assumes more knowledge of the impact of climate change than we have. ‘Human engineering can affect the runoff of individual river basins to the coastal ocean much more than climate change (Wisser et al., 2010).’ The comparison is being made between known impacts of engineering and the either less well known or unknown impacts of climate change” (Bob Pokrant, Curtin University)	Deleted
437	45954	5	11	18	0	25	line 18 seems somewhat inconsistent with line 24 - 18 says human engineering can have greater effect than climate change while 24 says human influence small compared with climate changes. I suggest qualifying line 18-19 by adding in line 19 chang (in some basins) (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Deleted
438	45955	5	11	18	0	25	section 5.2.2.2. While section 5.2.2.2.2. addresses Water diversions in watersheds (decreased river discharge), I think there should also be a comparable section on Modified discharge regimes.Human engineering can change seasonal and event discharges from land use change, dams, channelization, etc. This could also be accomplished by adding a few sentences to 5.2.2.2.2. and changing the header (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Deleted
439	40353	5	11	18	5	22	Should also mention drinking water use as a factor here. Also, this sub-section would make more sense as part of the "Changes in freshwater input" sub-section. (Laura Petes, National Oceanic and Atmospheric Administration)	This is covered in Chap. 4 of AR5
440	35291	5	11	18	11	19	The comparison "much more than climate change" is unsustainable, qualitative and unhelpful here. Delete. (Patrick Nunn, University of New England)	Deleted
441	42025	5	11	24	0	0	There should be a statement about the fact that this is locally driven and there are high levels of variations. (Liette Vasseur, Brock University)	The sentence has been rewritten to clarify Dai et al. contribution (see section 5.3.3.6)
442	37913	5	11	24	11	24	How small is "small"? The relative impacts of human alteration may be established say on base flow adjustments, but how is this compared to climate changes which have yet to be measured and yet to be measured as impacting? Reductions to flow regimes in parts of Bangladesh have major consequences for dynamics of tidal range change in embanked rivers. (Julian Orford, Queen\\\'s University, Belfast)	The sentence has been rewritten to clarify Dai et al. contribution (see section 5.3.3.6)
443	36369	5	11	24	11	25	Sentence is not fully clear, what is 'annual stream flow'? Do you mean that variation in freshwater discharge was mainly determined by rainfall and that human engineering played a minor role? If so, how does this relate to the findings by Wisser et al. 2010 (page 11, lines 18-19)? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The sentence has been rewritten to clarify Dai et al. contribution (see section 5.3.3.6)

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
444	44355	5	11	24	11	25	The human influence on the river runoff is expected to increase in the future and it is already substantial in several regions, like the Mediterranean. I think this idea should be stressed and some papers related to it could be cited. (Ibáñez Carles, IRTA)	The sentence has been rewritten to clarify Dai et al. contribution (see section 5.3.3.6)
445	46827	5	11	24	11	25	It does not make sense that 25% of the world's rivers run dry before reaching the oceans due to human activities, but that human influence is small compared with climatic changes. Is this saying that from one year to the next, the influence of climatic changes is more important, or that climatic changes have produced a greater volume change in the flow that reaches the ocean (despite the 25% that man has altered)? Please explain in the text how these two statements co-exist. (Genevra Harker, HarmonicQuay Ltd)	The sentence has been rewritten to clarify Dai et al. contribution (see section 5.3.3.6)
446	37409	5	11	28	11	37	This section seems important, but it is rather lost amongst a sequence of far less significant issues. (Colin Woodroffe, University of Wollongong)	The description was a little expanded
447	42785	5	11	30	11	31	Sand and gravel mining for construction is also extremely problematic in beach areas, for example, in small island countries such as Sao Tome and Principe or the coast of Senegal or Mozambique. This has led to unsustainable rates of high erosion threatening mosty poor coastal communities without alternative land to settle. (Sofia Bettencourt, World Bank)	This text has been rewritten.
448	35292	5	11	30	11	37	The word "causes" in the opening sentence appears problematic in three ways. Firstly, delta sinking is caused by a multiplicity of interacting factors, of which reduced terrigenous sediment delivery would not seem among the most important. Such a reduction might reduce delta aggradation, resulting in a reduction in delta growth rate, but it is not clear in the text how it might be implicated directly in sinking. Secondly, shoreline erosion is not "caused" by sediment delivery reduction; this increases the exposure (reduces resilience) of shorelines to wave erosion. Similarly, I guess for "threatened mangroves (sic) swamps and wetlands". Thirdly, the link with salinization appears tenuous and should be explained rather than merely asserted here. To balance this section, which looks exclusively at terrigenous sediment delivery, there should be something about climate-change associated changes in marine-sediment delivery, perhaps linked to ocean acidification, perhaps the overtopping of reef barriers by larger waves as sea level rises, perhaps associated with changes in nearshore sediment mobility linked to sea-level rise. (Patrick Nunn, University of New England)	This text has been rewritten. We showd here only sediment delivery without any description and discussion with delta subsidence and coasatl erosion. Salinization is descrobed in other section.
449	37914	5	11	30	11	37	This is too simplistic as all the aspects you consider are integrated at the stage of the coastal lowlands and the final outcome is highly uncertain. Changes in sediment yield in CZ needs appreciation of changing precipitation in CZ as much as changing land use practice. (Julian Orford, Queen\\\'s University, Belfast)	We showd here only sediment delivery without any description and discussion with delta subsidence and coasatl erosion.
450	49049	5	11	30	11	37	This paragraph contains contradictions which should be clearified and explained; in line 34 it is stated that sediment discharge in the sea has decreased, globally from 20 Gt/year before 1950 to 12-13 Gt/year today a.o due to dam constructions. Than in line 35-36 that "soil erosion causes the increase in sediment discharge and also impacts coastal ecosystem particularly coral reefs". Maybe different areas are effected, or different particle sizes involved with different effects? (Oyvind Christophersen, Climate and Pollution Agency)	This text has been rewritten to make clear both relationships.
451	38138	5	11	33	11	33	I think it would be helpful to give some idea of the enormous scale of dam building in recent decades. That doesn't quite come across in the present text (THOMAS SPENCER, University of Cambridge)	Hree we showed recent number of dams.
452	46828	5	11	34	11	36	Do the values quoted for the decrease in sediment discharge therefore include the increase due to soil erosion, or were they theoretical based on how much sediment is trapped? (Genevra Harker, HarmonicQuay Ltd)	This text has been rewritten to make clear both relationships.
453	38139	5	11	36	11	37	The McCulloch paper records the increased flux - but the corals are still there. On oceanic reefs this will not be an issue. I think if this statement is to remain then it has to be backed up with a reference that shows that a healthy reef was destroyed by sediment smothering. There are reefs which survive in very turbid waters elsewhere on the inner Great Barrier Reef and in Thailand where monsoon-generated waves give highs easonal turbidity. (THOMAS SPENCER, University of Cambridge)	We deleted such sentense and howed general view on sediment delivery.
454	42026	5	11	40	0	0	This section is very weak and does not include geological changes which are quite important in several places such as North America. (Liette Vasseur, Brock University)	This part was merged into relative sea level: 5.3.2.3 Local sea level
455	37514	5	11	40	11	0	This para. Seems somewhat oversimplified particularly in a section on non-climatic drivers. What about the after-effects of earthquakes so clearly exemplified by the 2004 Sumatran earthquake and tsunami where significant areas of the Nicobar islands in the eastern Indian Ocean subsided (see Subarya C et al (2006) Plate boundary deformation associated with the great Sumatra-Andaman earthquake Nature 440 46-51) and subsequent earthquake in 2005 (see Briggs RW et al (2006) Deformation and slip along the Sunda megathrust in the Great 2005 Nias-Simeulue earthquake Science 311:1897-1901) where there was further subsidence in the area. It also appears that the formerly stable Thai Malaysia peninsula was affected by these earthquakes as discussed in Brown et al (2011) Increased sea level promotes coral cover on shallow reef flats in the Andaman Sea, eastern Indian Ocean Coral Reefs 30:867-878 where subsidence and rising sea level have actually led to an enhancement of coral cover on shallow intertidal reefs. (Barbara Brown, University of Newcastle)	This part was merged into relative sea level: 5.3.2.3 Local sea level
456	44147	5	11	40	11	40	define subsidence (Anne Holsten, Potsdam Institute for Climate Impact Research)	This part was merged into relative sea level: 5.3.2.3 Local sea level
457	37410	5	11	40	11	46	The Syvitski et al 2009 paper should be mentioned here, it would give better balance to this section (Colin Woodroffe, University of Wollongong)	The findings of the syvitski et al (2009) paper are now referred to.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
458	46707	5	11	40	11	46	Section 5.2.2.2.4: It might be worth stating that in some regions isostasy is out pacing eustasy (e.g. southeastern Alaska). (Maria Caffrey, National Park Service and University of Colorado, Boulder)	This is now mentioned in 5.3.2
459	44356	5	11	42	11	43	Relative sea-level rise not only causes hazards on cities but also on crops and wetlands (see for instance Alvarado-Aguilar et al. 2012). (Ibáñez Carles, IRTA)	The material dealing with relative SLR, now in section 5.3.2, has been redrafted and care has been made to make more general references to the effects of sea level rise in the coastal zone
460	36372	5	11	48	0	0	Would prefer to use the term 'habitat destruction' here, so you can use the term 'habitat loss' later as an effect of climate change (e.g., flooding of coastal habitats as the result of sea level rise) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Subsection deleted
461	39429	5	11	50	11	52	The sentence reads rather tautologically: habitat loss causes habitat loss… One of the challenges of using such a broad definition of 'driver' means that it weakens some of the conceptual power that DPSIR-like framworks can give for distinguishing the causality of change in coupled social-environmental systems. If this section were framed as 'human transformation of coastal landscape', it might be clearer. (Sarah Cornell, Stockholm Resilience Centre)	Subsection deleted
462	47496	5	11	50	11	52	It should probably be noted that accelerated relative sea level rise could be a driver of habitat loss. It may be a driver of habitat loss in the past century, and is more likely to be a driver of habitat loss in this century. (Alexander Kolker, Louisiana Universities Marine Consortium)	Subsection deleted
463	35622	5	12	1	0	0	Section 5.3 comment: this section separates "impacts on coastal habitats and coastal ecosystems" and "impacts on human systems". May be the study of Murray et al. (2011) showing that some of these effects are actually coupled would be useful to make the link between both subsections. Murray A. B., Gopalakrishnan S., McNamarac D.E., Smith M.D., 2011: Progress in coupling models of human and coastal landscape change, Computers & Geosciences. (Goneri Le Cozannet, BRGM)	This section is now part of 5.4. We believe that even if observed and projected impacts are still structured into natural and human systems the links between them can be found in both the driver sections and the impact sections.
464	35624	5	12	1	0	0	Section 5.3 comment: Because section 5.3 discusses "observed impacts", the reader expects a discussion on attribution of observed changes, which is not exactly what we can find here. This looks more like a discussion on observed changes. On the other hand, this question of attribution is discussed in chapter 18 and in some regional reports (e.g. report on small islands, chap. 29 - page 8). (Goneri Le Cozannet, BRGM)	In the SOD we have make a big effort to discuss detection and attribution. In fact we have included a new section and a figure on detection and attribution summarizing the most relevant findings. SOD 5.4.4.
465	39006	5	12	2	0	0	Generally, this section on observations is not really focused on detection and attribution of climate change impacts. What the reader turns to the IPCC for is not a long and rambling list of problems in coastal areas - this is not the objective of the IPCC. Rather, in this section, it should be stated very very clearly which phenomena are attributable to recent climate change and which ones are not. (Wolfgang Cramer, Potsdam Institute for Climate Impact Research)	Please, see response to comment above
466	39275	5	12	2	0	0	Chap. 5, p. 12, line 2… Section “Observed impacts”: I think that the literature is sufficiently updated compared to AR4 and most recent papers are included. This section did not consider the important example of vermetus reefs of the Mediterranean Sea, another example to be included in the coral reef section. Vermetids reefs spread along the latitude 38° from Israel to Spain and through Sicily and they represent a very important habitat of intertidal rocky shores (Chemello R, Silenzi S (2011) Vermetid reefs in the Mediterranean Sea as archives of sea-level and surface temperature changes, Chem Ecol 27, 121-127; Sarà G, Sarà A, Milanese M (2011a) The Mediterranean intertidal habitat as a natural laboratory to study climate change drivers of geographic patterns in marine biodiversity, Chem Ecol 27, 91-93). (Gianluca SARA, University of Palermo)	Thank you for the relevant comment. In the SOD very extensive attention is paid to coral reefs including one full subsection 5.4.2.4. and a cross-chapter box. We think that this material is sufficient to explain the impacts on coral reefs.
467	39276	5	12	2	0	0	They are threatened mostly by climate change drivers, above all SLR, and large effort of research is devoted to the understanding of which factors are working to reduce vermetids reefs throughout the Med. While temperature is believed to be the major factor acting now, SLR will likely be in the near future. (Gianluca SARA, University of Palermo)	See comment above
468	50231	5	12	2	0	0	Section 5.3. In the title for this section, the author team should consider clarifying further the scope of material considered: observed vulnerabilities and impacts of climate change? potentially also mentioning the consideration of non-climatic drivers? (Katharine Mach, IPCC WGII TSU)	In the SOD this section has been included within a new section entitled 5.4 Impacts, vulnerabilites and risks where all these aspects have been addressed
469	49782	5	12	2	24	39	The section on observed impacts is long and detailed (12 pages = nearly 25% of the chapter) and yet none of this is reflected in the Executive Summary. That is an untenable omission, in part because of observed impacts were acknowledged, it would be a significant bit of progress in our climate impacts/adaptation communication challenges. Note, in a fairly cursory review, I noted several references that are NOT about observed impacts (e.g. Tebaldi et al. 2012) - why are they cited here; they should go into section 5.4 (Susanne Moser, Susanne Moser Research & Consulting)	This problem has now been solved in the SOD. 5.4. impacts, vulnerabilities and risk (observed and projected) are included in one section and the most relevant material reflected in the Executive Summary. All the information on adaptation has been moved to SOD 5.5.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
470	49783	5	12	2	30	38	I would just like to note that the distinction of natural from human systems throughout these two major sections is deeply disturbing. Almost none of the "natural" systems are just that - all of them are human-influenced and human-used. To separate out reefs and wetland from fisheries for example is just not helpful. It also gives the reader the impression that the authors do not pay any attention to the resilience/coupled natural-human systems/human-environment systems literature. A rather sad omission and reflecting an outdated state of thinking. this assessment should reflect the state of the art and thinking so that we are moving the ball forward not just dribbling in space. (Susanne Moser, Susanne Moser Research & Consulting)	We believe that the distinction between natural and human systems presented in the structure of the outline does not imply that the chapter does not reflect or recognize the evidence of the coupling between both subsystems in the coast. In fact, along the text you can find several references to the human and natural drivers as well as to the interaction between the different systems. It it also worth noting that with respect detection and attribution it is clearly indicated that for most of the natural systems the human system originates the drivers causing the major impacts.
471	52634	5	12	2	47	31	Section 5.3-5.8 Physical/biogeochemical/socio-economic effects addressed but little on biological effects, particularly examples of empirical or theoretical studies on effects (observed or predicted) on species/taxonomic group/habitat levels. Examples of effects on species dependent on or associated with the different coastal ecosystem types (i.e. epiphytes living on structures in the ecosystem, other organisms inhabiting structures in the ecosystems, or using these ecosystems as breeding grounds or nursery areas etc.) should also be of interest. Is this due to a lack of studies on these issues? Should future funding be channeled to this kind of research? Otherwise, this non-focus on biological systems and effects on these is strange since statement on p. 4 l. 51-54 “a generally high spatial heterogeneity and high number of habitats” (which usually also implies a high number of species) indicates a great potential for effects of climate change here. Since both primary and secondary production (and the processes working on these, including biological processes) in the coastal zone are important for human survival and well-being, effects on biological systems should be given more focus in this chapter than is currently the case. (Else Marie Løbersli, Norwegian directorate for nature management)	In SOD biological systems have been given more focus, especially in section 5.4.2.
472	35623	5	12	4	0	0	Section 5.3.1 comment: this section actually not only adresses impacts on coastal habitats and ecosystems but also impacts on external geodynamic processes (such as erosion). I wonder if this section would be more clear if these impacts could be discussed separately, starting from the statement that eco-system, geo-systems respond to climate and non climate related forcing factors. (Goneri Le Cozannet, BRGM)	In the SOD section 5.4. includes impacts, vulnerabilities and risks for both natural and human systemas. Under natural systems we have two sections for beaches, barriers and sand dunes and rocky shores separated from the rest of subsystems, including the relevant coastal ecosystems what will probably help to clarify the discussion.
473	41687	5	12	4	0	0	Section 5.3.1. It seems that the authors separated the content based on "habitats and ecosystems". I feel there are some overlaps and confusion in the way they define different habitats and ecosystems. (Rui Zhang, Xiamen University)	The section has been re-drafted completely and organized in a way that we feel avoids overlaps and helps to structure the information in a more clear way
474	41688	5	12	4	0	0	Section 5.3.1. I suggest the authors re-structure the subsections, showing more important or more attractive subsections (e.g. coral reefs, delta, etc.) firstly. (Rui Zhang, Xiamen University)	Done. See SOD 5.4.
475	36373	5	12	6	0	0	Here you use the terms 'stressors' and 'drivers' in one paragraph, are they synonyms? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The word stressor is no longer used. Driver is used trhrough out the chapter.
476	40355	5	12	6	12	17	This section should mention that coastal ecosystems that are already degraded (due to non-climatic stressors) have lower resilience and are therefore more susceptible to the impacts of climate change. (Laura Petes, National Oceanic and Atmospheric Administration)	This comes clear in the new section 5.4.
477	40354	5	12	8	0	0	Need to clarify "those" - is this saying that coastal ecosystems are the most impacted type of ecosystem globally? (Laura Petes, National Oceanic and Atmospheric Administration)	Has been redrafted. Page 15 line 34 (SOD)
478	42027	5	12	8	0	0	changer greater to greatest (Liette Vasseur, Brock University)	Does no longer apply. Page 15 line 34 (SOD)
479	38140	5	12	10	12	10	there are few…' The difficulty here is that most observations (both scientific and popularist) are made in readily accessible locations often with sizeable populations. But there are most probably coastal systems in remote locations which are very large and which have very small, or no, resident human populations - some of the very large coral atolls of the South - Central Pacific for example. In no-equatorial locations they are not likely to be climatically-stressed or impacted by increased incidence of storms. It is unlikely that this statement holds for those locations. (THOMAS SPENCER, University of Cambridge)	Has been redrafted. Page 15 line 36 (SOD)
480	46829	5	12	10	12	11	"There are few….with limited impact…" - this is not clear. Is this saying that are few that have not been affected? Please clarify in the text. (Genevra Harker, HarmonicQuay Ltd)	Has been reworded. SOD page 15, line 37
481	45956	5	12	11	0	17	Should these impacts on coral reefs be moved to the coral reef section? (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Removed
482	46830	5	12	12	12	12	"…indicate the changes impacted by climatic drivers…" - this is not clear. Does this mean the changes resulting from or due to climatic drivers? Please clarify in the text. (Genevra Harker, HarmonicQuay Ltd)	Removed
483	46831	5	12	12	12	12	"…coral bleaching impacted by climate change…" - this is not clear. Is this referring to coral bleaching due to climate change, or increased by climate change, or affected by climate change? (Genevra Harker, HarmonicQuay Ltd)	Removed

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
484	50232	5	12	13	12	15	The calibrated uncertainty language used on these lines should be italicized. Additionally, the author team should clarify where the traceable accounts supporting development of these findings can be found, for example through section references. (Katharine Mach, IPCC WGII TSU)	Removed
485	39430	5	12	13	12	16	Does D and A have to be abbreviated? It's ok in a table, but it ruins the readability of text. (Sarah Cornell, Stockholm Resilience Centre)	Removed
486	35293	5	12	15	12	17	At the very least the last sentence in this paragraph needs qualification/contextualization. There are innumerable examples of coastal system changes in which humans are not implicated. (Patrick Nunn, University of New England)	Reworded. SOD page 15, line 38
487	36374	5	12	15	12	17	The paper by Lotze et al. analysed data up to the year 2000 (ie., their late global period is 1950–2000). The impacts of climate change only became apparent at the very end of this period. Is climate change still considered to be a minor driver of the recent changes in coastal systems? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Please, read new sections on natural systems 5.4.2. and the summary on detection and attribution 5.4.4
488	37915	5	12	16	12	16	First mention of sand dunes which have not been cited as part of coastal systems: see comment above on p5 (Julian Orford, Queen\\\'s University, Belfast)	Dunes are included now in section 5.4.2.1
489	37916	5	12	18	12	28	Don't treat beaches and dunes as synonymous. In the general opening you talk about loss of entity related to different issues - you are confusing the two entities, eg I do not know where mangrove loss has effected contemporary dunes - yet this section can be read as implying it does occur. (Julian Orford, Queen\\\'s University, Belfast)	We do not aim to treat them as synonymous. However, the literature assessment provides much more information on beaches and consequently the section is biased towards beaches
490	36375	5	12	19	0	0	Figure 5-4: Is this figure an expert opinion of the authors, or based on literature? If it is the first, this should be explicetly stated. If it is the latter, this figure should be accompanied by an overview of all the sources of information underlying it. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	A new figure and a new section on detection and attribution is included in the SOD. The figure and the section summarize the assessment of the literature included in the chapter
491	42238	5	12	19	12	19	I think Figure 5-4 is a good concept. However, it will be absolutely essential to ensure that the text adequately supports the placement of the icons. The text should EXPLICITLY include consideration of detection and attribution. (Denise Reed, The Water Institute of the Gulf)	A new figure and a new section on detection and attribution is included in the SOD. The figure and the section summarize the assessment of the literature included in the chapter
492	46832	5	12	19	12	19	Need to refer to Figure 5-4 within the text. (Genevra Harker, HarmonicQuay Ltd)	A new figure and a new section on detection and attribution is included in the SOD. The figure and the section summarize the assessment of the literature included in the chapter
493	40646	5	12	20	0	0	Table 5.4 Latin America and Caribbean information is missing and there are several countries that have produced vulnerability assessment to sea level rise and to natural disasters. Examples include Mexico, Brazil, Venezuela, Argentina, Colombia, the Caribbean islands etc. There are approaches at the national level and also at local level. (Carmen Lacambra Segura, Grupo La era)	We are not aware of coastal vulnerability assessments of coastal areas outside the grey literature. references to be included in the final version
494	38141	5	12	28	0	0	section 5.3.1.1. rocky shores now appear in the chapter but they really should have bene flagged up at the start of the chapter. There is no real definition of the range of rocky shores - there is the world of difference between a granitic fjord and a highly erodible cliff in glacial sediments. It seems odd to provide some kind of classification but then draw attention to artificial rocky shores. Most of the text that follows is about organisms but there should be some discussion of the role of changing precipitation inputs into erodible cliffs and changing wave process regimes at cliff bases. Are coral reefs rocky shores? (THOMAS SPENCER, University of Cambridge)	The section on rocky shores has been rewritten.
495	43270	5	12	28	13	13	This section now nicely reflects effects on rocky shore species but misses out on processes like local adaptation and the differentiation between populations. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Some processes are given in the fourth paragraph under "Observed impacts".
496	47498	5	12	33	12	34	It would be helpful if the authors noted whether the changes that occurred on rocky shores since the 1940s are climate related. (Alexander Kolker, Louisiana Universities Marine Consortium)	We do not think that this is needed as the sentence after next is "The challenge is to distinguish the response to changes from climatic drivers, or to natural temporal and spatial fluctuations"
497	36376	5	12	36	0	0	What is meant with 'hydrology' (time of emersion, current speeds, wave action)? Why is 'hydrology' separately mentioned here? Does this imply that this is neither a 'climatic driver' nor 'a natural fluctuation'? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Agreed. "hydrology" deleted.
498	38735	5	12	36	0	37	In some cases the problem of geographycal limits of species is nor relateds with the physical environment, if not with biological characterístics of the species. A good example of this was the experiment developed by Arrontes related with the shore macroalgae Fucus serratus [Arrontes, J. 1993. Nature of the distributional boundary of Fucus serratus on the north shore of Spain. Marine Ecology - Progress Series.93: 183-193]. I suggest to indicate these cain of biologiical responses as necessary consideration to explain actual and future geographical distributions. These idea was indicated in the next paragraph but I preffer a more sarp consideration. (Ricardo Anadon, University of Oviedo)	As the referee indicates this aspect is addressed in this section. Unfortunately, space is very limited and it is not possible to include a detailed review of the factors affecting geographical boundaries.
499	37411	5	12	36	12	37	Hydrology? How is the hydrology important for rocky coasts? I am surprised that competition is not mentioned here, I thought there were any number of studies that showed the importance of competition between intertidal organisms and its effect on organism distribution (Colin Woodroffe, University of Wollongong)	Agreed. "hydrology" deleted. Competition is already mentioned.
500	38142	5	12	37	12	37	spatial and temporal fluctuations in what? (THOMAS SPENCER, University of Cambridge)	"in abundance and community structure". The text has been modified accordingly.
501	50233	5	12	39	12	39	For the statement "species can be eliminated" would be preferable to indicate possible outcomes with more complexity? For instance, it could be beneficial to indicate the potential for altered distribution (in terms of latitude and/or elevational height in the intertidal region). (Katharine Mach, IPCC WGII TSU)	The SOD has been modified accordingly.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
502	40356	5	12	39	12	41	Needs re-wording. Should delete the first clause (as it shouldn't be all about extinction) to say "Increases in air and water temperature, changes in upwelling regimes, and changes in oxygen and pH levels can lead to lethal and sublethal effects on intertidal organisms, in turn affecting population size, species interactions, and species persistence." (Laura Petes, National Oceanic and Atmospheric Administration)	The SOD has been modified accordingly.
503	42028	5	12	41	12	44	Split the sentence into two as you have two different ideas in one. (Liette Vasseur, Brock University)	The SOD has been modified accordingly.
504	37412	5	12	45	12	48	I urge re-consideration of the comments appear about things that DID NOT change (Colin Woodroffe, University of Wollongong)	The "no-change" comments have been deleted.
505	38736	5	12	47	0	49	In contrast with the papers referred in the actual version, there are many related with observed changes in the distribution that could promote novel combination of the species. As example I incorporate the reference of a Long term study in North Iberian coast [C. Fernández (2011): The retreat of large brown seaweeds on the north coast of Spain: the case of Saccorhiza polyschides , European Journal of Phycology, 46:4, 352-360]. In a long term survey this author shows a decreasing trend until disappearance of a kelp specie related with climate change: warmer summer temperatures, also related with decreased upwelling events during summer. I suggest to include this or other references about geographical shifts in shore species al least in some regions. (Ricardo Anadon, University of Oviedo)	Due to lack of space kelps are not considered in for the section.
506	38715	5	12	51	12	51	"increased storminess" should be replaced by "storminess increase" or "potential storminess increase" since storminess increase was so far only observed and proved at restricted areas and mainly for hurricanes or tropical storms. "increased stominess" is acepting that as a fact, observed and proved with global dimension. (Oscar Ferreira, University of Algarve)	NA - see response to #509.
507	46833	5	12	51	12	51	Sentence not clear. Should 'affect' be 'affecting', or is there something else missing? (Genevra Harker, HarmonicQuay Ltd)	NA - see response to #509.
508	42029	5	12	51	12	52	It seems that this sentence is not complete and will need references. (Liette Vasseur, Brock University)	NA - see response to #509.
509	37413	5	12	51	12	53	I think this paragraph should be deleted. Surely we cannot be concerned about this sort of issue in comparison to the many more pressing pressures on coasts. The reference is old, in any case. (Colin Woodroffe, University of Wollongong)	Yes - paragraph deleted.
510	46708	5	12	52	12	52	It should also be noted that storms can introduce invasive species. You may want to cite Hellmann et al. 1998. Five potential consequences of climate change for invasive species. Conservation Biology, 22: 534-543. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	The SOD has been revised but does not mention specifically what storms can do.
511	36385	5	13	0	0	0	Why are intertidal and subtidal soft-sediment organisms (such as bio-engineering musselbeds) not discussed in this section???? Considering their importance (see 2nd remark on Table 5-1), this group deserves a separate chapter comparable to the in depth discussion as has been provided for coral reefs. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Agreed. It is not possible to add a new section but the SOD has been revised accordingly and now includes a short text on mussel beds.
512	36386	5	13	0	0	0	This section shows overlap with previous sections, e.g., 5.3.1.3 (estuaries) and the general sections on sediment delivery (5.2.2.2.3) and sea level rise (5.2.2.1.1) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	This overlap has been dealt with.
513	36377	5	13	1	13	4	Can the results supplied by Wootton et al. (2008) be considered proof for impacts of pH on marine species as suggested in line 1 ("field evidence…is available."), or not as stated in line 4 (attribution..is difficult."). (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Agreed. The SOD has been revised accordingly.
514	36378	5	13	12	13	13	What are the implications of this last sentence? Or should it be moved to the beginning of this section? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The sentence has been deleted.
515	46709	5	13	16	13	50	Section 5.3.1.2: This section should also discuss the loss of barrier islands, e.g. Ship Island, Mississippi, or Cape Hatteras, North Carolina. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Loss of barrier islands is included in the loss of barriers in the "observed impacts".
516	36379	5	13	18	0	0	Please, explain "bluff". (Catharina Philippart, Royal Netherlands Institute for Sea Research)	"Bluffs and cliffs" have been removed in this section focusing on beaches, barriers and dunes.
517	38143	5	13	18	13	18	why do cliffs appear under beaches and dunes? (THOMAS SPENCER, University of Cambridge)	See answer to #516.
518	42239	5	13	18	13	28	Each of the citations in this paragraph needs to provide specific direct evidence for the association it is being used to support. Some of these citations seems very general in nature. (Denise Reed, The Water Institute of the Gulf)	Have reviewed each reference. The only truly truly general one is Bird (2000), which we have made clear that it is an overview account.
519	38948	5	13	19	13	19	Bird 2000 cited as 70% of sandy beachers erodigin. Please check this with original research papers as Bird 2000 is a review text (Neil Saintilan, Office of Environment and Heritage)	See answer to #518.
520	36380	5	13	20	13	26	Are these changes related to climate (variation in long-term weather patterns) or the result of climate change? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Yes they are potential climate related forcings. Have made the text clearer to address the reviewer's point.
521	44756	5	13	21	13	21	"…; changes in the frequency and severity of transient storm associated erosion events (Tebaldi et al., 2012). I don't think that the paper of Tebaldi et al investigated changes in the frequency and severity of coastal storms, instead, it studied the effect of sea level rise on storm surge flooding. Some references on changes in the frequency and severity of coastal storms are Bender et al (2010) and Knuston et al (2010) for tropical storms and Zhang et al. (1997; 2000) for nor'easters. (Keqi Zhang, Florida International University)	Yes, the paper focused on the influence of sea-level rise on storm surge, finding that the frequency of extreme surges will increase substantially with continued sea level rise. We have made the text clearer.
522	44757	5	13	24	13	25	"…; changes in the loss of natural protective structures such as coral reefs or mangrove forests due to increased ocean temperatures or ocean acidification. " I do not think that the loss of mangrove forests is mainly due to increased ocean temperatures or ocean acidification. (Keqi Zhang, Florida International University)	The text has been revised to indicate the climate-related factors that can cause the loss of mangrove forests.
523	46389	5	13	26	13	28	There has been some recent research regarding beach erosion in South Africa. See Corbella and Stretch 2012 Decadal trends in wave climate and beach erosion on the east coast of South Africa (in press) Nat. Hazards Earth System Science (Andrew Mather, eThekwini Municipality)	This is too specific and not considered.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
524	50234	5	13	27	13	27	As calibrated uncertainty language, "high confidence" should be italicized. (Katharine Mach, IPCC WGII TSU)	Corrected
525	37414	5	13	27	13	29	This process has been termed beach rotation, it is a reversible shift of sand from one end of the beach to the other. I am not clear how this fits into the remainder of this paragraph (Colin Woodroffe, University of Wollongong)	Text has been expanded to make the discussion clearer.
526	42786	5	13	30	13	32	Add "protection structures, and sand mining" (Sofia Bettencourt, World Bank)	NA - the sentence has been deleted.
527	38144	5	13	33	13	33	UK East coast figure for erodible glacial materials is (over 1000 transects along 11 km of shoreline): Long-term (1883–2008) mean shoreline retreat rates of 2.3–3.5 m a−1 (Benacre–Southwold) and 0.9 m a−1 (Dunwich–Minsmere). Brooks SM and Spencer T 2010 Temporal and spatial variations in recession rates and sediment release from soft rock cliffs, Suffolk coast, UK. Geomorphology 124, 26-41 [doi:10.1016/j.geomorph.2010.08.005 - but this should be in a cliffs section to the chapter. (THOMAS SPENCER, University of Cambridge)	Yes agree it should be associated with cliffs.
528	35616	5	13	37	13	39	The Webb and Kench (2010) included 27 islets in 4 atolls (not 27 atolls), many of which having experienced accretion because of urbanisation. (Goneri Le Cozannet, BRGM)	Correct, there are 27 atoll islands.
529	40241	5	13	39	13	42	I hereby attach examples of beach recovery from just the demolition of groyns in Cyprus (attachment 1, icluded in the presentation "Coastal Space and Coastal Structures", by X.I. Loizidou (invited speaker), Workshop on Coastal Space, November 2011, Limassol http://www.limassolmunicipal.com.cy/imerida/2.html (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	NA - Example is too localized and from non-peered source.
530	37415	5	13	40	13	42	I have not seen the term coastal squeeze used in this context before, that is to describe the loss of a beach in front of a seawall. Usually it refers to intertidal ecosystems. The loss of beaches in front of seawalls has been well documented. I think this chapter could do a useful job of providing clearer definition of coastal squeeze. The term is used in its more traditional context several times later in the chapter, but there are not many good definitions or examples. It is a distinctly COASTAL phenomenon, and I recommend it be treated a bit more systematically in this chapter. (Colin Woodroffe, University of Wollongong)	Coastal squeeze is defined in a broad manner in AR5 Glossary. It includes the loss of beaches in front of seawalls and other infrastructure due to long term erosion of beaches from a variety of processes, climate potentially being one.
531	38145	5	13	40	13	43	coastal squeeze'. A recent reassessment of the use of the 'coastal squeeze' terminology (Pontee, 2011) found that the term has not been applied consistently and that the underlying process base was either overlooked or found to be more complex than simply being the product of increased nearshore water depths. A recent analysis of the coastline of NW England, from North Wales to the Solway Firth, found only 7% of shore-normal profiles to have narrowed significantly, with the most likely controls being changes in offshore bathymetry, changes in wave climate and reductions in alongshore sediment supply (Pontee, 2011). Indeed, it has been argued that the scientific literature contains no evidence for sea level rise–driven 'coastal squeeze' whatsoever (e.g. Hughes and Paramor, 2004). Pontee NI 2011 Reapparaising coastal squeeze: a case study from north-west England. Proceedings of the Institution of Civil Engineers, Maritime Engineering 164 (MA3), 127- 138. Hughes, R.G., Paramor, O.A.L. 2004 On the loss of saltmarshes in south-east England and methods for their restoration. J. Appl. Ecol. 41, 440-448. (THOMAS SPENCER, University of Cambridge)	Coastal squeeze is now discussed, and the changes in seagrasses with sea level rise have been noted with "low confidence" - You are correct, in this lead author's opinion, that coastal squeeze has not been adequately related to sea level rise in order to confirm cause and effect. However, squeeze is used in a broader sense than climate forcing alone and this establishes its relevance. See answer to #530.
532	47499	5	13	42	0	0	The authors should describe the term, "coastal squeeze." The authors should also consider minimizig the use of jargon. (Alexander Kolker, Louisiana Universities Marine Consortium)	See answer to #530-531.
533	47549	5	13	42	0	0	Reference is made to 'coastal squeeze' here - and it might be appropriate to reference this - Titus JG (1991) Greenhouse effect and coastal wetland policy: How Americans could abandon an area the size of Massachusetts at minimum cost. Environmental Management 15, 39-58. DOI: 10.1007/BF02393837 would be a good choice. (Jon French, University College London)	Good examples but unable to include all.
534	38146	5	13	43	13	44	The key issue here is whether subsequent recovery is possible. Dolan and Godfrey on th US east coast suggested a long time ago that 'natural' beach profiles contract unde rstorm impacts but can then be restored subsequently in a way that artifically managed coasts cannot. (THOMAS SPENCER, University of Cambridge)	Added text clarifying the potential importance of post storm beach recovery.
535	42030	5	13	46	0	0	In fact, I storngly believe that there is more. E.g. http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=297D1933-034A-4BD2-996E-C83FAA1C8016 (which was peer-reviewed); Ashkenazy et al. (2011, Climate Change); Yizhaq et al. (2009, JOURNAL OF GEOPHYSICAL RESEARCH) (Liette Vasseur, Brock University)	We are not arguing that there is no evidence, but in our opinion there does not appear to be enough to link cause and effect in a statistically defensible sense.
536	35617	5	13	46	13	48	This sentence addresses the issue of identifying important factors causing erosion and/or accretion. This issue is not limited to beaches and sand dunes but is important for any kind of geomorphological features (e.g. soft rock cliffs). It could be mentionned that large coastal databases still exist (not only scarse data exist) and can provide insigth to the possible explanations of shoreline moibility (e.g. USGS databases, Eurosion...). In the eastern US, the Guttierez et al. (2011) study showed that bayesian networks can assimilate important factors contributing to coastal change. This study highligthed the importance of relative sea level variations in the eastern USA for explaining coastal erosion. In Europe, the same approach was applied by Yates and Le Cozannet (2012) highligting the importance of geomorphology and sea level variations. Gutierrez, B., Plant, N., and Thieler, E.R., 2011: A Bayesian network to predict coastal vulnerability to sea level rise. J. Geophys. Research Vol. 116, F02009, 15 pp. ; Yates, M. L. and Le Cozannet, G.: Brief communication "Evaluating European Coastal Evolution using Bayesian Networks", Nat. Hazards Earth Syst. Sci., 12, 1173-1177, doi:10.5194/nhess-12-1173-2012, 2012. (Goneri Le Cozannet, BRGM)	Guittierez et al 2011 study has been included as a potential means in forecasting coastal change.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
537	42240	5	13	46	13	50	This is a very important paragrah. Some of the text in the previous paragraphs may imply a level of certainity regarding the relationship between erosion and SLR that cannot be supported. Be sure the text leads appropriately into this concluding paragraph. (Denise Reed, The Water Institute of the Gulf)	This is acknowledged in the penultimate paragraph in this section.
538	42787	5	13	46	13	50	Note: Our observations on the coasts of Mozambique (Ihambane and Maxixe), Sao Tome and Senegal tend to indicate that climate change is not the most important driver, although it is often blamed (Sofia Bettencourt, World Bank)	This confirms the difficulty of attributing shoreline changes to climate change.
539	38147	5	13	47	13	47	Vivien Gornitz made this point in AR4 (THOMAS SPENCER, University of Cambridge)	Has become a general statement.
540	36274	5	13	48	13	49	I think that this sentence is ambiguous. Do the authors mean "For cases where no adaptation measure is taken" ? (Déborah Idier, BRGM)	This has been revised.
541	35618	5	13	48	13	50	"In the absence of adaptation measures there is a high confidence that beaches and sand dunes currently affected by erosion, will continue to do so under increasing sea levels or changing wave heights and mean energy flux direction.": This has been already written in a similar form page 6 (lines 46/47). If I understand well, the idea behind is just similar to that of Bruun (1968). I think that this statement would benefit from an updated review of studies on what we know about the actual effects of sea level rise on erosion (or should provide a link to the relevant paragraph). Note that chapter 18 and 29 also shortly discuss this issue. (Goneri Le Cozannet, BRGM)	This has been revised to take note of sea-level rise on beaches and sand dunes currently affected by erosion.
542	37416	5	13	48	13	50	This is a better worded than page 2 line 50. Again, I am not sure that this captures the fact that erosion is generally caused by some imbalance in the system, such as longshore drift, and that it is not strictly a result of sea-level rise. Here adaptation measures are specifically identified as the 'all other things being equal' that are mentioned more vaguely in page 2, line 50. It would be good to clarify whether it is such human factors or other natural factors that are meant elsewhere in the chapter. (Colin Woodroffe, University of Wollongong)	This has been revised to take note of sea-level rise on beaches and sand dunes currently affected by erosion.
543	50235	5	13	48	13	50	As calibrated uncertainty language, "high confidence" should be italicized. Additionally, it would be beneficial to provide citations in support of this statement, for example pertaining to projected outcomes. (Katharine Mach, IPCC WGII TSU)	This statement is traceable to the foregoing paragraphs.
544	36384	5	13	49	0	0	References are missing! See that this topic comes back on the next page (page 14, lines 6-12). Better move it to that section. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Except for SLR the rest have been removed.
545	46834	5	13	49	13	49	"...will continue to do so..." - this is not clear. Does it mean continue to erode? Please clarify in text. (Genevra Harker, HarmonicQuay Ltd)	The meaning is quite clear.
546	39005	5	13	52	0	0	"... changes in hurricane activity could subject mussels to more frequent and more severe disturbances compared to those that occurred during 1971-1994 (Carrington, 2002)." This is an example for a statement that makes no sense in a detection and attribution context. It may be so that something is sensitive to disturbances, but that is a statement about the future, and not about something that has been observed, even if there seems to be a precise reference. (Wolfgang Cramer, Potsdam Institute for Climate Impact Research)	This comment refers to page 12, line 52. The paragraph has been deleted - see response to #509.
547	45964	5	14	0	0	0	Comment: Breitburg et al. 2009 is an excellent paper, however, it isn't an appropriate citation here as these basic physical characteristcis of estuaries have been well know for decades - maybe a a more appropriate reference would be: Cameron WM, Pritchard DW, 1963, Estuaries, In: The Sea (Ed. MN Hill), Vol. 2, Wiley, New York, 306-324. (Sybil Seitzinger, International Geosphere Biosphere Programme)	Thank you. The classical, text-book reference has been added.
548	43272	5	14	1	17	6	These sections on beaches, deltas, mangroves, salt marshes have system level assessments of other human impact but less reference to species or system sensitivites to climate (in contrast to that on rocky shores). Some harmonization is warranted. These details should be added and the level of available information should be mentioned. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The section has been revised to be more encompassing
549	38716	5	14	2	0	0	Section 5.3.1.3 - An expected impact at coastal lagoons is the squeeze of the entire coastal lagoon system at occupied areas, in association to sea level rise, since the barrier islands will migrate landward (see works of Pilkey among others) and the lagoon system will not have the possibility to interely migrate due to human occupation at the inner areas. The overall area will be become therefore smaller. (Oscar Ferreira, University of Algarve)	Thank you for this feedback. This information and two Pilkey publications are now included.
550	47500	5	14	4	4	6	The statement that estuaries are the primary conduit for water, nutrients, and particulates to the sea is a bit misleading. The mixing zone for some rivers is offshore of the semi-enclosed region that would classically make up the estuary. For example, in the Mississippi River system, most of the mixing occurs on the continental shelf, which is generally a function of the large discharge associated with this river (Dagg 2003, Dagg et al. 2007). Other rivers discharge into deep water have a very small mixing zone, for which the Columbia river is an example. (Alexander Kolker, Louisiana Universities Marine Consortium)	The text has been reformulated so that mixing zones on the shelf or even in the ocean are included.
551	39431	5	14	4	14	15	As general background, these first 3-4 paragraphs are very text-bookish. Where there are new insights, this should be made clearer, and where the references cited are reviews of earlier literature, it would be better to be clear about that - at the moment, it looks as though they are the authoritative source for the information being given. (Sarah Cornell, Stockholm Resilience Centre)	Thank you. The whole text has been re-organised and this issue of introductionary paragraph has been resolved in this way.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
552	39433	5	14	4	15	12	Overall, this section does not flow well - each paragraph seems like a stand-alone set of factoids. Restructuring would help. Explain in the opening sections why coastal lagoons are treated together with estuaries - there are physical and ecological similarities, which (if these are set out clearly at the start) makes it easier later to explain where there are specific concerns about the different ecosystems. Nutrients and sediment inputs are one key set of common issues, then carbon/acidification is another. The literature cited on estuary productivity/fisheres is extremely sparse (line 49...). (Sarah Cornell, Stockholm Resilience Centre)	An introductionary paragraph has been added and text has been re-organised.
553	47550	5	14	4	15	12	Section 5.3.1.3 comment: the section on Estuaries, tidal flats and lagoons is presently rather disjointed and, in places, reads as though it has been bolted together from a set of sources rather than synthesised from the various arguments and findings within the very large literature. Also, there is virtually nothing specific to tidal flats (or other intertidal wetlands) in this section - despite the title. Specifically also, on page 5 line 15, it might also be noted that changes in sediment budget have profound implication for the maintenance of key landform features - tidal flats marshes - on which the varied ecosystem functions and 'processing' functions depend. (Jon French, University College London)	The section has been revised and reorganised
554	35294	5	14	5	14	5	Use "land" not "continent". (Patrick Nunn, University of New England)	Word replaced.
555	47501	5	14	10	14	11	It should be noted that not all estuaries have high sedimentation rates. (Alexander Kolker, Louisiana Universities Marine Consortium)	Text modified.
556	37285	5	14	12	14	12	Please add: "These complex causal relations and the influence of hydrodynamic boundary conditions on bed-load transport and migration of sand dunes in a tidal environment, i.e. the Elbe Estuary located approximately 100 km from the German Bight, have been analyzed based on a unique data set consisting of 66 bathymetrical charts collected between 1995 and 2010 (Zorndt et al., 2011). The study reveals that average sand dune migration rates stemming from bed-load transport mechanisms were directed upstream with an average magnitude of U_{mig} = 0.07 m day^{-1} and average estimated sand transport rates amounted to q_b = 0.06 m^3 (day m)^{-1} and demonstrate the strong influence of the flood dominance on the sand transport in the Elbe Estuary mainly driven by continuous dredging activities for navigational purposes." Full citation: Zorndt, A.C., Wurpts, A., Schlurmann, T.: The influence of hydrodynamic boundary conditions on characteristics, migration, and associated sand transport of sand dunes in a tidal environment: A long-term study of the Elbe Estuary (2011) Ocean Dynamics, 61 (10), pp. 1629-1644 (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	Thank you for this feedback. However, given the flow of information, the level of detail and space constraints, this reference is not included.
557	46835	5	14	13	14	14	"...land-use changes related changes in sediment..." - this is not clear. Sentence does not make sense. (Genevra Harker, HarmonicQuay Ltd)	Sentence modified.
558	36381	5	14	17	14	18	Do you mean that residence time is determined by tidal amplitude and river run-off, and that the relative strength of these factors determines which one is dominant? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Sentence modified.
559	36382	5	14	20	0	0	The use of the word "flood" for a runoff event might be a bit confusing, because climate change reports often refer to flood as in "flooding by storm surges". Better use "Fluvial flood". (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Text modified.
560	40357	5	14	23	14	42	This section should include the important role of estuaries in carbon sequestration and perhaps introduce the concept of "blue carbon." (Laura Petes, National Oceanic and Atmospheric Administration)	Carbon sequestration is now mentioned, but blue carbon is not covered in this section. It can better be discussed in the vegetated system section.
561	37418	5	14	34	0	0	What is the meaning of the unclear statement about 'mainly riverine ones are the only ones for surviving'? Reword (Colin Woodroffe, University of Wollongong)	This sentence does not appear in the text. Can therefore not respond.
562	39432	5	14	34	0	0	ecosystem engineers' Is an ambiguous term. (Sarah Cornell, Stockholm Resilience Centre)	Text modified.
563	37419	5	14	36	14	37	There is sediment accumulation in systems that have low sediment input; these ecosystems are not restricted to high sediment input systems. Low sediment input systems may be more at risk. Peat discussed in next sentence may accumulate in low sediment input systems (Colin Woodroffe, University of Wollongong)	This sentence does not appear in this section. Although the referee is right, it is implicitly mentioned in the text by stating that sediment accumulation is heterogenous and habitat specific.
564	37417	5	14	39	0	0	Reword 'overrule' (Colin Woodroffe, University of Wollongong)	Has been reworded to overrride.
565	36383	5	14	44	0	0	Further increase of riverine delivery of nutrients is not to be expected for all coastal systems, because nutrient reductions are already in place or planned for several coastal seas (e.g., Philippart et al., 2007. Impacts of nutrient reduction on coastal ecosystems. Ecosystems 10: 95–118; Carstensen et al., 2011. Connecting the dots: Responses of coastal ecosystems to changing nutrient concentrations. Environ. Sci. Technol. 45, 9122–9132) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Thank you. We have added a few lines on declining nutrient loadings and added three references for this.
566	46836	5	14	44	14	44	"...has increased significantly the last century..." - missing 'over' or 'during' the last century. (Genevra Harker, HarmonicQuay Ltd)	Has been corrected.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
567	45965	5	14	44	14	45	Comment: Bouwman et al. 2011 is an excellent paper but did not include river delivery of nutrients to coast but rather agricultural soil budgets with runoff being one component (there are many in-river processes that modify the transport and they were not a part of this modeling work) A few papers that did look at past and future riverine delivery of nutrients to the coast are: Seitzinger, S. P., et al. (2010), Global river nutrient export: A scenario analysis of past and future trends, Global Biogeochem. Cycles, 24, GB0A08, doi:10.1029/2009GB003587; Galloway, J. N., et al. (2004), Nitrogen cycles: Past, present, and future, Biogeochemistry, 70, 153–226, doi:10.1007/s10533-004-0370-0; Bouwman, A. F., G. Van Drecht, J. M. Knoop, A. H. W. Beusen, and C. R. Meinardi (2005), Exploring changes in river nitrogen export the world's oceans, Global Biogeochem. Cycles, 19, GB1002, doi:10.1029/2004GB002314. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Thank you for this feedback. The two most recent ones of the suggested references have been added.
568	47502	5	14	44	14	49	This statement is a bit misleading. I grant you that floods and related events could negatively affect the way that organic matter and nutrients are processes, given the right set of circumstances. However, such events could also bring more organic material to the coastal zone, and/or flush out systems, thereby enhancing nutrient cycling in these systems. This statement needs appropriate qualifiers and references. (Alexander Kolker, Louisiana Universities Marine Consortium)	Thank you for this feedback. This information is now included although in a different paragraph and a reference has been added as well.
569	45957	5	14	45	0	0	Comment: Bouwman et al. 2011 is an excellent paper but did not include river delivery of nutrients to coast but rather agricultural soil budgets with runoff being one component (there are many in-river processes that modify the transport and they were not a part of this modeling work) A few papers that did look at past and future riverine delivery of nutrients to the coast are: Seitzinger, S. P., et al. (2010), Global river nutrient export: A scenario analysis of past and future trends, Global Biogeochem. Cycles, 24, GB0A08, doi:10.1029/2009GB003587; Galloway, J. N., et al. (2004), Nitrogen cycles: Past, present, and future, Biogeochemistry, 70, 153–226, doi:10.1007/s10533-004-0370-0; Bouwman, A. F., G. Van Drecht, J. M. Knoop, A. H. W. Beusen, and C. R. Meinardi (2005), Exploring changes in river nitrogen export the world's oceans, Global Biogeochem. Cycles, 19, GB1002, doi:10.1029/2004GB002314. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	see above, # 567
570	45958	5	14	49	0	0	The increased primary production also results in increased uptake of CO2 and increase pH over short (seasonal) time scales (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Text has been reformulated to include this.
571	45963	5	14	49	0	0	increased nitrogen loading also increases N2O emissions in estuaries and contiental shelf systems -For example: Kroeze, C., E. Dumont and S. P. Seitzinger. 2010. Future trends in emissions of N2O from rivers, estuaries and continental shelves. Journal of Integrative Environmental Sciences 7:71-78. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Thank you. We have added a line on nitrous oxide from estuaries/lagoons and two references.
572	37420	5	14	52	0	0	What is the evidence for impacting the global economy. Such a statement would seem to require a reference (Colin Woodroffe, University of Wollongong)	This sectence does not appear in this section.
573	48272	5	15	0	0	0	Deltas - There should be a study of the Brahmaputra the river of the North East India and China, or the rivers of Bangladesh, and CHina (Malini Nair, Indian Institute of Science)	Thank you. The classical, text-book reference has been added.
574	50236	5	15	6	15	8	The author team should consider if more recent citations can be provided to support the statement. (Katharine Mach, IPCC WGII TSU)	The entire text has been re-arranged. The issue of species vs. ecosystem level should be replied at chapter level.
575	47503	5	15	17	15	11	The authors should refer to my earlier comments about this section for general remarks. Additional comments are also needed and will be provided below. (Alexander Kolker, Louisiana Universities Marine Consortium)	OK
576	38148	5	15	18	0	0	section 5.3.1.4 deltaic complexes contain habitats they are not a habitat themselves. This points to a problem in that this section discusses 'wetlands' - but they then re-appear in the next section entitled 'mangroves and saltmarshes'. Somehiow in this chapter there is a need to re-organize to show how smaller scale components nest within larger components (with both scales having their own space-time dynamics) (THOMAS SPENCER, University of Cambridge)	The section has been revised and reorganised
577	42031	5	15	20	0	0	Change natural systems for diverse habitats. And fix the sentence with its weird e.g. (Liette Vasseur, Brock University)	The text has been revised accordingly.
578	46837	5	15	27	15	27	"..as one of vulnerable areas." - this is not clear. Suggest delete 'one of'. (Genevra Harker, HarmonicQuay Ltd)	The text has been revised accordingly.
579	38149	5	15	29	15	29	a key process is the construction of levees along the major distributaries as this prevents bank failure and the input of sediments into interdistributary bays to build crevasse splay deposits. See any satellite image of the Mississippi bird's foot delta and the fine sediment discharges into deep water from the hydraulically efficient, constrained slots which are the major distributaries. The text should discuss the consequences of disconnecting deltaic distributaries from the inter-distributary bays. (THOMAS SPENCER, University of Cambridge)	This text has been rewritten.
580	43271	5	15	29	15	42	This paragraph needs polishing for clarity and understandability. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	This text has been rewritten.
581	35295	5	15	34	15	34	It seems that "coastal wetlands" and "salt marshes" are used interchangeably throughout this chapter (see also title of section 5.3.1.5 and line 36 on page 16). If this is the case, I suggest that readers would prefer one term ("coastal wetlands" seems best). Also the 2011 paper by Traill et al. in Diversity and Distributions is important to cite in this section in my view. (Patrick Nunn, University of New England)	The section has been revised and reorganised
582	38949	5	15	34	15	36	Careless wording "loss of mangroves due to….increased temperature and ocean acidification" ??? Also, you should cite the evidence fore shoreline erosion due to mangrove loss (Bongaerts et al is a reef paper) (Neil Saintilan, Office of Environment and Heritage)	This text was deleted.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
583	40358	5	15	35	0	0	This is not a complete clause: "riverine are only ones" - needs clarification. (Laura Petes, National Oceanic and Atmospheric Administration)	This text was deleted.
584	38150	5	15	35	15	35	But the Mediterranean is micro-tidal. Clearly this argument will not apply in meso- to macro-tidal settings where marine inputs of sediment are critical (and where they may be no riverine inputs at all) (THOMAS SPENCER, University of Cambridge)	This text was deleted.
585	38151	5	15	37	15	37	then the text talks about tides. This is confusing. Understanding wetlands requires a consideration of the physical settings within which they are found (French and Reed, 2001); marsh form and development within these contexts is primarily controlled by sea-level, tidal and sediment supply regimes (Allen, 2000). Continental / regional differences result from a range of i) tectonic (continental shelves and enclosed seas) and geomorphic settings (deltas, estuaries and barrier/open coasts), ii) environmental process regimes (fluvial flooding, wave climate, tidal range), iii) climatic gradients, and iv) biogeographical provinces (e.g. Spalding et al., 2007). Individual sites exhibit variations in elevation in the tidal frame and differing rates of geological subsidence, sediment supply (allochthonous v. autochthonous) and autocompaction. Combinations of these controls and regional differences in rates of sea level rise endow individual tidal wetland sites with varying degrees of resilience, and rates of loss. see Allen, J.R.L., 2000. Morphodynamics of Holocene saltmarshes: a review sketch from the Atlantic and Southern North Sea coasts of Europe. Quaternary Science Reviews 19, 1155-1231. Spalding, M.D., Fox, H.E., Allen, G.R., Davidson, N., Ferdana, Z.A., Finlayson, M., Halpern, B.S., Jorge, M.A., Lombana, A., Lourie, S.A., Martin, K.D., McManus, E., Molnar, J., Recchia, C.A., Robertson, J., 2007. Marine ecoregions of the world: A bioregionalization of coastal and shelf areas. Bioscience 57, 573-583. French, J.R., 2006. Tidal marsh sediment trapping efficiency and resilience to environmental change: exploratory modelling of tidal, sea-level and sediment supply forcing in predominantly allochthonous systems. Marine Geology 235, 119-36. French, J.R., Reed, D.J., 2001. Physical contexts for saltmarsh conservation. In: A. Warren, J.R. French (Editors), Habitat conservation: Managing the physical environment. Chichester, John Wiley, pp.179-228. (THOMAS SPENCER, University of Cambridge)	The section has been revised and reorganised
586	47504	5	15	41	15	42	The authors should be clear about whether this study means that of all deltas on Earth 42 are showing land loss or whether these 42 deltas were chosen as representative examples. (Alexander Kolker, Louisiana Universities Marine Consortium)	This text has been rewritten accordingly.
587	38152	5	15	44	15	44	Marsh drowning requires very high rates of sea level rise, such as in the Mississippi delta, with sediment supply turned off. In minerogenic marshes, modelling suggest that surface vegetation communities may change but some form of marsh system survives. French, J.R., 1993. Numerical modelling of vertical marsh growth and response to rising sea-level, Norfolk, UK. Earth Surface Processes and Landforms 18, 63-81. (THOMAS SPENCER, University of Cambridge)	Addition discussion of sea level rise and impacts has been added
588	47505	5	15	44	16	2	This sentence (along with others in this section) discusses sea level rise impacts to coastal ecosystems in general, but it is located in a section on deltas. What was the organization logic behind this? I think this paragraph needs to be reworked to follow a more logical document construction. (Alexander Kolker, Louisiana Universities Marine Consortium)	This text has been rewritten.
589	39434	5	15	44	16	11	These last two paragraphs do not flow well, mixing physical change, human and economic costs of events, responses to risks, and a flurry of place names. The reader might appreciate a bit more general geographical guidance, eg 'East Asian deltas… In Europe…' Line 4 - 'Thirty-three deltas in the world show that 85% of the deltas experienced' is a very awkward structure. Suggest 'A detailed study of 33 deltas around the world found that 85% had experienced...' And if each paragraph began with a clear sentence of the general issue that the various studies illustrate, it would be a better narrative. For example, lines 5-6 are actually a really good opener for that paragraph. (Sarah Cornell, Stockholm Resilience Centre)	The text has been revised and reorganised
590	47506	5	15	49	0	0	To the best of my understanding, Tokyo is not located in a delta. This should be mentioned. Also, there is no citation for the amount of subsidence that has occurred at any of these locations, which there should be. Finally, the statement would be much stronger if it had covered a geographic range of settings, for example include the Nile Delta, the Danube Delta, and the Mississippi Delta. (Alexander Kolker, Louisiana Universities Marine Consortium)	The section has been revised accordingly. We showed here only m scale subsidence per century.
591	37917	5	15	53	15	53	"recent large structures" of what type and/or purpose? (Julian Orford, Queen\\\'s University, Belfast)	It was deleted
592	47507	5	15	53	15	54	The authors should be clear about the amount of the 1-2 m of relative sea level rise that is expected from global sea level rise and the amount of relative sea level rise that is expected from subsidence. (Alexander Kolker, Louisiana Universities Marine Consortium)	Relative sea-level change and global sea-level rise are sumarized in 5.3.2. The impacts of loads from massive buildings and other large structures are only shown here. Its rate is 1 to 2 mm/a in the Fraser River delta.
593	40640	5	16	0	0	0	Spalding, M., Ruffo, S., Lacambra, C., Meliane, I., Hale, L.Z., Shepard, C., y Beck, M. (2012). The role of ecosystems in coastal protection: adapting to climate change and coastal hazards. Journal of Marine research Aceptado en Abril 15 2011(in press) (Carmen Lacambra Segura, Grupo La era)	This reference is useful and appopriately used in section 5.5.4 Adaptation practice.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
594	40641	5	16	0	0	0	It is observed that the text is not really referring to the impacts of climate change to mangroves. It has been reported that storms and hurricanes and cyclones can defoliate entire trees, uproot the trees, produce sediment burying etc. All of these impacts will reduce the ecosystem natural resilience and also its capacity to protect the coast. Climate change will affect the mangroves by an increase (perhaps) of impacts from storms and with sea level rise, perhaps there might be change in communities or distribution due to temperature and precipitation changes. It is possible that mangroves can keep up with sea level rise as saltmarshes but there are consequences related to the frequency of storm impacts to one ecosystem at one particular place. Reference texts: Lacambra, C., 2009. Ecosystem-Inclusive Coastal Vulnerability Assessment in Tropical Latin America. PhD Thesis, Department of Geography, University of Cambridge, Cambridge, UK. Lacambra, C., Spencer, T., Moeller, I., 2008. Literature review: tropical coastal ecosystems as coastal defences. The Role of Environmental Management in Disaster Risk Reduction and Climate Change Adaptation Annex 1 Case studies.ProAct Network. Switzerland (Carmen Lacambra Segura, Grupo La era)	The section has been revised and reorganised
595	42241	5	16	1	16	2	The theoretical context behind this statement about SLR, sediment deposiiton in river channels and reduction in sediment supply to coasts need to be amplified. Increase base level, reduced river gradient etc is a solid theoretical concept that could well apply more broqadly that the Po where it has been observed. providing more theoretcial context allows for the potential that this could occur elsewhere and is not a local effect in the Po. (Denise Reed, The Water Institute of the Gulf)	This text has been rewritten accordingly.
596	37421	5	16	4	0	0	Finally the Syvitski ref, which would have been appropriate earlier. Reword the 85% of 33 deltas; it is not clear. (Colin Woodroffe, University of Wollongong)	This text has been rewritten accordingly.
597	42032	5	16	4	0	0	Change the beginning of the sentence: On 33 deltas examined by Syvitski et al. (2009), 85% of them … (Liette Vasseur, Brock University)	This text has been rewritten accordingly.
598	38950	5	16	4	16	5	Poor sentence construction makes this difficult to intepret. Also, is this a departure from what mgiht be expected naturally (deltas do flood- it is why they are there) (Neil Saintilan, Office of Environment and Heritage)	This text has been rewritten.
599	47508	5	16	6	16	8	The report needs to clarify the role of Hurricane Katrina on the Mississippi River Delta and the reports surrounding that event. The Dixon paper is an analysis of subsidence rates in New Orleans PRIOR to Hurricane Katrina, and it found that areas that subsided the most had the greatest level of flooding during the storm. (Alexander Kolker, Louisiana Universities Marine Consortium)	The text was revised. Barras et al., 2006 was cited.
600	47509	5	16	6	16	8	A btter reference for the impacts of Hurricanes Katrina and Rita on the Mississippi Detla is Barras, J. A. (2006), Land area change in coastal Louisiana after the 2005 hurricanes—a series of three mapsRep. Open Files Report 06-1274, U.S. Geological Survey. (Alexander Kolker, Louisiana Universities Marine Consortium)	This text has been rewritten and cites Barras et al. (2008) accordingly.
601	38153	5	16	7	16	7	But you might argue that the impact of Katrina was the result of human failures... (THOMAS SPENCER, University of Cambridge)	Newly Barras et al. (2008) is cited to show the impact of episodic events (cyclones).
602	42033	5	16	7	16	11	These sentences are a repeat of a previous section. Not sure what they add here. (Liette Vasseur, Brock University)	The section has been revised and reorganised
603	40359	5	16	10	0	0	86% of cyclone-related mortalities? Need to clarify what the 86% is referring to. (Laura Petes, National Oceanic and Atmospheric Administration)	This text was deleted.
604	38951	5	16	10	16	10	Again, poor sentence construction makes this difficult to interpret: 86% of the world mortalities due to?? Cyclones??. Also, it is not clear how the remainder of this sentence fits. (Neil Saintilan, Office of Environment and Heritage)	This text was deleted.
605	39007	5	16	14	0	0	The statements about mangroves need to be carefully adjusted to chapter 4 and several of the regional chapters. (Wolfgang Cramer, Potsdam Institute for Climate Impact Research)	The section has been thoroughly re-written to address these problems - Same response as above.
606	42242	5	16	14	17	6	This section is POORLY linked to climate change. (Denise Reed, The Water Institute of the Gulf)	The section has been thoroughly re-written one of the goal being to be more detailed on climate change, even though the text had to be drastically cut
607	47551	5	16	14	17	6	Section 5.3.1.5 comment: the section on mangroves and saltmarshes is not very well organised. Paragraph 3 (from line 36-48 of page 16) offers a more general introduction to coastal wetlands and might replace paragraph 1 (from line 16 to 21). The saltmarsh section is very thin - some key functions (e.g. wave dissipation; and even wider habitat values) are missed (or at least alluded to rather obliquely). There are quite a number of modelling studies that examine marsh response to sea-level variability and change, but main reference given is the classic but dated study of Redfield (1972). (Jon French, University College London)	The section has been revised and reorganised

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
608	38956	5	16	16	0	0	Section 5.3.1.5 should be about observations of climate change impacts. Instead, we have four paragraphs on goods and services provided by mangrove and saltmarsh (mostly carbon sequestration, which is dealth with elsewehre in AR5), and one very scant paragraph on potential saltmarsh impacts, with the most recent reference being 15 years old. Shy not review the recent literature on observed climate change imapcts on coastal wetlands? For example, some recent papers include: Prahalad VN, Kirkpatrick JB, Mount RE (2011) Tasmanian coastal saltmarsh community transitions associated with climate change and relative sea level rise 1975-2009. Australian Journal of Botany 59, 741-748. Rogers K, Wilton KM, Saintilan N (2006) Vegetation change and surface elevation dynamics in estuarine wetlands of southeast Australia. Estuarine, Coastal and Shelf Science 66, 559-569. Krauss K.W, From A.S., Doyle T.W., Doyle T.J., and Barry M.J. (2011). Sea-level rise and landscape change influence mangrove encroachment onto marsh in the Ten Thousand Islands region of Florida, USA. Journal of Coastal Conservation 15 629-638. (Neil Saintilan, Office of Environment and Heritage)	The section has been thoroughly re-written one of the goal being to be more detailed on climate change, even though the text had to be drastically cut
609	39435	5	16	16	0	0	more than a hundred countries' and 'ecosystems perform many functions' (Sarah Cornell, Stockholm Resilience Centre)	The section has been thoroughly re-written one of the goal being to be more detailed on climate change, even though the text had
610	40637	5	16	16	0	0	Other services include: silviculture, provision of forest products (timber and non timber), biodiversity they support, sediment trap and land stabilization, among others. It would not require a reference because it is general knowledge. If needed can refer to the previous IPCC report, or to Silvestri, S., Kershaw, F. (eds.), 2010. Framing the flow: Innovative Approaches to Understand, Protect and Value Ecosystem Services across Linked Habitats, UNEP World Conservation Monitoring Centre, Cambridge, UK, or to Lacambra C., Fries., D, Spencer, T. and Moeller I (2013). Bioshields: mangrove ecosystems as resilient natural coastal defences. UNU Bonn (Carmen Lacambra Segura, Grupo La era)	The section is now combined with salt-marshes and seagrass, while being drastically shorter. Unfortunately, there is no space available.
611	40638	5	16	16	16	21	There is a general consensus regarding the protective role of mangroves, and that the forest to attenuate wind and swell waves. However most of the research has focused on small waves. There is a need for further research, databases and evidence on the protective role of mangroves during storms so policy makers and decision makers can draw shoreline protection strategies better informed. MUCH MORE INFORMATION McIvor, A.L., Möller, I., Spencer, T. and Spalding. M. (2012) Reduction of wind and swell waves by mangroves. Natural Coastal Protection Report 2012-01. Cambridge Coastal Research Unit Working Paper 40. Published by The Nature Conservancy and Wetlands International. 27 pages. Natural Coastal Protection Series ISSN 2050-7941. URL: http://www.naturalcoastalprotection.org/documents/reduction-of-wind-and-swell-waves-by-mangroves (Carmen Lacambra Segura, Grupo La era)	The section is now combined with salt-marshes and seagrass, while being drastically shorter. Unfortunately, there is no space available.
612	40639	5	16	16	16	21	There is also a geographical distinction on the use of mangroves as coastal defences. There are very few cases of mangroves in coastal protection in the Americas whereas in Asia most of the countries have policy and legislation implementing green belts. See also Lacambra, C., Spencer, T., Moeller, I., 2008. Literature review: tropical coastal ecosystems as coastal defences. The Role of Environmental Management in Disaster Risk Reduction and Climate Change Adaptation Annex 1 Case studies. ProAct Network. Switzerland (Carmen Lacambra Segura, Grupo La era)	The section now covers all vegetated marine habitats and had to be drastically cut. Hence, it is not possible to provide a regional analysis as suggested by the referee.
613	40361	5	16	16	16	48	These paragraphs are the strongest and most integrative of the text in section 5.3.1. Other sub-sections in 5.3.1 could potentially look to this sub-section for guidance on scope, style, etc. (Laura Petes, National Oceanic and Atmospheric Administration)	OK.
614	47510	5	16	16	17	6	The report needs to mention that there are numerous studies indicating that salt marshes and mangrove ecosystems responded to climate change in the past century. Warren and Neiring (1993) found changes in a Connecticut salt marsh that they related to global sea level changes. Varekamp, Thomas and colleagues found a strong relationship between climate change, sea level rise and flooding in other Connecticut salt marshes. Kolker et al., (2010) found an imprint of accelerated global sea level rise and temperature in Long Island salt marshes. Other studies have found similar results. I also think that there needs to be a section on the response of other coastal forests to climate change, including tidal freshwater forests, low-lying pine lands, and corresponding habitats around the world. (Alexander Kolker, Louisiana Universities Marine Consortium)	The section has been revised to be more encompassing
615	47511	5	16	16	17	6	The authors should consult the following citaitons for the above comment: Kolker, A. S., M. Kirwan, S. L. Goodbred, and J. K. Cochran. 2010. Global climate changes recorded in coastal wetland sediments: Empirical Observations lined to Theoretical Predictions. Geophysical Research Letters 37. Varekamp, J. C. and E. Thomas. 1998. Climate change and the rise and fall of sea level over the millennium. EOS, Transactions of the American Geophysical Union. 79:69, 74-75. Varekamp, J. C., E. Thomas, and O. van de Plassche. 1992. Relative sea-level rise and climate change over the 1500 years. Terra Nova 4:293-304. Warren, R. S. and W. A. Niering. 1993. Vegetation change on a northeast tidal marsh: interaction of sea-level rise and marsh accretion. Ecology 74:96-103. (Alexander Kolker, Louisiana Universities Marine Consortium)	These references were considered but not added because the section has been drastically cut. The references have not been considered essential in the context of the reorganized section.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
616	48308	5	16	17	16	17	The work done by Donato et al. 2011 refers to peat mangroves. This mangrove type is not representative in a global context. Many mangrove forests are on sediments (and not organic soils). "Constraining this estimate further will require quantification of carbon stocks in a range of other mangrove systems and the development of a typology for these ecosystems based on their carbon stocks and relative distribution globally " (Bouillon 2011, doi:10.1038/ngeo1130). (Luitgard Schwendenmann, The University of Auckland)	The section had to be cut by 2/3; this sentence is part of the material cut.
617	38952	5	16	18	16	18	Mangroves also extend into temperate coastlines where they co-exist with saltmarsh. (Neil Saintilan, Office of Environment and Heritage)	The sentences has been edited to avoid confusion
618	38953	5	16	19	16	19	It is an exaggeration to say that mangroves are always essential in protecting shorelines (Neil Saintilan, Office of Environment and Heritage)	We have rephrased the text.
619	37918	5	16	20	16	20	This is a claim that needs to be put into context. Some mangroves have highly mixed oxidising and reducing environments in which organic material is removed to a low level of stable carbon.Likewise often residual carbon (<10% by volume) is often elderly carbon which has been reworked by erosion from other sites. The point is whether mangroves are steadily aggrading - possible high and variable carbon loads compared to sites with a high erosional turnover and low net deposition rate. (Julian Orford, Queen\\\'s University, Belfast)	The section had to be cut by 2/3; this sentence is part of the material cut.
620	48706	5	16	23	16	24	However a review of temperate mangrove areas have shown an increase in several temperate areas due to changes in river catchments, in contrast to overall worldwide decline in mangroves Morrisey et al. (2010). Ref is: D.J. Morrisey, A. Swales, S. Dittmann, M. Morrison, C.E. Lovelock & C.M. Beard 2010: The ecology and management of temperate mangroves. Oceanography and Marine Biology: An Annual Review, 2010, 48, 43-160 (Robert Bell, NIWA)	This is correct, but these increases have not, at the global scale, compensated for the declines.
621	42034	5	16	25	0	0	...and crustacean is in particular important: this needs to be revised. (Liette Vasseur, Brock University)	The section had to be cut by 2/3; this sentence is part of the material cut.
622	38954	5	16	25	16	25	Poor wording- suggest "...is of particular significance" (Neil Saintilan, Office of Environment and Heritage)	The section had to be cut by 2/3; this sentence is part of the material cut.
623	46838	5	16	25	16	25	Suggest change wording to "...aquaculture for fish and crustaceans is particularly important." Insert 'The' before 'Annual'. (Genevra Harker, HarmonicQuay Ltd)	The section had to be cut by 2/3; this sentence is part of the material cut.
624	46839	5	16	26	16	26	The rate 'was' not 'were'. (Genevra Harker, HarmonicQuay Ltd)	The section had to be cut by 2/3; this sentence is part of the material cut.
625	38955	5	16	27	16	27	It is an exaggeration to say that mangroves may disappear without further protection. For example, one third of the world's mangrvoes occur in Australia where they are already protected. (Neil Saintilan, Office of Environment and Heritage)	The section had to be cut by 2/3; this sentence is part of the material cut.
626	50237	5	16	27	16	27	The chapter team should consider if extrapolation of this form is appropriate. If not done in the underlying sources themselves, extrapolation may not be appropriate here. (Katharine Mach, IPCC WGII TSU)	The section had to be cut by 2/3; this sentence is part of the material cut.
627	38154	5	16	36	16	37	This is an old chestnut. There are many examples where there is an interfingering of mangroves and saltmarshes, in Australia for example. Saintilan, N., Rogers, K., McKee, K., 2009. Salt marsh – mangrove interactions in Australasia and the Americas. In: Perillo, G.M.E., Wolanski, E., Cahoon, D.R., Brinson, M.M. (Eds.), Coastal wetlands: An integrated ecosystem approach. Elsevier, Amsterdam, pp.855-883. In the northern Gulf of Mexico, there is a fluctuating interplay between the presence of mangrove and saltmarsh vegetation; mild winters favour the colonization of Avicennia germinans whereas sequences of winter freezes result in mangrove mortality and expansion of the cordgrass Spartina alterniflora (Stevens et al., 2006). Conversely, drought periods appear to promote die-back in Spartina whilst allowing the spread of Avicennia (McKee et al., 2004). McKee, K.L., Mendelssohn, I.A., Materne, M.D., 2004. Acute salt marsh dieback in the Mississippi River deltaic plain: a drought induced phenomenon? Global Ecology and Biogeography 13, 65-73. Stevens, P.W., Fox, S.L., Montague, C.L., 2006. The interplay between mangroves and saltmarshes at the transition between temperate and subtropical climate in Florida. Wetlands Ecology and Management 14, 435-444. (THOMAS SPENCER, University of Cambridge)	The section has been revised to be more encompassing
628	39436	5	16	36	16	37	this is a nice sentence to open the whole section. (Sarah Cornell, Stockholm Resilience Centre)	Sentence moved to open the section as suggested.
629	42243	5	16	36	16	37	Suggest moving these two lines up to line 16, the start of the section, rather than launching straight into mangroves. (Denise Reed, The Water Institute of the Gulf)	Coastal wetlands are prominent features and important habitats along the coastline. null
630	44758	5	16	36	16	37	Remove “Coastal wetlands are prominent features and important habitats along the coastline.” Change “Mangroves dominate subtropical and tropical coastlines while tidal marshes (saline, brackish, and fresh-water tidal) dominate temperate systems.” into “Although mangroves dominate subtropical and tropical coastlines, tidal marshes (saline, brackish, and fresh-water tidal) dominate temperate systems.” for a better transition. (Keqi Zhang, Florida International University)	The section has been revised to be more encompassing

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
631	37919	5	16	40	16	41	Another singular case. I would like to see where (unless under specific protected circumstances - probably helped by anthropogenic structures (eg lahrnung in the Baltic)) , this concept of marsh protecting coast low lands is actually found. In most cases marshes are being eroded and may during their erosion offer some limited protection.Tthe Mississippi is often cited as a case where surge reduction can be cited as occurring due to marsh lands, but it does not stop the surge impacting on humans. It is thought that by increasing marsh areas, then more surge attenuation might be established, but this is a philosophy rather than known practice. Bromberg reference is missing. (Julian Orford, Queen\\\'s University, Belfast)	The section had to be cut by 2/3; this sentence is part of the material cut.
632	38155	5	16	41	16	41	The Gedan papers are largely review. Better to have substantive research papers on wave attenutation. Möller I, Mantilla-Contreras J, Spencer T and Hayes A 2011 Micro-tidal coastal reed beds: Hydro-morphological insights and observations on wave transformation from the southern Baltic Sea. Estuarine, Coastal and Shelf Science 92, 424-436 [doi:10.1016/j.ecss.2011.01.016]. Möller I and Spencer T 2002 Wave dissipation over macro-tidal saltmarshes: Effects of marsh edge typology and vegetation change. Journal of Coastal Research Special Issue 36, 506-521. (THOMAS SPENCER, University of Cambridge)	The section has been revised to be more encompassing
633	38156	5	16	42	16	42	Longer than that. In the Greater Thames estuary over the last 2,000 years over 40% of the intertidal zone has been subject to land claim, beginning in the Roman period, accelerating in the 15th century and peaking in the 18th and 19th centuries. Van derWal, D., Pye, K., 2004. Patterns, rates and possible causes of saltmarsh erosion in the Greater Thames estuary (UK). Geomorphology 61, 373-391. (THOMAS SPENCER, University of Cambridge)	The section had to be cut by 2/3; this sentence is part of the material cut.
634	37422	5	16	43	0	0	Marsh plants for construction? Is this right? (Colin Woodroffe, University of Wollongong)	The section had to be cut by 2/3; this sentence is part of the material cut.
635	38737	5	16	45	0	0	Change Intertidal Spartiona and phragmites have been…., by Intertidal Spartina and Phragmites species have been…. (Ricardo Anadon, University of Oviedo)	The section had to be cut by 2/3; this sentence is part of the material cut.
636	40360	5	16	45	0	0	Spartina and Phragmites are genus names and should be italicized and capitalized. (Laura Petes, National Oceanic and Atmospheric Administration)	The section had to be cut by 2/3; this sentence is part of the material cut.
637	42035	5	16	45	0	0	Put the real names of phragmites and spartina (Liette Vasseur, Brock University)	The section had to be cut by 2/3; this sentence is part of the material cut.
638	47512	5	16	50	0	0	The text would be improved if it provided quantitative information on the size of the carbon sink that salt marshes provide. (Alexander Kolker, Louisiana Universities Marine Consortium)	This information has now been added
639	42036	5	16	52	16	53	This sentence neds to be reworked and without reference can be argued a lot. Weak. (Liette Vasseur, Brock University)	The section had to be cut by 2/3; this sentence is part of the material cut.
640	44759	5	16	53	16	53	Change "…vulnerable to erosion due…" into "vulnerable to erosion due to…". (Keqi Zhang, Florida International University)	The section had to be cut by 2/3; this sentence is part of the material cut.
641	36388	5	17	0	0	0	This section is still unbalanced, because it is predominantly discussing seagrass, a bit of macroalgae and does not mention benthic microalgae at all. The latter groups should not be ignored, because it can comprise up to 50% of the primary productivity of coastal systems, is sensitive to climatic factors (temperature, light, waves, emersion time), and influences the resuspension characteristics of tidal flats. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Agreed that benthic microalgae are important. However, there is little - or no - literature on how benthic microalgae may respond or have responded to climate change
642	37423	5	17	1	0	0	There is a large literature on sedimentation rates and whether they are similar to sea-level rise rates. The Redfield reference is seminal, but more recent literature should be cited. For example, several papers by Karen McKee, Don Cahoon -- or Rogers, K., Wilton, K.M. and Saintilan, N., 2006. Vegetation change and surface elevation dynamics in estuarine wetlands of southeast Australia. Estuarine, Coastal and Shelf Science, 66: 559-569. (Colin Woodroffe, University of Wollongong)	The section had to be cut by 2/3; this sentence is part of the material cut.
643	37920	5	17	1	17	1	"The distribution of tidal marshes is closely linked with sea level.." A meaningless sentence (Julian Orford, Queen\\\'s University, Belfast)	The section has been revised to be more encompassing
644	35296	5	17	1	17	2	The second sentence of this paragraph is misleading. Just like coral-reef upgrowth rates (see below), accretion rates in salt marshes have been recorded as reaching rates in excess of those of recorded sea-level change. But there is a host of other factors that affect salt-marsh accretion rates, as the rest of this paragraph goes some way towards acknowledging, but at the very least I would remove the word "generally" in this sentence on the grounds that this is not a general/normal/usual response (and by implication would not necessarily obtain in the future). (Patrick Nunn, University of New England)	The section had to be cut by 2/3; this sentence is part of the material cut.
645	38957	5	17	1	17	2	Redfield 1972 is a very old reference and more recent work has shown that saltmarsh survival depends on the relationships between marsh elevation, the rate of vertical accretion and the rate of sea-level rise, which often-times exceeds the capacity of the marsh to keep pace. This has been the case in the Chesapeake bay marshes, for example. For a good review see: Cahoon, D., Hensel P.F., Spencer T. Reed D.J., McKee K., and Saintilan N., (2006). Coastal Wetland Vulnerability to Relative Sea-level Rise: wetland elevation trends and process controls. In Verhoeven J., Whigham D., Bobbink R., and Beltman B. Wetlands as a Natural Resource Springer Ecological Studies series. Also, McKee K., Rogers K. and Saintilan N. (2012). Responses of Salt Marsh and Mangrove Wetlands to changes in Atmospheric CO2, Climate and Sea-Level. In Middleton B.A. (ed) Global Change and the Function and Distribution of Wetlands. Volume 1, Part 2, 63-96. Springer (Neil Saintilan, Office of Environment and Heritage)	The section has been revised to be more encompassing
646	36387	5	17	1	17	6	Sea walls may prevent the marsh vegetation moves upward and inland as a response to sea level rise, which may lead to coastal squeeze and loss of marsh area. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Agreed. The text has been revised accordingly.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
647	38157	5	17	1	17	6	the key idea of marshes filling an 'accommodation space' if there is sufficient sediment availability (a control that is only partially climatic). French, J.R., 2006. Tidal marsh sediment trapping efficiency and resilience to environmental change: exploratory modelling of tidal, sea-level and sediment supply forcing in predominantly allochthonous systems. Marine Geology 235, 119-36. (THOMAS SPENCER, University of Cambridge)	The evidence is discussed where available and efforts have been made to expand the coverage, where possible
648	38717	5	17	1	17	6	A mention to the following work could be inserted, relating salt marsh erosion to SLR. HUGHE,Z.J.; FITZGERALD,D. M.; WILSON,C. A.; PENNINGS,S. C.; WIESKI,K. & MAHADEVAN (2009). Rapid hesdward erosion of marsh erreks in response to relative sea level rise. Geohysical research. There are also some other works on salt marsh evolution at the Matagorda, Texas that relate salt marsh evolution to SLR changes and that could be mentioned as well. (Oscar Ferreira, University of Algarve)	The section had to be cut by 2/3; this comment no longer applies.
649	39437	5	17	1	17	6	Very old literature here, and textbook tone. There must be something more current on the actual rates of accretion and trends in distribution of saltmarsh - the UK national ecosystem assessment is at least one national review. Some of the text on page 33 belongs here. (Sarah Cornell, Stockholm Resilience Centre)	The text has been extensively revised (and cut). We trust that the revised version will no longer be textbook-like.
650	44357	5	17	1	17	6	There are many recent references concerning the dynamic feed-backs of marsh accretion that could be commented in this paragraph. See for instance D'Alpaos et al (2011): Dynamic response of marshes to perturbations in suspended sediment concentrations and rates of relative sea level rise. Journal of Geophysical Research – Earth Surface, 116: F04020, and references therein. (Ibáñez Carles, IRTA)	The evidence is discussed where available and efforts have been made to expand the coverage, where possible
651	47513	5	17	1	17	7	. This description of salt marsh response to sea level rise is lacking the appropriate complexity, and somewhat contradictory. On one hand, the text points out that marsh accretion rates generally match rates of sea level rise (lines 2-3). However, it then goes on to state that marshes normally transgress landward or drown in response to sea level rise. Clearly both statements can not be correct. It would be better to say that marshes can accrete in response to sea level rise, provided that sediment supplies are ample and rates of sea level rise are sufficiently modest such that plants do not drown. In cases where SLR is greater than the supply of sediment and/or greater than the biological tolerance of marsh plants, then the marshes will drown. In some cases, marshes may be able to transgress landward if there is sufficient room to do so. In cases where there are natural or anthropogenic barriers to landward transgression, then the marsh is likely to be lost. (Alexander Kolker, Louisiana Universities Marine Consortium)	The section had to be cut by 2/3 and there is no longer space to address this aspect in any detail, hence it was not possible to get into the interesting but too detailed discussion provided by the referee. We trust that very concise coverage of the SOD will be OK.
652	38958	5	17	4	17	5	"the response of the marsh to sea-level rise involveds…." Please provide supporting references (eg Rogers K., Saintilan N. and Copeland C. (2012) Modelling wetland surface elevation dynamics and its application to forecasting the effects of sea-level rise on estuarine wetlands. Ecological Modelling IN PRESS http://dx.doi.org/10.1016/j.ecolmodel.2012.06.014) (Neil Saintilan, Office of Environment and Heritage)	The section had to be cut by 2/3; this issue is part of the material cut. The reference was therefore not added.
653	43273	5	17	7	19	22	There is text and then a box on coral reefs, both of which have overlapping information. One wonders whether the two can be harmonized more and merged into the box with a small introductory section remaining in the main body of the text. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The author teams of Chap. 5, 6 and 30 have consulted with each over in order to avoid unnecessary overlap and to work on the coral reef cross-chapter box.
654	38553	5	17	9	0	0	Section 5.3.1.6. The response of coral reefs to climate change depends critically on the health of the herbivore community. If there are lots of herbivorous fish and urchins, corals can hang on even in the face of fairly substantial temperature and pH insults. However, once the grazers are gone, the system goes to fleshy seaweeds. The tipping point depends on the grazers, and this important biological interaction deserves a paragraph here especially as it hints at a workable management strategy (see, e.g., Mumby, P. J. and A. R. Harborne. 2010. Marine Reserves Enhance the Recovery of Corals on Caribbean Reefs. Plos One 5). (Christopher Harley, University of British Columbia)	Agreed. The SOD has been revised accordingly.
655	37921	5	17	9	19	20	There is a major imbalance in the range of analysis around coral reefs compared to other coastal sections eg half a page on salt marshes and mangroves which are crucial for most deltas's surrounding coastal lowlands, whereas one can argue philosophically that coral reefs importance for surrounding coastal low lands is not on the same scale and for the same protective purpose? i suggest that the marsh section is beefed up over its ecosystem services assessment. (Julian Orford, Queen\\\'s University, Belfast)	The evidence is discussed where available and efforts have been made to expand the coverage, where possible
656	38615	5	17	9	19	20	My understanding is that this section should cover "Observed impacts" of climate change on tropical coral reefs which are a significant coastal ecosystem. The authors need to ensure that this section meshes closely with the tropical coral reef sections of Chapters 6 & 30. Overall, the FOD here is rambling, hard to follow and would benefit by drawing on various recent reviews/summaries of the sensitivity and vulnerability of tropical coral reefs to changing climate drivers. Examples include: 1) Johnson JE and PA Marshall (2007). Climate Change and the Great Barrier Reef - a vulnerability assessment, GBRMPA/AGO, Australia; 2) van Oppen MJH & JM Lough (2009). Coral Bleaching - patterns, processes, causes and consequences, Springer Ecological Studies Vol. 25; 3) Bell, JD, JE Johnson & AJ Hobday (2011). Vulnerability of tropical Pacific fisheries and aquaculture to climate change, Secretariat of the Pacific Community, Noumea, New Caledonia; 4) Lough JM (2008). A changing climate for coral reefs. J Environmental Monitoring 10: 21-29 amongst others (Janice Lough, Australian Institute of Marine Science)	The author teams of Chap. 5,6 and 30 have consulted with each over in order to avoid unnecessary overlap and to work on the coral reef cross-chapter box. The suggested references were useful, especially the modeling chapter by Donner et al. in your book which is cited in the SOD. It complements well the other modeling papers mentioned.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
657	38616	5	17	11	17	16	Provide references regarding the "value" of coral reef ecosystems; it would also be useful to articulate the environmental controls on current coral reef distribution (e.g. Kleypas JA, JW McManus & LAB Menez (1999) Environmental limits to coral reef development: where do we draw the line? American Zoologist 39: 146-159; Done TJ (2011) Corals: environmental controls on growth. In: Encyclopedia of Modern Coral Reefs - structure, form and processes, D Hopley (ed), Springer) - this then sets the scene for identifying which environmental factors (e.g. temperature, aragonite saturation state, etc) which are already or likely to change and thus affect coral reef ecosystems. (Janice Lough, Australian Institute of Marine Science)	Excellent suggestion which has been followed in a very brief manner due to space constraints).
658	35297	5	17	12	17	13	How can a biodiversity be "disproportionately high compared to surface area"? What are you comparing coral reefs to, and how is such a comparison meaningful? Rephrase. (Patrick Nunn, University of New England)	Agreed. The SOD has been revised accordingly.
659	40362	5	17	13	17	14	This is an incomplete sentence. Is it missing a last word - perhaps "stressors?" (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed. The SOD has been revised accordingly.
660	46710	5	17	13	17	14	Coral reefs are also vulnerable to increased storminess. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	We have been unable to find a reference demonstrating that storminess has increased and led to observed impacts on coral reefs.
661	39438	5	17	14	0	0	Missing word in this sentence - 'non-climatic drivers'. I'm not a coral ecosystem expert, but this whole section reads very well. (Sarah Cornell, Stockholm Resilience Centre)	Agreed. The SOD has been revised accordingly.
662	46841	5	17	14	17	14	Sentence needs 'drivers' at the end. (Genevra Harker, HarmonicQuay Ltd)	Agreed. The SOD has been revised accordingly.
663	35298	5	17	18	17	20	As per the comment above referring to salt-marsh accretion rates, just because Holocene upgrowth rates of coral reefs have in some places been equal to that of contemporaneous sea-level rise, this was neither universal nor is it necessarily a good guide to what will happen in the future. I think the comparison should also be made with the early Holocene (period of postglacial sea-level rise). As MacIntyre and Neumann (1988) argued, not all reefs were able to "keep up" with Holocene sea-level rise; many were "catch-up reefs", some "give-up reefs". I am not sure why the past 100 years is singled out, or that the Buddemeier study is believed to have much residual credibility, or whether this time period is in any way meaningful, given the slow rate of sea-level rise and the many stresses that most of the world's coral reefs experienced. (Patrick Nunn, University of New England)	MacIntyre and Neumann (1988) note that give-up reefs were impacted by floods and cold temperatures. Since this does not provide insight on future changes we have not included this reference. It seems that the most relevant paper on this issue is Buddemeier and Smith (1988;; Coral reef growth in an era of rapidly rising sea level...”). They discuss SLR for the past 50 and 100 years. Recent data gathered by Hubbard and colleagues may be included in the SOD if the paper is submitted before the cut-off date of 31 January 2013.
664	38617	5	17	18	17	20	As sea-level rise is generally considered to be a lesser climate change stressor, suggest moving this section after temperature and ocean acidification effects. (Janice Lough, Australian Institute of Marine Science)	Agreed. The SOD has been revised accordingly.
665	38158	5	17	20	17	20	An old reference. A more recent synthesis is Kench P, Perry C and Spencer T 2009 Coral reefs. In: Slaymaker O, Spencer T and Embleton-Hamann C (Eds.), Geomorphology and Global Environmental Change. Cambridge University Press, Cambridge, 180-213. (THOMAS SPENCER, University of Cambridge)	Chapter requested 30 Nov
666	35299	5	17	22	17	22	Insert "often" before "triggers", because bleaching is a response to environmental stress not just temperature increase. (Patrick Nunn, University of New England)	We agree that bleaching is a stress response triggered by several factors. However, this paragraph is only concerned with temperature-induced bleaching The revised sentence “Unusual increases of temperature trigger bleaching of corals...” seems fine then.
667	42244	5	17	22	17	22	This text seems to imply that any increase in temperature triggers bleaching. Actually we know a lot about the temnperature triggers. It is important to be clear [THIS GOES FOR MANY OTHER SECTIONS OF CH 5] about thresholds, seasonality, the specifics of how the change in the driver must be manifest to induce the chyange described. (Denise Reed, The Water Institute of the Gulf)	Agreed. The SOD has been revised accordingly.
668	38618	5	17	22	17	28	Coral bleaching is a general stress response of the coral:algal symbioses that can occur not only due to unusually warm temperatures but also unusually cold temperatures, lowered salinity, pollution etc. What appears to be occuring more frequently in recent decades are large-scale bleaching events that can be linked to unusually warm summer season water temperatures, and hence, observed wraming of the tropical oceans. See, for example, Eakin CM, JM Lough & SF Eakin (2009) Climate variability and change: monitoring data and evidence for increased coral bleaching stress. In van Oppen and Lough (2009 - cited above) updates the Lough (2000) analyses. (Janice Lough, Australian Institute of Marine Science)	We agree that bleaching is a stress response triggered by several factors. However, this paragraph is only concerned with temperature-induced bleaching The sentence “Increased temperature triggers bleaching of corals...” seems fine then.
669	37424	5	17	28	0	0	what are reef cells? Reword (Colin Woodroffe, University of Wollongong)	The SOD as been modified to make it clear that reef cells are on a 1°x1° grid.
670	38619	5	17	28	17	34	Unclear whether this information about bleaching in reef cells all comes from the Baker at al (2008) reference; also need to emphasise that bleaching intensity varies with spatially (across reefs) and between species etc. The Staus of Coral Reefs of the World reports edited by Clive Wilkinson probably provide more useful summary data about recovery from recent major bleaching events (available through the Global Coral Reef Monitoring Network URL: http://www.gcrmn.org/publications.aspx). (Janice Lough, Australian Institute of Marine Science)	We have clarified the bibliographical attribution.
671	52847	5	17	30	17	32	Reference required (John Hay, University of the South Pacific)	The text has been revised to add citations
672	40363	5	17	31	17	32	Need to clarify what "species" refers to for 2 and 3 - species of endosymbiotic algae (i.e. zooxanthellae)? (Laura Petes, National Oceanic and Atmospheric Administration)	The text has been revised accordingly

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
673	37515	5	17	33	17	33	In this line it is perhaps necessary to insert 'slow in western and parts of the central Indian Ocean' for a) the eastern Indian Ocean was not affected by marked bleaching in 1998 and b) much has been made of the remarkable recovery of parts of the central Indian Ocean post 1998. For eg the Chagos as shown in Sheppard et al (2008) Archipelago-wide coral recovery patterns since 1998 in the Chagos Archipelago, central Indian Ocean Mar Ecol Prog Ser 362:109-117 (Barbara Brown, University of Newcastle)	It is not possible to add so much detail due to constraints of space. The text has been revised as follows: “generally slow in the Indian Ocean”
674	38620	5	17	34	17	35	Unclear why the southern Arabian Gulf is introduced here - not sure what point is being made and how it applies to coral reef recovery from bleaching in general. (Janice Lough, Australian Institute of Marine Science)	The sentence has been reworded in order to clarify that recovery is being addressed: “Recovery has also been limited”
675	38621	5	17	37	17	39	Need to clarify that the Precht & Aronson (2004) is specific to the Caribbean and 2 Acropora species, i.e. That this evidence is regionally-specific. (Janice Lough, Australian Institute of Marine Science)	The text has been revised accordingly
676	38738	5	17	41	0	0	I suggest to incorporate the recent paper [Sunday, J.M. Bates, A.E. Dulvy, N.K. 2012. Thermal tolerance and the global redistribution of animals. Natre Climate Change, doi:10.1038/nclimate1539. 5 pp] as reference related to range shifts in marine anaimals (Ricardo Anadon, University of Oviedo)	This paper is an excellent one but it does not address corals at all. Hence, we refrained from citing it.
677	35300	5	17	41	17	41	Use "extensions" not "shifts". (Patrick Nunn, University of New England)	The text has been revised accordingly
678	38622	5	17	41	17	41	Need to clarify that temperature is just one of several environmental factors controlling present-day coral reef distribution (see Kleypas et al 1999 cited above), so these other factors need to be within certain limits (and suitable shallow-water substrate is critical) for "increased temperature" to favour "range shifts." (Janice Lough, Australian Institute of Marine Science)	Indeed, range extensions can only occur if other environmental parameters are suitable. This seems quite obvious and the text has not been changed for the sake of conciseness.
679	50238	5	17	41	17	41	For the statement on this line, it would be helpful to indicate if increased temperature favors range shifts based on mechanistic expectations or based on understanding from observations to date. (Katharine Mach, IPCC WGII TSU)	Both geological and present-day observations suggest that. The paragraph has been rewritten to make that clear and also to shorten it a bit.
680	38623	5	17	43	17	43	Suggest also cite Kleypas JA, RW Buddemeier, D Archer et al (1999) Geochemical consequences of increased atmospheric carbon dioxide on coral reefs. Science 284: 118-120 - as this was an early high-profile paper that highlighted the potential significant consequences of progressive ocean acidification for tropical coral reefs. Also need to emphasise somewhere in this section that sustained calcification, that overcomes the natural forces of biological and physical erosion, is fundemental to maintaining tropical coral reef ecosystems & provides the necessary structural complexity to support the many thousands of other reef-associated organisms. (Janice Lough, Australian Institute of Marine Science)	We have added the suggested citation in our chapter assessment. The issue of the balance between gross calcification and bioerosion is an important one. The text has been revised to incorporate it.
681	37997	5	17	46	17	48	There is an important new paper by McCulloch et al 2012 (Nature Climate Change 2: 623-627) which suggests that some corals may be able to regulate pH at their calcification sites and thus buffer the impacts of ocean acidification. (Chris Perry, University of Exeter)	We agree that this is an important paper but, in the context of this chapter, it is not absolutely essential to explain why some corals are less affected than others. It was therefore decided not to cite this paper.
682	38624	5	17	50	18	1	This section needs clarifying; several retrospective coral growth studies have provided evidence of a recent decline in coral calcification rates (i.e. In recent decades and not "since the beginning of the the industrial revolution"). See also Tanzil JTL, BE Brown et al (2009) Decline in skeletal growth of the coral Porites lutea from the Anadaman Sea, South Thailand between 1984 and 2005. Coral Reefs doi: 10.1007/s00338-008-0457-5; Cantin NE, AL Cohen et al (2010). Ocean warming slows coral growth in the central Red Sea. Science 329: 322-325 and review paper Lough JM & TF Cooper (2011). New insights from coral growth band studies in an era of rapid environmental change. Earth-Science Reviews 108: 170-184. In addition, a recent study Cooper TF et al (2012) Growth of Western Australian corals in the Anthropocene. Science 335: 593-596 suggests that rates of SST warming are the primary drivers of recent observed changes in coral calcification rates. Note, the studies of Bessat and Buiges (2001) and Helmle et al (2011) only measuured coral growth through 1990 and 1996, respectively, i.e. they end prior to the period when other cited studies suggest changes in recent calcification rates. There is, as yet, no evidence from retrospective coral growth studies, that ocean acidification is affecting coral growth rates - the primary driver appears to be temperature changes (setbacks in growth due to bleaching events and likely also passing optimum threshold for calcification). (Janice Lough, Australian Institute of Marine Science)	We essentially agree but note that the expression “since the beginning of the industrial revolution” specifically referred to perturbation studies rather than to retrospective studies. Quoting Lough & Cooper (2011), which you suggested, “There is a critical need for further manipulative experiments to determine the relative contribution of thermal stress and ocean acidification to declines in coral growth.” That is what is meant by “attribution has proven difficult. We now cite the paper by Cooper et al. (2012) which provides some evidence that temperature is the primary driver. The paragraph has also been revised for the sake of clarity.
683	37425	5	17	52	0	0	why talking about field samples here, need to be more focused on overall outcomes not specific corals (Colin Woodroffe, University of Wollongong)	We do not understand what is meant here as no specific coral is mentioned.
684	37998	5	17	53	17	53	The paper by Cooper et al. (2012) Science 335: p. 593 - which did NOT observe a decline in calcification rates in the same species of corals examined elsewhere is worth citing here. (Chris Perry, University of Exeter)	Agreed. The SOD has been revised accordingly.
685	50239	5	18	1	18	1	It could be helpful to specify more explicitly what the shortcomings are. (Katharine Mach, IPCC WGII TSU)	The text has been revised to add this information.
686	38625	5	18	1	18	2	Riebsell (2008) comments refer to the temperate (Mediterranean) volcanic seeps - delete or clarify. (Janice Lough, Australian Institute of Marine Science)	Yes, but the shortcomings are the same irrespective of the region considered. The statement is now clarified as requested by the comment above, which should reassure the referee.
687	38626	5	18	2	18	6	Clarify - the main points from the Fabricius et al (2011) study is the loss of coral reef biodiversity as ocean acidification increases at the natural seep sites. (Janice Lough, Australian Institute of Marine Science)	The original text was quite clear, we think: “dramatic impacts on the biodiversity”. Nevertheless, the sentence as been reworded for extra clarity. It is important to mention that corals are not completely eliminated and that the calcification rate of the ones remaining do not seem to be badly affected by elevated pCO2.
688	38627	5	18	8	18	10	Need to clarify - Sokolow (2009) is much more circumspect in attributing increased reports of diseases to these 6 factors than suggested by this statement (Janice Lough, Australian Institute of Marine Science)	Agreed. The statement has been toned down.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
689	40364	5	18	8	18	13	This paragraph contains sentences that are not related to each other. The introductory sentence is about disease, but the following sentences are about extinction risk. Need to separate this material out and organize it more logically. Also, somewhere in this sub-section should be a description about the importance of corals as habitat for fish and invertebrates, as well as coral reefs as buffers for coastlines (from storm surge). (Laura Petes, National Oceanic and Atmospheric Administration)	We agree with the first part of the comment and have reorganized the two paragraphs mentioned accordingly. The impact of sea level rise of coastal protection is addressed in the "Projected impacts" section.
690	42245	5	18	9	18	9	altered' rainfal and circulation is not sufficiently informative. What is it that needs to change aboput rainfall and circulation that infleunces diseases? At least indicate directionality. (Denise Reed, The Water Institute of the Gulf)	Sokolow (2009) mentions a possible increased exposure to land-based pathogens or pollutants with increased rainfall and possible, but unclear, changes in ocean productivity, reservoirs of infection, or movements of pathogens in response to changes in ocean air atmospheric circulation. Space is unfortunately too limited to increase the coverage of this issue in the SOD.
691	38628	5	18	12	18	13	Agree that problems of overfishing are a primary driver of changes in reef fish abundance but there is an expanding literature about the consequences of ongoing climate change for reef fish (see fish chapters in Johnson & Marshall (2007) and Bell et al (2011), cited above, for example). There is also published evidence that loss of coral cover due to bleaching events results in loss of reef fish abundance (e.g. Jones GP et al (2004) Coral decline threatens fish biodiversity in marine reserves, Proc. Nat. Acad. Sci. 101: 8251-8253.) (Janice Lough, Australian Institute of Marine Science)	Agreed. The text has been revised to incorporate this perspective.
692	37999	5	18	18	18	19	The example given here is for the Caribbean, but is linked to coral declien across the Indo-Pacific. It might be worth citing also the Gardner et al (2003) study which reports the massive (~80% reduction in LCC) in the Caribbean since the 1970's - this would then flow into the example correctly. (Chris Perry, University of Exeter)	Agreed. This paragraph has been revised accordingly.
693	38629	5	18	18	18	20	Please provide evidence that dramatic changes in Caribbean reefs (not just Jamaica) can be attributed to climate changes as opposed to other factors e.g. Overfishing of key predators etc (Janice Lough, Australian Institute of Marine Science)	This is a good point. The paragraph has been extensively revised to make it clear that most of the observed changes are from drivers non related to climate.
694	40365	5	18	18	18	20	This is not a good example for communicating climate-related impacts. The coral decline in Jamaica was primarily due to the loss of the primary herbivore (the urchin, Diadema antillarum) and the resulting outcompetition of corals by macroalgae. (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed. See reply to the previous comment.
695	46842	5	18	27	18	27	"…mostly occur…" rather than "are mostly distributed". (Genevra Harker, HarmonicQuay Ltd)	The text has been revised accordingly.
696	42037	5	18	28	0	0	Almost 500 million people live within 100 kilometers of a coral reef… However, in Burke et al.: "approximately 850 million people live within 100 km of reefs"… in both cases these numbers are weird considering that UN and other international numbers suggest that there are 500 million people in the first 100 km of ALL coastal ecosystems. I think the numbers may have been exaggerated somewhere? (Liette Vasseur, Brock University)	We now use the more conservative estimate "275 millions within 30 km of a coral reef (Burke et al., 2011)"
697	46843	5	18	38	18	38	Need to specify that the bleaching is in images A and B. Also need to mark A, B, C and D on the photos. (Genevra Harker, HarmonicQuay Ltd)	Done.
698	50240	5	18	47	18	51	The summary terms for evidence and agreement provided on lines 47 and 50-51 should be italicized. Additionally as possible, it would be beneficial to specify more fully the nature of the vulnerability described on line 47 and risk described on line 48--most vulnerable, but in the context of which specific drivers (including in the role of non-climatic drivers)? risk of what? (Katharine Mach, IPCC WGII TSU)	The text has been revised accordingly (italics, and "risk of degradation"). We think that the non-climatic and climatic drivers are adequately described.
699	38630	5	18	49	18	51	On Page 17: 18-20 the authors suggest that sea level rise is not a primary driver? (Janice Lough, Australian Institute of Marine Science)	The text was not modified because the discussion on page 17 is about "observed changes" while here "future impacts" are discussed.
700	35301	5	19	1	19	2	These statistics would be made more meaningful if the percentages for subsistence and commercial fisheries were given. Most people living on tropical developing coasts are dependent on fisheries; there is a massive food security issue if these are significantly depleted by climate change or any other factor. (Patrick Nunn, University of New England)	The text was not modified because we are not aware of statistics distinguishing subsistence and commercial fisheries.
701	35302	5	19	4	19	7	The GBR is not a representative situation, nor is climate change the only significant threat to it; perhaps some data on the Maldives would be useful. See for instance, Susanne Becken's 2011 book chapter "The risk of climate change for tourism in the Maldives" or Galanos 2010 in Sustainable Tourism. (Patrick Nunn, University of New England)	The goal of this bullet point is to provide estimates of the income generated and the number of jobs sustained by coral reefs. We are not aware of such estimates at the global scale and therefore provide an example for the largest marine park enclosing coral reefs. The Maldives could cited instead of theGreat Barrier Reef but the two chapters recommended do not provide such estimates. The text was therefore not modified.
702	35621	5	19	4	19	14	It is difficult to understand if these effects of sea level rise have been observed or are hypothetised for the future. If these effects have been observed, is this only in a Portuguese estuary ? Is climate related sea level rise undoubtly the cause of the observed impact ? (Goneri Le Cozannet, BRGM)	As explained in the main body of the text, these are projected effects. This is now made clear in this bullet. We are not sure what is meant by "portuguese estuary" because this is not mentioned in our text. This section addresses coral reefs which are not present along the coast of Portugal.
703	37426	5	19	8	0	0	I think it may be over-stating the ecological role of reefs to call them coastal protection. Certainly they play an important part and increase the resilience of a coastline, but is this protection? (Colin Woodroffe, University of Wollongong)	The sub-title "Coastal protection" is used because there is ample evidence that coral reefs do contribute to coastal protection. The next sentence has been toned down a little: "Coral reefs contribute to protecting the shoreline" to include the perspective outlined by the referee.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
704	44760	5	19	8	19	9	Add references for the statement “Coastal Protection: Coral reefs protect the shoreline from destructive action of storm surges and cyclones.” (Keqi Zhang, Florida International University)	A reference has been added.
705	35303	5	19	8	19	11	Coral reefs provide habitable land only in the sense that they are sometimes emergent and have become foci for marine-sediment accumulation, which creates islands. Rewrite this section. Also why say "several island nations" rather than "nations like Kiribati, Tokelau and Tuvalu"? (Patrick Nunn, University of New England)	The sentence has been re-phrased as suggested.
706	38631	5	19	8	19	11	References for role of coral reefs in shore protection? (Janice Lough, Australian Institute of Marine Science)	A reference has been added.
707	38159	5	19	8	19	12	This is where thresholds are important - high magnitude storms can overcome the structural resilience of the reef and reduce it to rubble - with loss of protective function. The idea that the protective role is threatened by sea level rise suggests that reefs are passive structures that will simply be inundated by progressively increasing water depths. But the Holocene record shows that reefs have responded proactively in the past to sea level rise. Indeed it has bene argued that near-future sea level rise may actually rejuvenate many reefs systems, particularly those in the Indo-Pacific region which have adjust to a largely static sea level over the last 6,000 years. (THOMAS SPENCER, University of Cambridge)	This perspective is addressed in the main body of the text rather than in the box.
708	42246	5	19	8	19	12	This section needs supporting citations. There are few studies specifically of this phenomena. (Denise Reed, The Water Institute of the Gulf)	A citation has been added and links made with relevant chapters.
709	42788	5	19	14	19	17	Suggest changing this assertion - incorporation of adaptation considerations into the design of MPAs has been done since at least the mid-2000s. For example, in Palau and Samoa, core areas of MPAs were often selected to protect the species concentrations known to be most resistant to bleaching. (Sofia Bettencourt, World Bank)	A citation has been added to highlight the fact that alternative and complimentary strategies can be used to address the deficiencies of MPAs.
710	40366	5	19	15	19	16	But as Selig et al. (2012) indicates, shortcomings in MPA design may contribute to the lack of protective benefits for corals. i.e. MPAs that are designed well may be more effective. In general, reducing non-climatic stressors (e.g. pollution, overfishing) on coral reefs can enhance the resilience of corals to climate-related stressors. Perhaps this should be reworded to say "Although MPAs are a key conservation and management tool, their limitations in reducing coral loss from thermal stress (Selig et al., 2012) suggest that they need to be complemented with additional and alternative strategies (Rau et al., 2012)." (Laura Petes, National Oceanic and Atmospheric Administration)	The text has been revised accordingly.
711	35304	5	19	18	19	20	This seems over-optimistic. There is a lot of literature suggesting that current coral reefs cannot be sustained given the amount of warming and acidification to which the world is irrevocably committed. See Hoegh-Guldberg (2011) in Regional Environmental Change, already cited. Also see the Wild et al (2011) in Marine and Freshwater Research, which explains that the scleractinian "engineers" of reef upgrowth are particularly susceptible to climate change. (Patrick Nunn, University of New England)	We agree but it would be much worse if ocean warming and acidification were not limited. The text has been revised to incorporate this perspective.
712	50241	5	19	19	19	19	The author team should consider indicating further why limiting warming and acidity are the most important tools--because of physiological limits and limits to adaptation? Additionally, it would be beneficial to provide indication of where the traceable account supporting this conclusion is developed, for example through a reference to the relevant chapter section. (Katharine Mach, IPCC WGII TSU)	The text has been revised accordingly
713	38554	5	19	25	0	0	Section 5.3.1.7. Good coverage of seagrass beds, but no coverage at all of kelp forests except for a passing reference to macroalgae. Kelp forests are a more extensive habitat type than seagrass beds, and are more economically important in many regions of the world. They deserve at least as much attention, preferably in their own subsection. For a review that provides inroads into the current literature, I can provide our recently accepted review paper on seaweeds and climate change once it is available. Reference: Harley, C.D.G, Anderson, K.M., Demes, K.W., Jorve, J.P., Kordas, R.L., Coyle, T.A., & Graham, M.H. 2012. Effects of climate change on global seaweed communities. Journal of Phycology (in press, due out in the October 2012 issue). (Christopher Harley, University of British Columbia)	The review of kelp forests has been expanded, citing recent papers
714	35305	5	19	25	19	25	Use of the adjective "submerged" implies a process, which is that the vegetation in question was once emerged and has now been inundated. Why not "shallow-water vegetation"? (Patrick Nunn, University of New England)	“submerged vegetation is no loger used.
715	40367	5	19	25	20	23	This section needs to better emphasis the importance of seagrasses and macroalgae - e.g. seagrasses as nursery habitat for juvenile fishes, etc. Otherwise, it doesn't present the "what's at stake" piece. Also, macroalgae deserve more coverage than 7 lines. Kelp forests and other macroalgae serve as the critical base for certain coastal ecosystems. (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed. The review on Seagrass and macroalgae has been expanded
716	43274	5	19	25	20	23	As this text deals with submersed vegetation there is overlap with text in chapter 6 which may need to be sorted out. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The overlap should be minimal with the drastic cut made on this section.
717	37922	5	19	27	20	14	An over enthusiatic statement about sea grass conditions which though interesting, has not the justification for major lowland impacts, which this chapter is supposed to be about. (Julian Orford, Queen\\\'s University, Belfast)	The text has been throughly modified.
718	39439	5	19	27	20	23	Very Europe-centric (clearly the legacy of past regional research investment on seagrass meadows over the last 1-2 decades, which is obviously a very good thing!) But this regional specificity should be acknowledged. Also some of the text on page 34 relates to current state of seagrass. (Sarah Cornell, Stockholm Resilience Centre)	The evidence is discussed where available and efforts have been made to expand the coverage, where possible

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
719	37427	5	19	29	0	0	I believe that this is a little over-stated in comparison with mangroves/saltmarsh. In the coastal context, the intertidal systems play a larger role in the carbon cycle and also both a more significant role in ameliorating the impacts of extreme coastal events, or experiencing the impacts of climate change (particularly sea level rise). I think the seagrass sections are a little repetitive, whereas the mangrove and saltmarsh sections scarcely get into the enormous literature that has appeared on them and their likely response to climate change (Colin Woodroffe, University of Wollongong)	Agreed. The text has been revised accordingly.
720	47514	5	19	29	0	0	The report should describe why sea grass meadows are so valuable and the services they support. (Alexander Kolker, Louisiana Universities Marine Consortium)	The section had to be cut by 2/3; this sentence is part of the material cut.
721	42247	5	19	29	19	30	Citiation and text needed to demonstrate that seagrasses are any more valuable than the other ecosystems described. (Denise Reed, The Water Institute of the Gulf)	Additional reference and text has been added.
722	50242	5	19	30	19	30	Here, it would be helpful to indicate more specifically what is meant by "highly vulnerable"--vulnerable to what drivers, vulnerable in what way? (Katharine Mach, IPCC WGII TSU)	The section had to be cut by 2/3; this sentence is part of the material cut.
723	38959	5	19	37	19	50	Again, the focus here is on potential impacts and carbon sequestration values when it should be observed climate change impacts. Suggest you also cite Fourqurean et al 2012 Seagrass Ecosystems as a Globally Significant Carbon Stock. Nature Geoscience (published on line). Also, not all of the Duarte references appear in the reference list (Neil Saintilan, Office of Environment and Heritage)	The changes suggested have been implemented and additional references included
724	46844	5	19	50	19	50	What is meant by 'realised climate'? (Genevra Harker, HarmonicQuay Ltd)	Agreed; “realized” deleted.
725	52635	5	19	52	20	2	Can increased photosynthesis due to increased CO2 levels in the water somewhat compensate for seagrass mortality due to increased water temperatures? (Else Marie Løbersli, Norwegian directorate for nature management)	This is now addressed
726	46845	5	19	53	19	53	Can 'realised increased' be replaced by just 'increase'? (Genevra Harker, HarmonicQuay Ltd)	Agreed; “realized” deleted.
727	36390	5	20	0	0	0	Is there no projection for the impacts of increasing SST and the impacts of changing winds? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Increasing SST is now addressed. Wind is not due to the lack of space.
728	37428	5	20	4	20	7	Is this really considered likely. The incredibly subtle gradients in these environments and the small increment of SLR. Such landward translation of intertidal ecosystems is occurring, but to expect to see that in seagrass, this seems a little fanciful to me. Is there really any evidence? I would have thought this was an issue, together with coastal squeeze, which deserved treating in detail for intertidal wetlands (and even the freshwater wetlands behind them that will experience incursion, but to propose it for seagrass is far less appropriate. (Colin Woodroffe, University of Wollongong)	Coastal squeze is now discussed, and the changes in seagrasses with sea level rise have been noted with "low confidence"
729	42248	5	20	5	20	5	As desribed earlier in this chapter the link between SLR and erosion is very complex. Simplistic representations like this either need to be eliminated or amplified. (Denise Reed, The Water Institute of the Gulf)	This is a major difficulty as erosion must be mentioned but it can only be done very briefly as 800 words are available for the whole section. A generic statement is made and will, hopefully, meet consensus.
730	47515	5	20	12	0	0	I am surprisd to hear that seagrass meadows are such an important carbon sink, given that their spatial range is often limited. I think the report could be improved if they provided quantative data on this topic. (Alexander Kolker, Louisiana Universities Marine Consortium)	Additional data and references are now provided
731	50243	5	20	12	20	12	It could be helpful to indicate in what way the sinks are most intense--in terms of the amount of CO2 or rate of CO2? (Katharine Mach, IPCC WGII TSU)	The section had to be cut by 2/3; this sentence is part of the material cut.
732	37429	5	20	13	0	0	Loss of seagrass aggravates climate change. Isn’t this rather over-stated? (Colin Woodroffe, University of Wollongong)	Agreed. The text has been revised accordingly
733	40242	5	20	13	20	14	Another reason of coastal erosion related to sea grass (P. Oceanica) is: the dead leaves of P. Oceanica used to be swept onto the shoreline, usually every Automn and created a buffer that protected the coast from the severe winter action. In other words, it was the natural revetment for the shorelines. The long waves of February/ March were carrying the dead leaves away, leaving the beach "clean" during summer. With the intense tourism and urban coastal development in the Med, the dead leaves of P. Oceanica are considered as debrit and are regularly removed from the coasts/ beaches, leaving them without protection. In Cyprus we have several examples of this behaviour e.g. the beach of Geroskipou in Pafos etc. AKTI NGO carried out a campaign to inform stakeholders on this issue (www.akti.org.cy). (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	Agreed but the section has been cut by 2/3 and it is not possible to provide the details suggested in the little space available.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
734	38739	5	20	17	0	18	I suggest introducing as reference of impacts on macroalgae two papers. The first is related to Long term decline until disappearance in kelp [Fernández, C. 2011. The retreat of large brown seaweeds on the north coast of Spain: the case of Saccorhiza polyschides. European Journal of Phycology, 46:352-360] . The second is related to decreasing abundance and productivity of four Fucoids species that configure the mid tide levels of eastern coast of Europe, that shows a very rapid decline in their southern limit (now practically disappear), changes in fauna as well as a model of dynamic response of those Fucoids [Lamela, C., Fernández, C., Arrontes, J. y Anadón, R. 2012. Fucoids Assemblages on the North Coast of Spain: Past and Present (1977-2007). Botánica Marina, 55: 199–207]. Similar results about changing distribution of coastal seaweed species has been obtained by [Lima, F.P. Ribeiro, P.A. Queiroz, N. Hawkins, S. J. Santos, A.M. 2007. Do distributional shifts of northern and southern species of algae match the warming pattern?. Global Change Biology 13, 2592–2604; Díez, I. Muguerza, N. Santolaria, A. Ganzedo, U. Gorostiaga J.M.. 2012. Seaweed assemblage changes in the eastern Cantabrian Sea a nd their potential relationship to climate change. Estuarine, Coastal and Shelf Science 99: 108-120] (Ricardo Anadon, University of Oviedo)	Macroalgae are now addressed in section 5.4.2.2. Fernandez et al. (2011) is cited in the revised text.
735	46846	5	20	21	20	21	Spelling: 'led' not 'lead'. (Genevra Harker, HarmonicQuay Ltd)	OK but the sentence has been deleted.
736	40368	5	20	21	20	23	While there may be one study suggesting that reef ecosystems are more resistant to macroalgae than previously thought, there are many references (particularly those from the Caribbean in the 1980s and 1990 after the mass mortality of Diadema urchins) that show macroalgae outcompeting corals. That balance should be better reflected here. (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed; sentence deleted.
737	42249	5	20	21	20	23	This short section on corals and macroalgae seems to conflict with discussion of algae in the coral section. Check this for consistency. (Denise Reed, The Water Institute of the Gulf)	Agreed; sentence deleted.
738	38160	5	20	22	20	22	see also Perry CT, Spencer T and Kench PS 2008 Carbonate budgets and reef production states: a geomorphic perspective on the ecological phase-shift concept. Coral Reefs 27, 853-866 for a critical review of the 'phase shift' model (THOMAS SPENCER, University of Cambridge)	The section had to be cut by 2/3; this sentence is part of the material cut.
739	49781	5	20	31	20	31	add: and the preventive actions taken (Susanne Moser, Susanne Moser Research & Consulting)	This is correct. The sentence has been removed.
740	38161	5	20	34	0	0	Section 5.3.2.1 Little of this seems particularly coastal, just generally urban. If space gets tight surely this could go? Yes, flooding but what about coastal cliff erosion in soft rock cliffs which threatens settlments and disrupts infrastructure? (THOMAS SPENCER, University of Cambridge)	The refined section now focuses on coastal global impacts. While cliff erosion is relevant, this has not been assessed globally.
741	42790	5	20	36	20	47	It should be mentioned here that in many developing countries) the people settling in coastal or delta areas had nowhere else to go - they were often landless, or new migrants. Thus the problem is compounded both by the increased risk of flooding,as well as the fact that there is often no alternative land for them to settle. This creates a very complex problem for Governments since resettlement programs are intrinsically difficult and further complicated by speculative practices on nearby available land. (Sofia Bettencourt, World Bank)	This is a good point, but beyond the scope of this section.
742	47552	5	20	36	20	47	Some of the urban factors mentioned in this section are generic (e.g. heat island effect) and I wonder why they are included in a specifically coastal section. The extension of hard paving may be a factor in increasing the risk of flooding due to impeded surace infiltration and drainage, and one might argue that this will increase due to more frequent high intensity rainfall events (e.g. in the UK) and that this may be especially pertinent to low-lying coastal settlements where the terrain acts further to impede drainage from this kind of freshwater flooding. The logic and coastal focus of this section could be improved. (Jon French, University College London)	Yes. The treatment of impacts not specific to coastal areas has been removed.
743	44151	5	20	38	20	40	rephrase or skip; make relevance for climate change clear (Anne Holsten, Potsdam Institute for Climate Impact Research)	Has been removed.
744	44152	5	20	40	20	41	rephrase or skip; make relevance for climate change clear (Anne Holsten, Potsdam Institute for Climate Impact Research)	Has been removed.
745	42789	5	20	43	20	44	In developing countries (where streets are seldom paved) it is often the tin roofs of settlements that increase runoff concentration. (Sofia Bettencourt, World Bank)	Has been removed.
746	43096	5	20	44	21	11	the section on ecosystem based adaptation could be usefully expanded. There also needs better linkage to chapter 4. Note that ecosystems themselves need to adapt / be adapted if they are to continue to deliver adaptation benefits. (Michael Morecroft, Natural England)	We now treat ecosystem based adaptation in the adaptation section (5.5)
747	44153	5	20	45	20	45	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	Sentence has been removed.
748	47516	5	20	49	0	0	Is 2000 population the most up-to-date information available. It would be better to use more up-to-date information if that was available. Either way, this information needs a citatin. (Alexander Kolker, Louisiana Universities Marine Consortium)	Yes, we have included the appropriate references now (McGanahan et al 2007). These authors uses 2000 data.
749	40369	5	20	49	20	51	Are there no updated statistics? These numbers are over a decade old. (Laura Petes, National Oceanic and Atmospheric Administration)	Not to hour knowledge.
750	42250	5	20	49	20	51	The concept of LECZ should be introduced earlier in the chapter. (Denise Reed, The Water Institute of the Gulf)	We now introduce this in the Introduction of the Chapter

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
751	42038	5	20	51	0	0	on 2000 estimates: need to have a reference such as Oliver-Smith of UNU? You may also consult Julian Quan with Nat Dyer (2008); McGranahan, Balk, and Anderson 2009; Engleke (2012). (Liette Vasseur, Brock University)	McGranahan, Balk and Anderson (2007) is already in the text (the year is not 2009). This is the paper that defined the LECZ. Regarding the others, to our knowledge there are no references of Oliver-Smith on global coastal population (he works on disasters). From Quan and Dyer we have only found an unpublished report on land tenure and climate change but we have not come across any peer-reviewed publication. Same with the remaining names.
752	44154	5	20	51	20	51	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	Done.
753	43275	5	20	52	0	53	Sentence is incomplete? (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Has been removed.
754	36389	5	20	53	0	0	Please, explain "Urban poor in informal settlements,.." (Catharina Philippart, Royal Netherlands Institute for Sea Research)	We have reworded this to “Poor people living in urban informal settlements”
755	47517	5	20	53	21	2	This statement would be improved if it noted the amount of urban poor that live in the coastal zone. (Alexander Kolker, Louisiana Universities Marine Consortium)	Yes, but this number is not known/published.
756	35762	5	21	0	0	0	IPCC (2007) Climate change 2007: Synthesis report. A report by the Intergovernmental Panel on Climate Change, Available at http://www.ipcc.ch Krausmann, E. and Baranzini, D. (2009) Natech risk reduction in OECD Member Countries: Results of a questionnaire survey, Report, JRC 54120, European Communities. Krausmann, E.(2010) Analysis of Natech risk reduction in EU Member States using a questionnaire survey, Report EUR 24661 EN. Krausmann, E; Cozzani, V.; Salzano, E; Renni, E. (2011) : Industrial accidents triggered by natural hazards: an emerging risk issue. Nat. Hazards Earth Syst. Sci., 11, 921–929. Santella N, Steinberg LJ, Sengul H. (2010) Petroleum and hazardous material releases from industrial facilities associated with Hurricane Katrina. Risk analysis. 30:635-649. Showalter PS and Myers MF. (1994) Natural disasters in the United States as release agents of oil, chemicals, or radiological materials between 1980–1989: analysis and recommendations. Risk Anal ;14:169 –182. United Nations 2012. World Urbanization Prospects: The 2011 Revision,, Department of Economic and Social Affairs, Population Division,http://esa.un.org/unpd/wup/index.htm. Warm, H.J.; Köppke, K.-E. (2007) Safety of new and existing facilities and establishments against natural environmental hazards, especially floods. German Federal Environment Agency, Ref.-No. 203 48 362 (Jitendra Desai, Reliance Indusries Limited)	The purpose of table (now table 5.3 in the SOD) is meant to be general and in the context of the human drivers. It provides a general picture of the top 10 nations with the largest populations and the highest proportions of population in the low-lying areas without breakdown on various types of risks as indicated by the references.
757	35763	5	21	0	0	0	List of References quoted in the comments : Antonioni, G., Spadoni G., and Cozzani, V. (2007). A methodology for the quantitative risk assessment of major accidents triggered by seismic events. Journal of Hazardous Materials 147, 48-59 Cozzani, V., Salzano, E., Campedel, M., Sabatini, M. & Spadoni, G. (2007). The assessment of major accident hazards caused by external events. In Proc. 12th Int. Symp. on Loss Prevention and Safety Promotion in the Process Industries, IChemE Symp. Series n.153, IChemE, Rugby (UK), pp.331-336 Cruz A.M. and Okada N. (2008) Methodology for preliminary assessment of Natech risk in urban areas. Natural Hazards, 46: 199-220 Cruz, A. M. and Krausmann, E.(2009) Hazardous-materials releases from offshore oil and gas facilities and emergency response following Hurricanes Katrina and Rita, J. Loss Prev. Proc. Ind., 22, 59–65. (Jitendra Desai, Reliance Indusries Limited)	See response to comment #756.
758	46847	5	21	4	21	4	Why are Bangladesh and Vietnam highlighted? Is it because they occur on both sides of the table? Please explain this. (Genevra Harker, HarmonicQuay Ltd)	Yes, this is correct.
759	48707	5	21	10	21	11	A good NZ example to balance the Australasian section of Table 5-4 is the coastal inundation assessment for parts of Auckland by Reisinger et al. (in press). Citation: Reisinger, A., J. Lawrence, G. Hart, R. Chapman, in press: From coping to resilience: the role of managed retreat in highly developed coastal regions. In: Climate Change and the Coast: Building Resilient Communities [Glavovic, B., R. Kaye, M. Kelly, A. Travers (eds.)]. Taylor and Francis, London. (Robert Bell, NIWA)	Thanks. Unfortunately Table 5-4 is already very large and we can not take more cases on board.
760	37430	5	21	14	0	0	Is there a particular reason the Pearl and Mekong deltas have been chosen here. Surely many of the megadeltas have been shown to be subsiding, ie the Chao Phraya, Changjiang, etc (Colin Woodroffe, University of Wollongong)	No particular reason. The sentence has been dropped due to space restrictions.
761	40370	5	21	14	0	0	Is "trebled" supposed to be "tripled?" (Laura Petes, National Oceanic and Atmospheric Administration)	Yes, thanks.
762	42791	5	21	19	21	20	Note that the problem is especially acute where you have a combination of storm surge and river flooding (ie settlements located in delta areas). (Sofia Bettencourt, World Bank)	We agree. The sentence has been dropped due to space restrictions.
763	37431	5	21	19	21	21	More careful wording required here; is it really the case that a coastal city is exposed to weather and climate because of sea level extremes. What is meant by any of the terms weather, climate and sea-level extremes in this sentence. If a sea level extreme is a storm surge, then the city is exposed to flooding. And the increasing trend to urbanisation is putting more assets at risk. (Colin Woodroffe, University of Wollongong)	Yes. The sentence has been dropped.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
764	47518	5	21	19	21	21	While I agree that many coastal settlements could be threatened by sea level rise, the degree of risk they face is also a function of the defenses that these settlements have, and coastal defenses have not been discussed here. The report should examine coastal defenses to sea level rise in urbanized and other populated areas. Properly designed and implemented coastal defenses can reduce an areas risk to climate change, while poorly executed defense can make system and people more risk prone. (Alexander Kolker, Louisiana Universities Marine Consortium)	Absolutely. We now acknowledge this.
765	50244	5	21	20	21	20	The summary terms for evidence and agreement on this line should be italicized. (Katharine Mach, IPCC WGII TSU)	Done.
766	41689	5	21	24	0	0	Section 5.3.2.2. Nuclear power stations at coast should be mentioned here (e.g. Japan's case). (Rui Zhang, Xiamen University)	Reference to nuclear power stations included in new section 5.4.3.2
767	42039	5	21	24	0	0	5.3.2.2. Industry, Transport, and Infrastructures: section is superficial and does not state anything almost. You may want to look at Report of PIANC EnviCom Task Group 3: Climate change and navigation. (Liette Vasseur, Brock University)	This section has been completely rewritten. New section 5.4.3.2
768	35759	5	21	26	21	26	Instead of coastal industries "Industrial installations at coasts, would be more appropriate. (Jitendra Desai, Reliance Indusries Limited)	Expression kept for shortness
769	42252	5	21	26	21	32	This sections needs some specific examples to make it more meaningful to the reader who is not familiar with the citations (Denise Reed, The Water Institute of the Gulf)	New section 5.4.3.2. includes several references to specific studies
770	42792	5	21	26	21	44	Part of the problem is that most infrastructure drainage is dimensioned based on records of past flood patterns which fail to take into account future changes in sedimentation or storm patterns. (Sofia Bettencourt, World Bank)	Agreed
771	47519	5	21	26	21	44	The section should also discuss the role that melting arctic ice will have on commerce in the arctic, and in regions that would benefit from increased traffic in the arctic ocean. If this material is discussed in another chapter in the report, then there should at least be a reference to that section. (Alexander Kolker, Louisiana Universities Marine Consortium)	A reference has been added page 34
772	44761	5	21	28	21	29	Insert “snow” into “Severe storms with associated winds, rain, lightning and storm surges are…” (Keqi Zhang, Florida International University)	NA.
773	35760	5	21	29	21	29	consider insertion of " bulk storages including of hazardous substances," before transport. (Jitendra Desai, Reliance Indusries Limited)	Relevance is given to network infrastructures
774	38162	5	21	29	21	30	Again, I'd like to see a more coastal focus (THOMAS SPENCER, University of Cambridge)	New section 5.4.3.2 has a more coastal focus
775	35761	5	21	35	21	35	Consider insertion, after handmer et al., 2012). "A far reaching consequencies have also been reported by Santella et al (2010) due to over 200 onshore releases of hazardous chemicals, petroleum, or natural gas associated with Hurricane Katrina. (Jitendra Desai, Reliance Indusries Limited)	Thanks for the comment. We have decided not to include it due to space limitations
776	37286	5	21	35	21	35	Please add: "Another study dealing with this topic surveyed port authorities from around the world about how administrators felt climate change might impact their operations, what sea-level change would create operational problems, and how they planned to adapt to new environmental conditions (Becker et al., 2012). The ports community needs to address this issue and most felt relatively uninformed about potential climate impacts, although most ports felt that SLR would not be an issue at their port this century, sea-level rise was nevertheless an issue of great concern.", Full citation: Becker, A., Inoue, S., Fischer, M., Schwegler, B.: Climate change impacts on international seaports: Knowledge, perceptions, and planning efforts among port administrators (2012) Climatic Change, 110 (1-2), pp. 5-29. (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	Thanks for the comment. We are fully aware of the reference but have not included it since we have already several paragraphs on ports
777	46390	5	21	37	0	0	There has been a subsequent more recent UNCTAD report on these issues Climate change impacts and adaptation: A challenge for global ports Sept 2011 Geneva. (Andrew Mather, eThekwini Municipality)	UNCTAD reference is no longer applicable
778	47520	5	21	41	0	0	The report should define the term coastal squeeze, though the authors should also consider reducing their use of jargon. (Alexander Kolker, Louisiana Universities Marine Consortium)	Coastal squeeze is an accepted term and defined in AR5 Glossary. It includes the loss of beaches in front of seawalls and other infrastructure due to long term erosion of beaches from a variety of processes, climate potentially being one.
779	40371	5	21	42	0	0	Need to define "coastal squeeze." (Laura Petes, National Oceanic and Atmospheric Administration)	Coastal squeeze is defined in a broad manner in AR5 Glossary. It includes the loss of beaches in front of seawalls and other infrastructure due to long term erosion of beaches from a variety of processes, climate potentially being one.
780	38163	5	21	42	21	42	coastal squeeze. See comment on page 13, line 40. (THOMAS SPENCER, University of Cambridge)	See response to comment #531.
781	38555	5	21	47	0	0	Section 5.3.2.3. Include some information on the effects of ocean acidification on shellfish aquaculture. This has been all over the news along the west coast of North America, particularly where the multi-million dollar oyster industry is concerned. (Christopher Harley, University of British Columbia)	Some text and associated references was added. The section has been rewritten and combined with section 5.4.2.3
782	43276	5	21	47	22	33	This section is not well defined in whether it reaches beyond coastal waters. If so and in any case, balancing of the respective sections with chapter 6 and 30 is needed. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Thsi section concerns only coastal waters
783	45869	5	21	47	22	33	This entire section should be brought in line with section 5.3.2.5 on water resources, that has large overlaps on salinisaton (Laurens Bouwer, Vrije Universiteit Amsterdam)	Done

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
784	39440	5	21	49	0	0	LECZ is a new terminology - should be introduced in definitions section, if it is going to be used 'officially' in this chapter (but actually it only gets two mentions in the whole text). Otherwise, stick with 'low-lying areas' which is included in the definitions. (Sarah Cornell, Stockholm Resilience Centre)	This remark concerns page 20, line 49 instead of page 21
785	39441	5	21	49	22	2	This is a better opening paragraph for the section than the previous one. (Sarah Cornell, Stockholm Resilience Centre)	OK
786	39442	5	21	52	0	0	Badjeck et al is not a primary source for this data - better to use (and cite) the original estimates published by FAO and similar. Better to refer to both Badjeck et al and Barange & Perry as analyses of the policy implications of these facts. (Sarah Cornell, Stockholm Resilience Centre)	Done, original reference has been added
787	42793	5	22	1	22	33	On the coast of Sao Tome and Principe, changing storm patterns are also affecting fishermen's safety at sea, since they are no longer able to navigate reliably by sight once sudden storms and fog settle in (see Sao Tome and Principe National Communication to UNFCCC) (Sofia Bettencourt, World Bank)	information added
788	38740	5	22	2	0	0	The above mentioned problem of nomenclature of Ayeyarwaddy delta, here as Irrawaddy. In many maps I revised appear with this last name:Irrawaddy. I suggest to use in all chapter. (Ricardo Anadon, University of Oviedo)	OK: Use this name in the rest of the chapter
789	50245	5	22	4	22	11	The author team should consider and cross-reference the findings of chapter 6 and 30 here. (Katharine Mach, IPCC WGII TSU)	OK
790	45959	5	22	4	22	12	The examples included of changes in regional abundances of fish species for the North Sea and southeastern Australia are good. I suggest also including in this paragraph the analysis of the impact of sea surface temperature changes over the last 25 years on the fisheries yields of 63 large marine ecosystems that annually produce 80% of the world's marine fisheries catches ..... K. Sherman, I. M. Belkin, K. D. Friedland, J. O'Reilly and K. Hyde. 2009. Accelerated Warming and Emergent Trends in Fisheries Biomass Yields of the World's Large Marine Ecosystems. Ambio Vol. 38, No. 4, June 2009 - pages 215-224. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	Some references where added including the ones provided
791	38741	5	22	6	0	0	I suggest to consider the reference [Bañón, R. 2009.Variacions na diversidade e abundancia ictiolóxica en Galica por efecto do cambio climático. In: Pérez Muñuzurri, V. Fernández, M. Gómez, J.L (eds): Evidencias e impactos do cambio climático en Galicia. Xunta de Galiza. 391-401] as an example of shift on marine fish distributions to nothern waters and their potential effect on fisheries. The study about the shift to northern waters of subtropical species also is a good reference about nothward displacement of marine species [Quero, J.C., Du Buit, M.H., Vayne, J.J. 1998. Les observations de poissons tropicaux et le réchauffement des eaus dans l'Atlantique européen. Oceanologica Acta, 21: 345-351] (Ricardo Anadon, University of Oviedo)	Quero reference is old, 1998; the other reference could not be traced
792	45870	5	22	6	22	6	What does increased distribution mean here, increased abundance or occurrence over space? (Laurens Bouwer, Vrije Universiteit Amsterdam)	Here the distribution means abundance which will be reflected also on space distribution
793	40372	5	22	15	0	0	Wording makes it sound like all sea urchins are pests. Need to clarify. (Laura Petes, National Oceanic and Atmospheric Administration)	the word pest was changed by detrimental
794	43056	5	22	15	0	0	Perhaps best to give the taxonomic name for the sea urchin (Centrostephanus rodgersii) (Beth Fulton, CSIRO Marine and Atmospheric Research)	Centrostephanus rodgersii– Diadematidae
795	50246	5	22	16	22	16	It would be helpful to specify what this acronym stands for. (Katharine Mach, IPCC WGII TSU)	Meaning: East Australian Current
796	40373	5	22	17	0	0	Are mosquitofish pests? Need to clarify. (Laura Petes, National Oceanic and Atmospheric Administration)	The word pest was changed by detrimental
797	40374	5	22	18	22	20	HABs aren't really "pests." Should perhaps pull HABs out and do a separate paragraph on them. (Laura Petes, National Oceanic and Atmospheric Administration)	The word pest was changed by detrimental
798	45871	5	22	19	22	19	"Episodes of HABs have increased", but where and over which period? (Laurens Bouwer, Vrije Universiteit Amsterdam)	Deleted
799	45872	5	22	22	22	23	What sources of salinity are meant here, soil, ground water, inundation? (Laurens Bouwer, Vrije Universiteit Amsterdam)	It is soil and water, salinity caused by inundation
800	35306	5	22	27	22	27	Not sure that the Keener reference was peer-reviewed. Better to replace with Lata and Nunn (2012) in Climatic Change, already cited. (Patrick Nunn, University of New England)	OK replaced
801	50247	5	22	29	22	33	Calibrated uncertainty language used on lines 30 and 33 should be italicized. Additionally, for these findings, it may be preferable to cross-reference the findings of chapter 6 and 30, which treat this topic in detail. For conclusions presented here, it is important to ensure that the traceable accounts, citations, and cross-references fully support the conclusions. (Katharine Mach, IPCC WGII TSU)	OK,
802	45873	5	22	30	22	31	Very unfortunate wording: "Limited evidence to suggest that … has not been adversely affected", but the reverse is more important: is there evidence that aquaculture has been adversely affected? (Laurens Bouwer, Vrije Universiteit Amsterdam)	Done
803	45874	5	22	32	22	33	But what is the cuase of slat water inundation? And is it really salt water inundation, or is it salinisation of aquifers, intrusion in open water, etc? And what is the relation to anthropogenic climate change? (Laurens Bouwer, Vrije Universiteit Amsterdam)	Rephrased in the text
804	38164	5	22	36	0	0	section 5.2.3.4 Is there any real evidence that climate change is affecting numbers of visitors? Are there studies where individuals have said that they are not now going to particular loactions because of perceived degradation as a result of climate change? (THOMAS SPENCER, University of Cambridge)	For impacts on tourist numbers, this section has been revised to show expected impacts from changes in extreme events, impacts linked to climate-sensitive resources for coastal tourism and impacts on tourist behaviour, activities or flows. Few studies show climate change affecting numbers of tourists.
805	42040	5	22	36	0	0	you may want to add a few numbers: see Hinrichsen 1999 (Liette Vasseur, Brock University)	Newer references, e.g. Burke et al 2011, UNEP 2009, provide some numbers on coastal tourism.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
806	52848	5	22	36	0	0	Section 5.3.2.4. Coastal Tourism and Recreation - Following reference (synthesis) highly relevant: Climate Change and Tourism: From Policy to Practice, By Susanne Becken and John Hay; Published June 14th 2012 by Taylor and Francis/Routledge - 280 pages (John Hay, University of the South Pacific)	Noted but not used. This section relies mainly on peer-reviewed papers and other publications.
807	54380	5	22	36	0	0	Section 5.3.2.4: The discussion in this section is fairly compact, and to me, the support for the high confidence conclusion at the end of the section is not clearly developed. I suggest considering revisions that more clearly present the basis for this conclusion. For example, the first paragraph mentions significant impacts from changes in extreme events and climate variability, but the nature, magnitude, and distribution of these impacts is unclear. In addition, the second paragraph states that impacts are particularly relevant for tropical island coasts that depend on coral reefs for tourism where bleaching has occurred, but there is no presentation of literature that quantifies this impact. (Michael Mastrandrea, IPCC WGII TSU)	Amended in text. The concluding paragraph has been revised to reflect what has been discussed.
808	43277	5	22	36	22	53	A statement is needed whether damages can already be seen and quantified. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Coral bleaching is mentioned here and a reference is made to the cross-chapter box on ocean acidification where more details on
809	45875	5	22	36	22	53	This section should cross refer to WG2 Chapter 10, specifically section 10.6 on recreation and tourism (Laurens Bouwer, Vrije Universiteit Amsterdam)	Cross-reference is made to chapter 10 in the third paragraph.
810	47521	5	22	38	0	0	The report states that coastal tourism is the most important and fastest growing tourism sector. Most important for what? Fastest growing where? I am guessing that the authors mean the fastest growing tourism sector on earth, and an important component of GDP in a large number of countries. This is an example of a place where a bit of specificity could greatly improve the clarity of the report. (Alexander Kolker, Louisiana Universities Marine Consortium)	Revision made. Specific examples with references are given in the first paragraph.
811	50248	5	22	41	22	41	For the described "at risk" destinations, it would be helpful to be more precise--at risk of what, as measured by what metric? Also, it may be preferable to use a more qualified description of the "changes in extreme events"--especially because impacts for these types of events have not been attributed to climate change (or to changes in physical drivers) in all cases. (Katharine Mach, IPCC WGII TSU)	Deleted although the 'at risk' destinations is based mainly on climate change variables (Scott et al. 2008).
812	35307	5	22	46	22	46	delete "due to SST increase". Superfluous and only partly correct. (Patrick Nunn, University of New England)	Deleted.
813	46848	5	22	46	22	46	Explain SST in full when it first appears. (Genevra Harker, HarmonicQuay Ltd)	NA – see #812.
814	50249	5	22	51	22	51	The chapter team should ensure that this conclusion is fully supported by literature citations provided in the traceable account of this section. (Katharine Mach, IPCC WGII TSU)	Amended in text. The concluding paragraph has been revised to reflect what has been discussed and supported by references.
815	35620	5	22	51	22	53	This statement is ambiguous. Why do we have high confidence that coastal tourism is vulnerable to sea level rise ? In the Caribean, which is the example mentionned here, one could think that this activity is even more vulnerable to rarefaction of oil or to other manifestations of global change. References here would be needed. (Goneri Le Cozannet, BRGM)	The final paragraph has been revised to reflect what is discussed in the paragraphs and supported by references. Although oil pollution can be a factor in any tourist destination, the paragraph is on future impacts by climate change.
816	41729	5	22	51	22	53	The fact that coastal tourism is highly vulnerable to weather and climate extremes and rising sea-levels is only one side of the coin. The flipside is: the tourism industry annualy moves millions of tourists to hazard prone areas without adequately informing about potential environmental risks. Rather than coastal tourism being vulnerable, the tourists, which are mostly not familiar with local natural hazards and protection measures, as well as the local people that economically depend on the tourists are highly vulnerable. Full reference: Weichselgartner, J. (2006): Soziale Verwundbarkeit und Wissen. Geographische Zeitschrift 94 (1): 15-26. (Juergen Weichselgartner, University of Kiel)	An interesting argument but not considered.
817	38165	5	23	2	0	0	section 5.3.2.5 there will need to be cross reference to Chapter 29 of WGII here (THOMAS SPENCER, University of Cambridge)	This section has been now splitted into 5.3.3.6 and 5.4.2.5. cross refrences to relevant chapters have been included
818	47522	5	23	2	23	38	This section should also look at the impacs of climate change on submarine groundwater discharge. Moore, W. S. (2010), The effect of submarine groundwater discharge on the ocean, Annual Review of Marine Science, 2, 59-88. (Alexander Kolker, Louisiana Universities Marine Consortium)	Due to limitations of space this impact has not been considered. A specific section on coastal aquifers has been included
819	40375	5	23	6	23	8	Very confusing sentence - would benefit from rewording and/or more separation of thoughts. (Laura Petes, National Oceanic and Atmospheric Administration)	it has been reworded
820	46849	5	23	8	23	8	Spelling: aquifer. (Genevra Harker, HarmonicQuay Ltd)	Done
821	50250	5	23	10	23	10	It would be helpful to specify what these knowledge gaps are, more specifically. (Katharine Mach, IPCC WGII TSU)	Done, see SOD page 21, line 51-54
822	46850	5	23	23	23	23	Spelling: 'led' not 'lead'. (Genevra Harker, HarmonicQuay Ltd)	No longer applies
823	42628	5	23	26	23	38	Given evidence that freshwater lenses do not conform to the Ghyben-Herzberg equation, it is possible that increases in sea level will actually increase the capacity of freshwater lenses on atolls. For analysis, see Rozell, Daniel J. 2010. Effects of climate change on groundwater resources at Shelter Island, New York State, USA. Hydrogeology Journal 18 (7):1657-1665. For corroboration that atoll lenses are "truncated at a shallow depth", see Wheatcraft, Stephen W. 1981. Atoll Island Hydrology. Ground water 19 (3):311-320. (Erin Coughlan, Red Cross / Red Crescent Climate Centre)	A new section on coastal aquifers has been included 5.4.2.5. Rozell (2010) have been included
824	50251	5	23	36	23	37	The calibrated uncertainty language provided on these lines should be italicized. Additionally, presumably the intended summary term for evidence here is "robust evidence." (Katharine Mach, IPCC WGII TSU)	Done
825	50252	5	23	41	0	0	Section 5.3.2.6. The author team should consider and cross-reference the findings of Chapter 11 in this section. (Katharine Mach, IPCC WGII TSU)	The introductory paragraph now cross-references chapters 6 and 11

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
826	53848	5	23	41	0	0	This section could refer to chapter 11 for an overview of the health risks of climate change, and then focus on issues of particular importance for low-lying areas. For example, heatwaves are a health risk, but there is nothing particular about risks in low-lying areas. Extreme events such as flooding and storm surges are important, as noted in the text. Cholera has been an important cause of morbidity and mortality in Bangladesh. Research suggests an association between SST and cholera in the Bay of Bengal. (Kristie L. Ebi, IPCC WGII TSU)	Greater emphasis is now made to the coastal aspects of health. for links to cholera and SST in Bangladesh
827	45876	5	23	41	24	39	This section should highlight what spicifc health issues are at play at coasts; now there is much overlap with WG2 Chapter 11 (Laurens Bouwer, Vrije Universiteit Amsterdam)	The paragraphs in this section have been shortened to focus more on coastal specific health issues with cross-references to chapter 11
828	47523	5	23	50	0	0	The report would be improved if it described why flood risk has fallen since 1980 and the difference between flood risk and flood exposusre. (Alexander Kolker, Louisiana Universities Marine Consortium)	Done, page 36
829	38166	5	23	50	23	51	WHY have these mortality risks fallen? (THOMAS SPENCER, University of Cambridge)	Explained in the new text, page 36 and Box 5.1.
830	44762	5	23	50	23	53	“Flood mortality risk has fallen since 1980 in all regions apart from South Asia and cyclone mortality risk has fallen all regions since 2000 and is now lower than in 1980. Since…” I am not sure if this claim on “ALL REGIONS” is solid. (Keqi Zhang, Florida International University)	Explained in the new text page 36 and Box 5.1.
831	37432	5	23	52	0	0	What is meant by ‘development has reduced vulnerability’. This seems like a statement that might be taken out of context to mean something else. Development is a very vague term. I recommend being much more specific here. (Colin Woodroffe, University of Wollongong)	Changes in the new text page 36
832	46851	5	23	52	23	52	Add apostrophe: countries'. (Genevra Harker, HarmonicQuay Ltd)	Done
833	39277	5	24	0	0	0	Chap. 5, p. 24 - Section “Projected impacts”: I found this section a bit weak compared to the other sections of this chapter. It is repetitive and highly redundant in large part with respect to the previous parts and no specific advancement is presented here. However, this clearly does not depend on Authors, it derives from the weak tools available to quantitatively predict effects of climate change drivers on biota and habitats. This limit should be more emphasised throughout the document including the other chapters (e.g. chaps. 6 and 30). (Gianluca SARA, University of Palermo)	The new structure of the section, including both observed and projected impacst under the same sections have to avoid redundancies and provides a more balanced assessment
834	39278	5	24	0	0	0	The nearly complete inability of the scientific world to predict what will happen in the near future, apart from the general and macroscopic effects, should be clearly stressed at the beginning of relevant sections. This holds, for example for the problem of data resolution to be inputted in models, which is only recalled at pag. 46 (lines 3-4). Rather, the issue of scale resolution should be considered and recalled also in this section with a couple of sentences. (Gianluca SARA, University of Palermo)	What are considered to be the most relevant gaps and needs are summarized in new section 5.6.
835	39279	5	24	0	0	0	Recently Kearney et al. 2012 (Biomechanics meets the ecological niche: the importance of temporal data resolution. J. Exp Biol 15, 922-933) pointed out that in the emerging field of mechanistic niche modelling (which aims to link the functional traits of organisms to their environments and predict survival, reproduction, distribution and abundance), is necessary to have great regard to the resolution of temporal scale. This approach has a great potential to increase the understanding of the impacts of environmental change on individuals, populations and communities by providing functional connections between physiological and ecological response to increasingly available spatial environmental data. (Gianluca SARA, University of Palermo)	We agree with your comment, but this discussion is too specific to be included in this assessment report
836	39280	5	24	0	0	0	Kearney and co-authors explored the appropriate level of temporal resolution of input data required for these models, and specifically the error in predictions that may be incurred through the use temporally-averaged data. They show that fine-scale temporal resolution (daily) data can be critical for unbiased inference of climatic impacts on survival, growth and reproduction. (Gianluca SARA, University of Palermo)	We agree with your comment, but this discussion is too specific to be included in this assessment report
837	53849	5	24	1	24	2	This is generally true, but not for heatwaves. (Kristie L. Ebi, IPCC WGII TSU)	This has been noted
838	38167	5	24	4	24	26	this is very interesting material but it needs either more specific focus on coastal systems or to be shorthened (because of this lack of a coastal focus) (THOMAS SPENCER, University of Cambridge)	These 2 paragraphs have been shortened and the linkage to coasts has been strengthened
839	40376	5	24	4	24	26	It would be helpful if this section were more strongly tied to coasts. (Laura Petes, National Oceanic and Atmospheric Administration)	These 2 paragraphs have been shortened and the linkage to coasts has been strengthened
840	42041	5	24	6	0	0	For example, dengue risk in Hawaii contracts… this sentence does not make complete sense. Missing word? (Liette Vasseur, Brock University)	Changed 'contracts' to 'lowers'
841	53850	5	24	6	24	9	There has been a resurgence in cases of dengue in the past few years. You also could mention chikungunya, another viral disease carried by the same mosquito. (Kristie L. Ebi, IPCC WGII TSU)	Done
842	53851	5	24	11	24	12	There is a rich literature on the association between malaria and environmental variables, much that reaches different conclusions. This issue is covered in the health and Africa chapters. (Kristie L. Ebi, IPCC WGII TSU)	Reference is now made to the health chapter
843	53852	5	24	16	24	26	Food- and water-borne diseases also are covered in the health chapter and, in some cases, the Asia and Africa chapters. The unique issues for this chapter relate to weather-related health risks unique to low-lying areas, such as how unplanned settlements in low-lying areas can increase risks of food- and water-borne disease, flooding, storm surges, etc. (Kristie L. Ebi, IPCC WGII TSU)	Cross-references to other relevant chapters have been included. We have tried to select information only relevant for coastal areas
844	47526	5	24	17	24	20	The authors have not pointed out why changes in the distribution of a barncale species are significant to a global audience. Is this barnacle a good indicator species? (Alexander Kolker, Louisiana Universities Marine Consortium)	There are no references to barnacles in this page or section

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
845	41341	5	24	17	24	21	A link between cholera and temperature has also been reported. For example, 1) Hashizume M, Faruque ASG, Wagatsuma Y, Hayashi T, Armstrong B. Cholera in Bangladesh: Climatic components of seasonal variation. Epidemiology 2010;21(5):706–710.; 2) Hashizume M, Armstrong B, Hajat S, Wagatsuma Y, Faruque ASG, Hayashi T, Sack DA. The effect of rainfall on the incidence of cholera in Bangladesh. Epidemiology 2008;19:103–110.) (Masahiro Hashizume, Institute of Tropical Medicine, Nagasaki University)	Done
846	41342	5	24	21	24	22	typo: "rotovirus" should be "rotavirus". (Masahiro Hashizume, Institute of Tropical Medicine, Nagasaki University)	Corrected
847	50253	5	24	25	24	26	It would be helpful to clarify if this result refers to an observation or a projection--or to an experimental or model result? (Katharine Mach, IPCC WGII TSU)	This study used a model and this point has been clarified in the text
848	40377	5	24	26	24	54	This should introduce the concept that degraded and depleted ecosystems are less resilient to climate-related impacts. (Laura Petes, National Oceanic and Atmospheric Administration)	Where relevant, degraded ecosystems are mentioned to have less resilience to climate change impacts.
849	50254	5	24	29	24	29	Discussion here of harmful algal blooms should consider and cross-reference chapter 6. (Katharine Mach, IPCC WGII TSU)	Done
850	53853	5	24	36	24	36	There is one or two publications on increased salination in Bangladesh adversely affecting maternal health. Another issue that could be covered is diseases like Ross River virus that are carried by saltwater mosquitoes and the implications of saltwater intrusion for disease incidence. (Kristie L. Ebi, IPCC WGII TSU)	Considered (Khan et al2008).
851	38168	5	24	37	24	39	again some coastal tie-in is needed, rather than this general statement (THOMAS SPENCER, University of Cambridge)	Agreed
852	50255	5	24	39	24	39	The summary terms for evidence and agreement on this line should be italicized. (Katharine Mach, IPCC WGII TSU)	Done.
853	41690	5	24	42	0	0	Section 5.4. There is one paragraph in each subsection to introduce the importance of each "habitat". I think they should appear early in Section 5.3. or even earlier. (Rui Zhang, Xiamen University)	We think that the short introduction on each system is needed at the beginning of each section rather than in a general introduction.
854	41691	5	24	42	0	0	Section 5.4.Since most of the projection studies projected based on "factors", not "habitats". I suggest the authors reorganize this section according to impact factors as well. (Rui Zhang, Xiamen University)	The author team considered the suggestion but decided to keep the section organized by system for clarity.
855	45877	5	24	42	30	38	What does section 5.4 provide beyond section 5.5? Perhaps the two could be merged. (Laurens Bouwer, Vrije Universiteit Amsterdam)	Agreed. the two sections have been merged.
856	38169	5	24	46	24	48	this repeats earlier text, at page 12, lines 6-10 (THOMAS SPENCER, University of Cambridge)	Duplication eliminated
857	47524	5	24	48	24	49	The meaning of this sentence is unclear. (Alexander Kolker, Louisiana Universities Marine Consortium)	Agreed. The text has been revised accordingly.
858	37433	5	24	49	0	0	To say that there are few ecosystems with limited impact is a muted way of saying that many have been heavily impacted. Reword for greater meaning here. (Colin Woodroffe, University of Wollongong)	Although we agree, we feel that it is better to use a generic statement in the introduction and address the level of impact in the various sub-sections.
859	50256	5	24	49	24	49	It would be helpful to clarify if this "limited impact" is referring to impacts observed or projected? (Katharine Mach, IPCC WGII TSU)	“limited observed impact”; the text has been modified accordingly.
860	47525	5	24	49	24	52	This is a run-on sentence. (Alexander Kolker, Louisiana Universities Marine Consortium)	Agreed. It has been re-worded and shortened.
861	37434	5	24	51	0	0	What does the ‘last phase of estuarine history mean’? Reword, it is not clear whether this is a reflection of geomorphological evolution of individual estuaries or an outcome of human impact on them (Colin Woodroffe, University of Wollongong)	This expression gas been deleted.
862	39443	5	24	57	0	0	Halpern et al 2008 is referred to in several sections of the chapter. It is an iconic map based on a comprehensive synthesis, but it is not the only assessment in the last 5 years of human impact on coastal zones. It might be politic to highlight it explicitly - just once - at the start of the chapter somewhere, emphasising the synthesis approach behind the article and saying that it provides important background to much of the remainder of the chapter. This allows for more appropriate citation of more specific reviews of habitat types or regions in the sub-sections that follow. (Sarah Cornell, Stockholm Resilience Centre)	Halpern is now mentioned only once. It would be nice to be able to mention the original papers but it is not possible considering the number of words allocated. High-level reviews are therefore very useful in this context. The paper mentioned by the referee should be cited only once in the revised text.
863	50257	5	25	3	0	0	Section 5.4.1.1. In further developing this section, the chapter team should ensure comprehensive consideration and assessment of relevant literature. (Katharine Mach, IPCC WGII TSU)	We have tried to be comprehensive in the very limited space allocated. More specific suggestions of missing aspects or studies would have been helpful.
864	38743	5	25	5	0	10	The rapid loss of some cold water species in some coast (see previous comment) introduces a interresting and not well solved question: What species could play a significant role in the new ecosystems? The dissapaerance of cold Fucoids in NordIberia (see references of Lima et., 2007, Lamela et al 2012, Fernández 2011, Diez et al., 2012) transform the intertidal landscape and the functioning of their ecosystem, and probably originate . Some of the ecosystem services like primary production, absorving CO2, the species interactions (with unknow results) between others must be considered as projected impacts on rockky shores !Are occurring actually¡ (Ricardo Anadon, University of Oviedo)	Cold water corals are much too deep to be considered in the rocky shore section. Space is limited and we cannot provide regional details. Hence the text was not modified
865	50260	5	25	5	25	5	"likely" -- If being used as calibrated uncertainty language per the guidance for authors (reflecting a probabilistic basis for assignment), this term should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Agreed. The SOD has been revised accordingly.
866	42253	5	25	5	25	10	This paragrah seems to overgeralize some complex issues. There will be an issue with sediment supply that controls the squeeze in front of rocky cliffs, sediment is not necessarily generated fron the cliffs themselves. (Denise Reed, The Water Institute of the Gulf)	Erosion must be mentioned in this section but very little space is available. We have tried to be more informative in fewer words.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
867	40378	5	25	5	25	20	This section needs some work. There is a wealth of literature (particularly from Europe, West Coast of U.S., South Africa, New Zealand, Chile) on climate-related impacts to rocky shore organisms and ecosystems. Is this supposed to cover subtidal and intertidal? The first paragraph focuses only on physical impacts to the rocks themselves, as opposed to impacts on the ecosystem and associated organisms, and the second paragraph has just a couple of examples that don't form a cohesive story. What about shifts in species range shifts? Impacts on species interactions? Spread of invasive species? Etc. Here are just a few references that are relevant to this section: Harley, C.D.G. et al. 2006. The impacts of climate change in coastal marine systems. Ecology Letters 9(2): 228-241. Helmuth, B. et al. 2006. Living on the edge of two changing worlds: forecasting the responses of rocky intertidal ecosystems to climate change. Annual Review of Ecology, Evolution, and Systematics 37: 373-404. Mieszkowska, N. et al. 2006. Changes in the range of some common rocky shore species in Britain - a response to climate change? Marine Biodiversity 183: 241-251. (Laura Petes, National Oceanic and Atmospheric Administration)	This section is about projected impacts, not observed impacts which the referee addresses here. These two sections have been merged and revised. It should address the referee's concerns.
868	46852	5	25	8	25	8	Insert word: "In a feadback process,…." (Genevra Harker, HarmonicQuay Ltd)	The SOD as been modified accordingly.
869	38170	5	25	9	25	10	a good reference for this sediment release is Brooks SM and Spencer T 2012 Shoreline retreat and sediment release in response to accelerating sea level rise: measuring and modelling cliffline dynamics on the Suffolk Coast, UK. Global and Planetary Change 80-81, 165-179 [doi:10.1016/j.gloplacha.2011.10.008] (THOMAS SPENCER, University of Cambridge)	The section had to be cut by 2/3; this sentence is part of the material cut.
870	38742	5	25	12	0	19	Not only the effect of acidification has been observed near CO2 vents, if not also in various environments and species. This calcifiyng species (mollusc) decrease their calcification rates, and could be seen as good examples for many other species in rocky shores and in aquaculture. Also the synergistic effect between acidification and warming will be important in a near future (see second reference). I suggest to introduce a comment at these respects, and probably two good references could be :[Gazeau, F., C. Quiblier, J. M. Jansen, J.-P. Gattuso, J. J. Middelburg, and C. H. R. Heip (2007), Impact of elevated CO2 on shellfish calcification, Geophys. Res. Lett., 34, L07603, doi:10.1029/2006GL028554; Rodolfo-Metalpa, R. Houlbrèque, F. Tambutté, E. Boisson, F. Baggini, C. Patti, F.P. Jeffree, R. Fine, M. Foggo, A. Gattuso, J.-P. Hall-Spencer, J. M. 2011.Coral and mollusc resistance to ocean acidification adversely affected by warming. Nature Climate Change 1:308-312 (Ricardo Anadon, University of Oviedo)	The responses observed near CO2 vents were addressed in a previous section on “Observed changes). In the SOD, the sections “Observed changes” and “Projected changes” have been merged and extensively revised, which should be much less confusing.
871	46853	5	25	12	25	12	Remove hyphen in rocky-shore. (Genevra Harker, HarmonicQuay Ltd)	Done.
872	42254	5	25	18	25	18	Reference to 'the Channel' is unclear. (Denise Reed, The Water Institute of the Gulf)	English channel. The SOD has been modified accordingly.
873	38171	5	25	23	0	0	section 5.4.1.2 it is important not to see coastal change as a) passive (the filling bath tub model) and or b) simply progressive in a landward direction. Coastal systems can be controlled by intrinsic feedback mechanisms as well as by extrinsic forcing. In some situations , these intrinsic processes can drive coastal progradation rather than retreat. The important point is that global change may send coastal systems into new modes which have not been seen in the historical record. (THOMAS SPENCER, University of Cambridge)	Text has been added to make the point clearer that coastal response to sea level rise is not always shoreline erosion and retreat.
874	43278	5	25	23	26	50	These sections on beaches, deltas, mangroves, salt marshes have again system level assessments and less reference to species sensitivites to climate. The level of available information should be mentioned, ditto in 5.5. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Section has been re-structured and expanded
875	47527	5	25	25	5	30	These statements are contradictory. The authors first state that climate change is impacting erosion on beaches, and then they note determining whether or not this is happening has been challenging. (Alexander Kolker, Louisiana Universities Marine Consortium)	Added text to make clearer that even a very small sea level rise will induce some shoreline change although the climate induced shoreline change signal, at least at present, is not statistically detectable.
876	35625	5	25	25	25	26	"Climate change has undoubtedly contributed to the observed erosion impacts found along the world’s beaches and dunes (See 5.3)": Section 5.3 says that it is difficult to draw conclusions because the observations are too sparse. The AR5 report quotes 2 studies that adress this issue, including Zhang et al. 2004. An updated review of this topic would be useful and relevant in this chapter. Note that this issue is addressed in chapter 18 and 29, but the statement chapt. 29 - page 8 is different from that here. This raises the issue of: can we attribute shoreline changes and evaluate the respective contribution of forcing factors. It should probably be underlined that there is a lack of commonly recognized methods to attribute shoreline changes. For example, Zhang et al. (2004) but also Brunel and Sabatier (2007 and 2009) tried to quantify how much erosion can be attributed to contemporary sea level rise. In these both papers, the method is arguable because either the Bruun rule or an "active flooding principle" are used, although these rules lack validation. In Gutierrez et al. (2010) (quoted in the report), the bayesian network is used over many coastal sites to evaluate the relative importance of geomorphology, of sea level rise, waves and tides in shoreline mobility. However, it is still possible that a hidden variable with spatial patterns similar to those of one of the observed factors perturbates this assessment. The chapter would much benefit from a complete discussion on this, which would link sea level rise knowledge (from WG1) to the work in WG 2. Zhang,K.Q., B.C.Douglas and S.P. Leatherman, 2004:Globalwarming and coastal erosion. Climatic Change, 64, 41-58. Brunel, C., and Sabatier, F.: Pocket beach vulnerability to sea-level rise, Journal of Coastal Research, 604-609, 2007. Brunel, C., and Sabatier, F.: Potential influence of sea-level rise in controlling shoreline position on the french mediterranean coast, Geomorphology, 107, 47-57, 10.1016/j.geomorph.2007.05.024, 2009. (Goneri Le Cozannet, BRGM)	The text has been revised to look at observed impacts and projected impacts. It recognized that "attributing shoreline changes to climate change is still difficult". Some examples of climate-related coastal erosion are given; usefulness of methodology of Gutierrez et al 2011 is noted; reference to future SLR is made in a more general sense.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
877	44358	5	25	25	25	26	The first sentence of section 5.4.1.2 is possibly a little strong, and somewhat in contradiction with section 5.3, where it is stated that "…attributing shreline changes to climate change is still difficult". I would suggest to change "undoubtedly" by "quite likely" or something similar. (Ibáñez Carles, IRTA)	New wording has been added.
878	35626	5	25	25	25	31	This discussion would be definitly relevant in the previous section (5.3, observed impacts) since it does not relate to future changes. See my comment page 13 from line 46 to line 48 (Goneri Le Cozannet, BRGM)	The two sections have now been combined.
879	40379	5	25	25	25	43	This is all about physical impacts, not ecological. Should include ecological changes as well. (Laura Petes, National Oceanic and Atmospheric Administration)	Ecological changes on rocky platforms are discussed.
880	48709	5	25	25	25	43	One aspect not covered is the relative ratio of tide range to SLR for each region will have a bearing on the frequency of permissible occurrences when waves and storms can reach above the present-day MHWS mark. For a given SLR, areas with smaller tide ranges, will have greater occurrences of high tides exceeding the present MHWS mark, and therefore more opportunities to coincide with less-frequently occurring storms/waves. Therefore lower tide-range coasts will have a higher potential for erosion, all other aspects being equal, and also similarly for coastal inundation. The only Reference I personally have is a Conference Proceedings in an IAHR Asia-Pacific Congress: Bell, R.G. (2010). Tidal exceedances, storm tides and the effect of sea-level rise. Proceedings of 17th Congress of the Asia and Pacific Division of the IAHR, Auckland, 21-24 February 2010. (but there may be other studies out there on this aspect. (Robert Bell, NIWA)	Thanks for the interesting input. To include we need a peer reviewed paper that we can reference.
881	44763	5	25	27	25	28	"Definitively linking sea-level rise to observed magnitudes of beach erosion has been challenging (e.g., see Sallenger et al. 2000), although…" Change the citation (Sallenger et al. 2000 and Leatherman et al., 2000a; 2000b) for complete background information on this issue. (Keqi Zhang, Florida International University)	Leatherman references have been added.
882	37435	5	25	29	0	0	This comment does not accord with my understanding of what that paper concluded (Colin Woodroffe, University of Wollongong)	Have made the discussion of the authors' conclusions clearer.
883	48708	5	25	30	0	0	The phrase " … approaching 1 m or more over the next century .." is somehwat ambiguous - I take it that it means the 2100's, but is likely to be well over 1 m by 2200 - so better to say "… approaching 1 m or more during the next century .." (Robert Bell, NIWA)	Changed text to make this clearer.
884	50258	5	25	30	25	30	It would be beneficial to specify the climate/socio-economic scenarios corresponding to the described projected sea level rise. (Katharine Mach, IPCC WGII TSU)	No scenario is implied - see response to comment #883.
885	37436	5	25	30	25	31	Reword, should become detectable and progressively important. (Colin Woodroffe, University of Wollongong)	Reworded.
886	37437	5	25	33	0	0	Surely this paper will have concluded that the return period of a particular high water level will shorten, not that storm surges will become more frequent. Reword accordingly (Colin Woodroffe, University of Wollongong)	Reworded.
887	42255	5	25	34	25	35	This text implies that there will be bathtub and dynamic changes. I suggest there there will be no 'bathtub' effects and that all interactions between rising SL and beaches and dunes should be considered dynamic. (Denise Reed, The Water Institute of the Gulf)	We attempted to draw comparisons between sea level rise, which is commonly viewed as global (uniform like a bathtub) plus regional, which varies spatially for a variety of reasons. The reviewer is correct though, that the net sea level rise , global plus regional, will affect beaches and coasts dynamicslly. We have reworded text.
888	44359	5	25	34	25	36	Sea-level rise will not inundate most of the low-lying land like a bath tube, since in most cases the existing (or future) infrastructures such as dikes, roads, canals, etc., as well as pumping stations, prevent flooding. This is a fact nowadays as it will be in the future. In the end the risk of flooding has a strong socio-economic component, related to the costs and benefits of maintaining dryland under sea-level. Future sea-level rise will increase the risk of flooding mostly because the costs of avoiding it will be unsustainable in many cases. The construction of dikes along river banks and coastlines as a protection measure against floods and marine storms is widespread in the low-lying coasts (e.g. Po, Mississippi and Nile deltas), but there is increasing evidence that this strategy is not sustainable under a scenario of climate change and energy scarcity (Day et al., 2005). (Ibáñez Carles, IRTA)	See #888.
889	37438	5	25	35	25	36	It is very disappointing to see the 50-year old concept of the Bruun rule and its effect condensed down to a comment on beaches shifting landward and higher, despite the extensive debate on the effect, limitations to it, some new alternative approaches, and so on. (Colin Woodroffe, University of Wollongong)	Have added additional discussion.
890	42794	5	25	37	25	39	Please ensure consistency with the SREX regarding emerging conclusions on cyclone intensity trends. (Sofia Bettencourt, World Bank)	Intensity trends have been deleted impacts of extreme events remain.
891	50259	5	25	37	25	40	The author team should consider and cross-reference the findings of the working group one contribution to the 5th assessment report for this topic, as well as chapter 3 of the special report on extremes. (Katharine Mach, IPCC WGII TSU)	Revised. Extreme storms mentioned for impacts on beaches and dunes.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
892	36275	5	25	39	25	43	"… impacting Europe to a greater degree than present". I do not fully agree. First, I think that the authors should make clearer to what they refeer. Indeed, is it the winds ? Is it the waves ? The storm surges ? I ask this question, because waves and storm surges are not a local process, and thus a local increase of wind (by displacement of storm trajectory) will not always lead to a local increase of surge. Further more, even if Woollings et al (23012) predict Atlantic winter storm extending eastward, there are also studies which investigated the impact of climate chnage direclty on hydrodynamic conditions, like waves and surges, I think, there should be reference to that in this part, since, together with local wind, waves and storm surges play a significant role in beaches and sand dunes erosion. For instance, Charles t al (2012) show a significant decrease of 95th percentile wave height along teh Aquitanian coast (France) together with an increase of wave incidence : both together, they will modify the longshore sediment fluxes and beach dynamics (beach type) in the future. For the storm surges, I suggest to discuss the results of Wang et al (2008) for instance. References: Charles E., Idier D., Delecluse P., Déqué M., Le Cozannet G. (2012) Climate change impact on waves in the Bay of Biscay, France. Ocean Dynamics, DOI 10.1007/s10236-012-0534-8. Wang S., McGrath R., Hanafin J., Lynch P., Semmler T. and Nolan P. (2008) The impact of climate change on storm surges over Irish waters. Ocean Modelling 25: 83–94. (Déborah Idier, BRGM)	Details deleted and coastal squeeze is regarded more as a result of the impacts.
893	37439	5	25	40	25	43	Three short statements that could each have been expanded into more detail. I particularly encourage greater discussion of squeeze. (Colin Woodroffe, University of Wollongong)	Added some additional text, but we have a strict length limit for the section in the chapter.
894	37923	5	25	41	25	42	This implies that erosion wil be open-ended. There is a case to be understood that this unknown (+feedback forcing?)change is likely to eventually develop a negative feedback response that will reduce impact. I would be concerned that this system response is being ignored in anumber of the cases being articulated about future change. (Julian Orford, Queen\\\'s University, Belfast)	Added further explanation.
895	42256	5	25	42	25	42	Unlcear why sediment or funding should eb considered limiting. Either provide more context for this or delete. (Denise Reed, The Water Institute of the Gulf)	Have added more discussion.
896	40243	5	25	42	25	43	Beach nourishment is not always a good solution. Eg the huge evnironmental impacts in benthic organisms from beach nourismhment in Spain. Or in Cyprus, if our solution was beach nourishment it would cause terrible distractions. Thus, funding is not the only and major problem of this solution. The environmental and morphological impacts are to be considered in severa areas of the world. (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	More explanation has been added.
897	45960	5	25	48	26	12	This section (5.4.1.3.) would benefit from a few more specifics - similar to the level ofdetail indicated under 5.4.1.2. or 5.4.1.4. (Sybil Seitzinger, International Geosphere-Biosphere Programme)	This section has been thoroughly re-written and drastically cut (>50%). This sentence is part of the cut.
898	36391	5	25	50	0	0	"sality" = "salinity"? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	OK. The text has been revised accordingly
899	46854	5	25	50	25	50	Spelling: 'salinity' not 'sality'. (Genevra Harker, HarmonicQuay Ltd)	OK. The text has been revised accordingly.
900	36392	5	25	51	0	0	Stronger winds and drought may, on the other hand, reduce the extent, duration and frequency of estuarine stratification (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The text has been revised to include the effects of storms on estuarine stratification.
901	44764	5	25	51	25	52	"…and altered riverine discharge may increase the extent, duration and frequency of estuarine stratification…" Add citation (Hong and Shen, 2012) after "stratification". (Keqi Zhang, Florida International University)	The text has been revised to include the effects of storms on estuarine stratification. Reference has been included.
902	42257	5	25	52	25	54	This is a classic example of considering factors in isolation. What about the effects of storms in disrupting the stratiifcation. Suggest this is a narrow view of the effects of climate change. (Denise Reed, The Water Institute of the Gulf)	The text has been revised to include the effects of storms on estuarine stratification.
903	47528	5	25	53	25	54	The sentence ends with the poorly constructed phrase, "…will lead to more increasing hypoxia." (Alexander Kolker, Louisiana Universities Marine Consortium)	This section has been substantially revised.
904	36395	5	26	0	0	0	Please, be very (more) specific about the differences in the impacts on deltas compared to those on estuaries (5.4.1.3). (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Revised.
905	38174	5	26	0	0	0	In 1991, Ellison and Stoddart (1991) argued that low island mangroves, dominated by autochthonous inputs can only keep up with a rate of sea level rise of 1.2 mm a-1, although mangroves of high islands and continental coastlines, which receive both authochthonous and allochthonous inputs of sediment, can keep pace with a relative sea level rise of 4.5 mm a-1. Other work, however, shows that mangroves have persisted for 7000 to 8000 years on some Caribbean islands and kept up with sea-level rise rates of up to 5 mm a-1 (Snedaker et al., 1994; Toscano and Macintyre, 2004; McKee et al., 2007). In the estuarine mangroves of South Alligator River, Northern Territory, Australia, between 8 – 6 ka BP, mangrove vegetation communities kept pace with a 12 m sea level rise, or an average vertical accretion rate of 6 mm a-1 (Woodroffe, 1990). Furthermore, in the neighbouring Mary River catchment mangroves developed between 6.5 – 4.0 ka BP at local rates of sea level rise of up to 10 mm a-1 (Woodroffe and Mulrennan, 1998a). (THOMAS SPENCER, University of Cambridge)	New observations and experiments on the capacity of mangroves and salt-marshes to keep with sea-level rise have been added.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
906	38963	5	26	0	0	0	Section 5.4.1.5: Loss of saltmarsh to m angrove where both communities co-exist in subtropical and temperate climates is well deocumented (See Saintilan N. and Williams R. 1999. Mangrove transgression into saltmarsh environments in New South Wales, Australia. Global Ecology and Biogeography 8 117-124; Krauss K.W, From A.S., Doyle T.W., Doyle T.J., and Barry M.J. (2011). Sea-level rise and landscape change influence mangrove encroachment onto marsh in the Ten Thousand Islands region of Florida, USA. Journal of Coastal Conservation 15 629-638), though the relative contribution of sea-level rise, rainfall and elevated CO2 requires further research. This section should consider the probable proliferation of mangroves on the US Gulf coast with the reduction in frosts associated with temperature rise, and also the encroachment of mangroves into upper intertidal saltmarsh with sea-levle rise (for a review, see :Saintilan N., Rogers K. and McKee K. (2009) Saltmarsh-Mangrove interactions in Australasia and the Americas. Chapter 31 in Perillo G.M.E., Wolanski E., Cahoon D.R and Brinson M.M. (eds.) Coastal Wetlands; an integrated ecosystems approach. Elsevier pp. 855-883) (Neil Saintilan, Office of Environment and Heritage)	Agreed. A section has now been included to capture these trends.
907	42258	5	26	2	26	2	Unclear why climate change will generate sediment redistribution - suggestion breif summary of processes leading to this that are climate related. (Denise Reed, The Water Institute of the Gulf)	this section has been thoroughly revised.
908	44765	5	26	2	26	2	“Anthony et al. (2010)…” should be “Anthony et al. (2009)…” (Keqi Zhang, Florida International University)	This sentence has been omitted (section cut by 2/3).
909	36393	5	26	3	0	0	Please, explain "flushing rate" and its relationship with residence time (as discussed in 5.1.3.1) (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The section had to be cut by 2/3; this sentence is part of the material cut.
910	49050	5	26	5	26	6	The sentence "……could either increase due to barrier breaching or lower freshwater supply or decrease if the input of freshwater decreases" seems to say that less fresh water could both increase and decrease flushing. If this is correct could it be explained? (Oyvind Christophersen, Climate and Pollution Agency)	The section had to be cut by 2/3; this sentence is part of the material cut.
911	36394	5	26	8	26	12	This paragraph should be moved to section 5.4.1.7 (Catharina Philippart, Royal Netherlands Institute for Sea Research)	We agree that this paragraph was misplaced. Macroalgae have been transferred (and greatly cut) to the section on rocky shores.
912	44360	5	26	8	26	12	In addition to increased mortality and decreased net primary production of benthic macrophytes, it is expected that the increase in temperature will produce other impacts on coastal lagoons and other shallow coastal systems (see Ibáñez 2009): - Changes in the metabolism of ecosystems: higher increase in respiration relative to photosynthesis (increased degree of heterotrophy), thereby reducing net primary production. - Changes in the composition and diversity of biological communities: further colonization and spreading of species adapted to high temperature. - Mortality of species susceptible to extreme temperatures and increased hypoxia, especially fish and bivalves. - Changes in the metabolism of organisms and the distribution of the ecological niche. - Changes in the interactions between species and their distribution. - Changes in the structure of food webs and biogeochemical cycles. - Changes in hydrology and salinity of the lagoons and bays. (Ibáñez Carles, IRTA)	The text has been adapted to partly include this, but at a higher level of integration. We now mention that benthic community may change because of multiple factors including temperature, exchange of resources and organisms with adjacent systems etc, including a reference.
913	49051	5	26	9	26	10	"…..increased inputs of nutrients and suspended solids (Lloret et al., 2008)." See also the comment to p 11 lines 30-37. about the conflicting information about sediment discharge in the sea; decreasing or increasing? Line 22 on page 26 mentions reduction in sediment delivery. (Oyvind Christophersen, Climate and Pollution Agency)	The section had to be cut by 2/3; this sentence is part of the material cut.
914	44361	5	26	15	26	27	When analyzing the projected impacts of sea-level rise on deltas and other low-lying coasts high-end scenarios beyond the present century should be taken into account. Recently some global sea-level projections beyond this century have been carried out (Jevrejeva et al. 2012), as well as some projections specific for deltas like the case of The Netherlands (Katsman et al. 2011). As well, a comprehensive assessment of projected impacts on deltaic systems along the present century have been carried out at least in the San Francisco Bay-Delta system (Cloern et al. 2011). (Ibáñez Carles, IRTA)	The impact of new sea-level senario on the coastal zone, particular on human system is presented in new 5.4.3. and This text has been added accordingly.
915	37440	5	26	15	26	50	There has been considerable literature on both deltas and mangrove/satlmarsh systems. This is a very poor summary that captures very little of the discussion that has been published. Oliver, T., Rogers, K. and Woodroffe, C.D., 2012. Measuring, mapping and modelling: an integrated approach to the management of mangrove and saltmarsh in the Minnamurra River estuary, southeast Australia. Wetland Ecology and Management. Doi 10.1007/s11273-012-9258-2 Lovelock, C.E., Bennion, V., Grinham, A. and Cahoon, D.R., 2011. The role of Surface and subsurface processes in keeping pace with sea level rise in intertidal wetlands of Moreton Bay, Queensland, Australia. Ecosystems. doi.org/10.1007/s10021-011-9443-9 (Colin Woodroffe, University of Wollongong)	The section has been expanded to improve coverage
916	42259	5	26	17	26	27	This section on deltas provides little information - it is weak and inclusive. Ok if the science is inconculsive but the reason why needs to be clear. (Denise Reed, The Water Institute of the Gulf)	The ms is a little re-organized and one more paper is cited.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
917	47529	5	26	17	26	27	The section on deltas just does not adequately portray the complex interactions that will affect how deltas will respond to sea level rise. The writing is confusing, the facts are minimal, and there are very few modeling studies referenced that describe how deltas might respond to climate change. Instead, the authors have provided a few bits of general knowledge. In my view, this paragraph does not adequately portray the state of the science. The section would be greatly improved if it explained what the AR5 sea level rise scenarios are, and how deltas across the world might respond to these scenarios. The authors should discuss deltas that are likely to fare poorly under these scenarios and the ones likely to fare better under these scenarios. The authors should try to show a variety of examples, including deltas in tropical regions, temperate regions and arctic regions. The Syviski (2009) paper provides a good starting point for this discussion, and the authors may want to rely on it more heavily. (Alexander Kolker, Louisiana Universities Marine Consortium)	Sea-level rise scenario of AR5 is higher than that of AR4. As a minimum estimate of the projected impact using AR4 scenario is shown. Sea-level rise impacts globally of AR5 are shown in 5.5. Further sea-level rise beyond 2100 is shortly stated.
918	46712	5	26	19	26	20	This sentence needs to be reworded: "Projected impacts on deltas are mainly caused by fluvial floods…" What we have found with the Mississippi delta is that a lack of water reaching the delta could have a significant impact on it in the future. As precipitation changes upstream coupled with water diversions and increasing water demands, much of the fresh water (and the sediment carried in that water) is likely to decrease. Fluvial floods could be a problem, but they are not the major problem here. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	The sentenses have been reworded. However flooding in deltas is stated because it is important in developing countries.
919	37924	5	26	21	26	21	McCleod reference unclear (Julian Orford, Queen\\\'s University, Belfast)	The impacts of salinity intrusion into river deltas in Islands of SE Asian are assessed .
920	50261	5	26	25	26	25	It would be beneficial to specify further which scenario and amount of sea level rise were considered here. (Katharine Mach, IPCC WGII TSU)	The assessment using new scenario (AR5) is discussed in 5.5.
921	35309	5	26	26	26	27	The Murray reference is an odd choice of sole supporting reference for this sentence - I suggest Dasgupta et al. (2011) in Climatic Change is better. (Patrick Nunn, University of New England)	The impacts of tropical cyclones is separately shown in Box CC-TC. Murray reference is for cyclone Sidr in Bangladesh and cylcone Nargis in Myanmar.
922	38172	5	26	26	26	27	but see Cahoon 2006 A Review of Major Storm Impacts on Coastal Wetland Elevations. Estuaries and Coasts 29, 889–898 'A single low frequency, high magnitude storm can deposit more sediment on a marsh than an entire year of high frequency, low magnitude cold fronts (Cahoon et al. 1995b). Low-frequency sediment pulsing events such as hurricane storm surges are postulated to be critical for maintaining wetland soil elevation in sediment-poor settings with high rates of subsidence' (p.896) (THOMAS SPENCER, University of Cambridge)	Sediment accumulation by storms in islands in sediment-poor settings is important. However in deltas like the Mississippi, erosion and wetland-loss are more dominat (Barras et al. 2010). Therefore Cohoon 2006 is not cited here.
923	37925	5	26	27	26	27	I am getting irritated by the continuing use of this ref (Murray et al). Yes it probably is a good one, but it is used too many times and covers a number of untested statements concerning deltas. Citing Internal Conf meetings of ICPP are not helpful for actual cross referencing of statements. This goes for the Seneviratne 2012 paper which is 120 pages long and is in the same collection as Murray, and has been used too many times. Let us get some independent verification. Not reviews of reviews, but original statements. (Julian Orford, Queen\\\'s University, Belfast)	The impacts of tropical cyclones is separately shown in Box CC-TC. Murray reference is for cyclone Sidr in Bangladesh and cylcone Nargis in Myanmar. Seneviratne et al chpater is still useful.
924	40642	5	26	30	0	0	Most of the information included is on saltmarshes and very little on Mangroves. An interesting figure that is useful to explain the current knowledge and status of knowledge of mangroves and coastal ecosystems is provided by Spencer, T., and I. Möller, (in press) “Mangrove systems”. In: Sherman, D.J. (ed.). Coastal Geomorphology (Treatise in Geomorphology). Elsevier (Carmen Lacambra Segura, Grupo La era)	Contents on mangroves have been expanded
925	41692	5	26	30	26	50	I do not think these are "projection". (Rui Zhang, Xiamen University)	Agreed. This section has been extensively revised (and shortened).
926	47553	5	26	30	26	50	Section 5.4.1.5 comment: this section is better on saltmarshes (though still a bit brief, with paragraphs organised around individual sources rather than being properly synthesised) but there is nothing specific to mangroves. (Jon French, University College London)	A new section including a vegetated coastal habitats has been added
927	38175	5	26	32	26	33	Many of these ideas go back to Ellison and Stoddart (1991) who argued that low island mangroves, dominated by autochthonous inputs can only keep up with a rate of sea level rise of 1.2 mm a-1, although mangroves of high islands and continental coastlines, which receive both authochthonous and allochthonous inputs of sediment, can keep pace with a relative sea level rise of 4.5 mm a-1. Other work, however, shows that mangroves have persisted for 7000 to 8000 years on some Caribbean islands and kept up with sea-level rise rates of up to 5 mm a-1 (McKee et al., 2007). In the estuarine mangroves of South Alligator River, Northern Territory, Australia, between 8 – 6 ka BP, mangrove vegetation communities kept pace with a 12 m sea level rise, or an average vertical accretion rate of 6 mm a-1 (Woodroffe, 1990). Ellison, J.C., Stoddart, D.R., 1991. Mangrove ecosystem collapse during predicted sea-level rise: Holocene analogues and implications. Journal of Coastal Research 7, 151–165. McKee, K.L., Cahoon, D.R., Feller, I.C., 2007. Caribbean mangroves adjust to rising sea level through biotic controls on change in soil elevation. Global Ecology and Biogeography 16, 546-556. Woodroffe, C.D., 1990. The impact of sea-level rise on mangrove shorelines. Progress in Physical Geography 14, 483-520. (THOMAS SPENCER, University of Cambridge)	This section has been extensively revised and broadened. It has also been considerably shortened. Detailed information on the response to sea level rise is not possible due to the lack of space but we hope that the SOD captures
928	35310	5	26	32	26	34	Needs expansion, particularly explaining why geological records may be poor guides to mangrove futures. Supporting reference needed at end. (Patrick Nunn, University of New England)	Additional reference and text has been added.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
929	36396	5	26	32	26	34	Is this statement based on references (then supply those) or is it an expert-jugdement of (one of) the authors? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The section had to be cut by 2/3; this sentence is part of the material cut.
930	38960	5	26	32	26	34	Poor sentence construction, and also needs upporting references (suggest: Ellison J.C. 2008. Long-term retrospection on mangrove development using sediment cores and pollen analysis: A review. Aquatic Botany 89: 93-104; Hashimoto T. Saintilan N., and Haberle S. 2006 Mid-Holocene development of mangrove communities featuring Rhizophoraceae and geomorphic change in the Richmond River estuary, New South Wales, Australia. Geographic Research 44(1) 63-76. Also, this should read mangroves may migrate landwards (rather than "these systems migrate landwards", as often they don't due to topographic constraints. (Neil Saintilan, Office of Environment and Heritage)	The section has been re.written and expanded to improve coverage
931	48710	5	26	32	26	34	For temperate mangroves (see Morrisey et al. 2010 Ref above), the characteristic where temperate mangroves only grow above the MSL mark means they will retreat if sedimentation doesn't keep up with SLR. (Robert Bell, NIWA)	This inference is correct and does not enter in conflict with the text
932	42260	5	26	32	26	50	This is weak section that provides little on mangrovesand seems to rely heavily on one paper. Surprising given that this is a rich area of research - at least in the US? What about the extensive stuies using the SLAMM model for example? 1991 reference for Co2 - seems like there should be something more recent. (Denise Reed, The Water Institute of the Gulf)	The section has been re.written, re-organised and expanded to improve coverage
933	47530	5	26	32	26	50	Like the deltas section, this section inadequately portrays the complexities that govern how salt marshes will respond to sea level rise, an increase in tropical storms and other climate change related processes. The information in here is incomplete and poorly organized. For example, the authors write that, “Global warming will have effect [sic] on the geographical distribution patterns of salt marshes, with likely increases at high latitudes and decreases at low latitudes, but this is rather uncertain at the moment.” This is statement just does not make sense. Do the authors mean to say that it is likely or uncertain that salt marshes will increase at high latitudes? The authors also give no explanation for which this is the case. Finally, I’m not sure if this is actually true. The distribution of salt marshes is governed by a variety of factors, of which the length of the growing season is just one of many important variables. (Alexander Kolker, Louisiana Universities Marine Consortium)	The section has been re.written and expanded to improve coverage
934	47531	5	26	32	26	50	I am also concerned that there is no attempt to make any quantitative statements that relate response of salt marshes to the AR5 climate change scenarios. The reader should know what levels of global sea level rise marshes are expected to experience in the coming years. The authors should then explain how marshes may or may not respond to these changes. I know that the models that predict marsh response to sea level rise are filled with assumptions, but more should be done to present these models and their findings. The Kirwan and colleagues papers are a good place to start, but much more needs to be done to make this report scholarly, accurate and complete. I would also like to point out the report says nothing about the potential impacts from changes in tropical cyclones, and this is oversight should be corrected in the next version of this report. Finally, I would like to point out that the writing needs substantial improvements. (Alexander Kolker, Louisiana Universities Marine Consortium)	The writing has been improved and the responses of salt marshes have been now reported within the limits imposed by the strict word limits to the section
935	44766	5	26	33	26	34	Change “Geological record shows that these systems migrate landwards during transgressions.” to “Historical and geological records show that these systems migrate landwards during transgressions when landward spaces are available (Krauss et al., 2012; other references for geological record). (Keqi Zhang, Florida International University)	The section had to be cut by 2/3; this sentence is part of the material cut.
936	50262	5	26	36	26	37	"likely" -- If being used as calibrated uncertainty language per the guidance for authors (reflecting a probabilistic basis for assignment), this term should be italicized. Casual usage of the reserved likelihood term should be avoided. Additionally, the chapter team should consider indicating more specifically what uncertainties are relevant as mentioned on line 37, perhaps assigning calibrated uncertainty language per the guidance for authors if the usage of "likely" is casual. (Katharine Mach, IPCC WGII TSU)	The text has been revised accordingly.
937	38176	5	26	36	26	42	This may be important for systems dominated by organic sedimentation but for many systems it is the sediment supply from external sources whuich is the key to saltmarsh survival. (THOMAS SPENCER, University of Cambridge)	This is correct. The text has been edited to avoid confusion
938	38961	5	26	38	26	38	Saltmarsh diversity might decrease at higher latitudes under higher temperatures given the strong association between diversity and minimum monthly temperature in Australia (see Saintilan N. (2009). Biogeography of Australian Saltmarsh Plants. Austral Ecology 34, 929-937) (Neil Saintilan, Office of Environment and Heritage)	This is probably correct,but the section focusses on response to climate change, not biogeographic patterns
939	46855	5	26	38	26	38	Spelling: "…more productive as temperature rises…" (Genevra Harker, HarmonicQuay Ltd)	OK but the sentence has been deleted to save space.
940	37926	5	26	40	26	40	As long as there is sediment available. Marsh is not an either/or of sedi-clastic or biogenic. They operate at different rates relative to source and tidal conditions and the change of one does not mean that the other is going to operate at a different rates, other than by general environmental changes (bio) or source supply changes. (Julian Orford, Queen\\\'s University, Belfast)	This is correct. The text has been edited to avoid confusion
941	40380	5	26	44	26	26	Too much jargon - could this be more clearly explained without the jargon? (Laura Petes, National Oceanic and Atmospheric Administration)	This section has been revised and shortened. Jargon has been eliminated.
942	38964	5	26	44	26	44	Suggest "…may lessen drowning…" rather than "…may limit drowning…." These positive feedbacks generally fail at higher rates of sea-level rise. (Neil Saintilan, Office of Environment and Heritage)	This is correct. The text has been edited to avoid confusion
943	38177	5	26	44	26	46	it is not at all clear what point is being made here - not clear and more detail needed (THOMAS SPENCER, University of Cambridge)	The section had to be cut by 2/3; this sentence is part of the material cut.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
944	36397	5	26	48	0	0	If you like to bring "Phragmites" into the game, then you might consider to discuss the impacts of climate-change related changes in salinity (and the consequences for Phragmites and Spartina) as well. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	The section had to be cut by 2/3 and this level of detail has been eliminated due to the lack of sapce.
945	38178	5	26	48	26	50	see Langley et al. (www.pnas.org cgi doi 10.1073 pnas.0807695106): elevated CO2 stimulates plant productivity, particularly below ground, thus raising surface elevation. (THOMAS SPENCER, University of Cambridge)	Responses to elevated CO2 are now discussed
946	38962	5	26	48	26	50	Suggest "….depending on whether C3 (most saltmarsh species) or C4 (Spartina, Sporobolus) plants dominate, because growth rates for the latter are usually less sensitive to enhanced CO2 (Rozema et al. 1991). Competitive shifts from C4 to C3 dominance might have flow-on effects to trophic structure in saltmarsh ecosystems (Saintilan N. and Mazumder D., (2010). Fine scale variability in the dietary sources of grazing invertebrates in a temperate Australian Saltmarsh. Marine and Freshwater Research.61 615-620) (Neil Saintilan, Office of Environment and Heritage)	This is correct. The text has been edited to avoid confusion
947	36399	5	27	0	0	0	Title of this section "Seagrasses and Algae" is not consistent with title of section5.3.1.7 "Submerged vegetation", and not correct because only "Macroalgae" are discussed here. Possible impacts on benthic microalgae should be included! (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Section has been re-structured
948	47532	5	27	2	27	28	I am not an expert on coral reefs, so I cannot comment on the information here. However, I will note that the writing style is confusing. (Alexander Kolker, Louisiana Universities Marine Consortium)	This section has been revised and combined with the one on “Observed changes”, which should be less confusing.
949	43279	5	27	2	28	5	Balancing with chapters 6 and 30 needed. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	The author team has worked with the CLAs of chapters 6 and 30 to minimize the overlap.
950	38000	5	27	4	27	5	It is important to point out here that recent reef growth potential has been very variable regionally - higher in the Caribbean as reefs have caught up woth a slowing rate of sea level rise, but that across much of the Indo-Pacific many reefs have experienced little or no vertical growth in the last few 1000 years - since SL reached its present (or slightly higher) point around that time. Hence SL rise may actually invigorate growth on senescent sea level constrained IP reefs. (Chris Perry, University of Exeter)	The text has been revised to include this perspective with just a few additional words as space is limited.
951	49257	5	27	4	27	6	Vertical accretion rate of coral reefs differ among geomorphic units in coral reefs. The key geomorphic unit is a reef crest, which reaches to the sea surface and act as a natural breakwater. It is formed by a few key species of corymbose types of Acropora and other genera. The vertical accretion rate of the reef crest ranges from 1-7m kyr-1 (1-7mm y-1) almost comparable to the projected rise rate of sea level in 21 century. Therefore, the statement "modern reefs appear to be able to keep pace with the present rate of sea level rise" based on a general accretion rate of 20mm y-1, which includes the rate for fore-reef and lagoonal facies is rather too optimistic. The loss of the key species by climatic and non-climatic stresses will lead to loss of potential to keep pace with sea level rise. Hongo and Kayanne (2010) Relationship between species diversity and reef growth in the Holocene at Ishigaki Island, Pacific Ocean. Sedimentary Geology, 223, 86-99. (Hajime Kayanne, University of Tokyo)	This section has been revised extensively. Unfortunately, the space available does not enable to address the varying potential growth rate of the different geomorphologic units.
952	42261	5	27	4	27	7	Line 4 includes a rate and line 6 includes a total rise. Without a start date for the total rise these are incompatible. Suggest framing both amounts in the same manner for ready comparison. (Denise Reed, The Water Institute of the Gulf)	The text has been revised accordingly.
953	37441	5	27	4	27	8	There is a considerable literature on reef accretion rates, and in a recent paper Camoin et al have shown that the Tahiti reef was not drowned but continued vertical growth around 14,000 years ago when sea level rose at as much as 40 mm /year. However, this relates to the reef itself which is submerged. Shorelines did not keep pace with these rates of rise, indeed there weren’t islands on most of these reefs, so it does not follow to jump from reef growth to talk about erosion. Reefs will survive under water, but people will not (Colin Woodroffe, University of Wollongong)	Agreed. The text has been revised to incorporate this perspective and the work of Camoin and colleagues cited.
954	35311	5	27	4	27	19	As per the comment on page 17 (lines 18-20), the opening sentence of this paragraph does not in my view reflect majority scientific opinion. G39This sentence is misleading and inappropriate. In addition in this paragraph, the references to Hawaii in both the second and the penultimate sentence suggests that coral cover decline is a local rather than regional projection (as it is) and the last sentence needs a timeframe to be helpful, specifically when is atmospheric CO2 likely to reach 560 ppm. Some of the research on the Great Barrier Reef may be pertinent to mention in this paragraph. (Patrick Nunn, University of New England)	This section has been rewritten. The discussion on the projected impacts of sea level rise has been extensively revised and extended, suing comments from the community and referees. It has been reviewed informally. Hopefully, it will read better and will reflect a consensus opinion.
955	40381	5	27	4	27	19	This paragraph reads more like a random list of examples than a cohesive story. It would be stronger if the major threats to coral reefs (climatic and non-climatic) were presented, as well as the consequences of these changes on corals themselves, as well as reef ecosystems. (Laura Petes, National Oceanic and Atmospheric Administration)	The section has been extensively revised. In particular, the drivers are organized in the same order as for the observed changes (temperature, ocean acidification, sea level rise). Additionally the sub-sections on observed changes and projected impacts are now in a single section on “Coral reefs” which should make it easier to read. Finally, some material was moved to an extended, cros-chapter, coral reef box.
956	38001	5	27	6	0	9	In a related point - this example may not be correct. The citied reef reached SL and stopped growing vertically 2-3000 years ago (see Engels et al, 2008, Coral Reefs 27: 991-996) - and reef growth may be re-started by SL rise (Chris Perry, University of Exeter)	Agreed. This statement is now toned down and given a “low confidence” tag.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
957	50263	5	27	10	27	12	"likely" on line 10 and "very likely" on line 12 -- If being used as calibrated uncertainty language per the guidance for authors (reflecting a probabilistic basis for assignment), these terms should be italicized. Casual usage of the reserved likelihood terms should be avoided. (Katharine Mach, IPCC WGII TSU)	The SOD as been modified accordingly.
958	36398	5	27	15	0	0	Please, explain "reef cells" (now you have to read the figure legend to know what is meant here). (Catharina Philippart, Royal Netherlands Institute for Sea Research)	We now use “grid cells”.
959	50264	5	27	16	27	16	As calibrated uncertainty language, "high confidence" should be italicized. Additionally, it could be helpful to specify the relative importance of drivers (temperature, acidification) before the described decline. (Katharine Mach, IPCC WGII TSU)	"high confidence" now italicized and the attribution is mentioned.
960	44362	5	27	17	27	19	Although it is clear that ocean acidification will impact negatively coral reefs and other calcified organisms, a recent study has shown that phytoplankton species (the coccolithophore Emiliana huxleyi) can adapt to more acidic waters after only 500 generations (Nature Geoscience 2012, doi:10.1038/ngeo1441). Rapid acclimatation to climate change has also been recently reported in a tropical reef fish (Donelson et al. 2012). (Ibáñez Carles, IRTA)	I agree with your statement on coccolithophores but this section only addresses coral reefs. Space is limited here and chapter 5 does not address physiological adaptation and acclimation in depth. This is done in Chapter 6.
961	38744	5	27	18	0	0	Probably is interesting to note that stop coral growth could occurs in 2050 in a medium emission scenario. (Ricardo Anadon, University of Oviedo)	The timeframe is now roughly indicated.
962	46856	5	27	18	27	18	When is atmospheric CO2 liekly to reach 560 ppm? (Genevra Harker, HarmonicQuay Ltd)	It depends on the emission scenario consider. We now mention mid 21st century in the revised text.
963	46857	5	27	21	27	21	Figure 5-6: Are there any observations that can verify the predictions for 2000-2009? (Genevra Harker, HarmonicQuay Ltd)	We are not aware of such observations.
964	48111	5	27	22	27	28	Figure 5-6 (caption) : Please add the name of the scenario, even if it is in the text (A1B). (Philippe Marbaix, Université catholique de Louvain)	The legend has been modified accordingly.
965	46858	5	27	33	27	33	Delete 'realised' before climate. (Genevra Harker, HarmonicQuay Ltd)	Deleted.
966	46713	5	27	33	27	35	Seagrass will experience a decline with further warming, but also because in some cases they have nowhere to retreat to. At Gateway National Park in New York, USA we have found that seagrass could have naturally retreated, but because of the development around the park the seagrass has nowhere else to go. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Agreed. Coastal squeze is now discussed
967	50265	5	27	34	27	34	Is it possible to specify the nature of the decline mentioned on this line? (Katharine Mach, IPCC WGII TSU)	This section has been thoroughly re-written and drastically cut (>50%). This sentence is part of the cut.
968	38179	5	27	37	27	37	There is an important point here which doesn't just relate to seagrasses - but also applies to corals, mangroves and saltmarshes. Warming may given potential for range expansions but these can only take place if there are suitable substrates and accommodation spaces in the new areas of higher temperatures (THOMAS SPENCER, University of Cambridge)	Range expansion with ranging is now addressed
969	38745	5	27	50	0	0	The shifts of seaweeds probably was more generalized than the paper of Lima et 2007 suggest. I my opinnion the phrase must be reestructurated in the sense of a generalised processes as has been show in many papers (some of them previously incorporated to my revision), and probably uncertainties on the velocity of the shift for different species and geographical areas. I recommend to introduce two references about seaweeds geographical shift [Müller, R. Laepple, T. Bartsch, I. Wiencke, C. 2009. Impact of oceanic warming on the distribution of seaweeds in polar and cold-temperate waters. Botanica Marina 52: 617-638; Wernberg, T. Russell, B.D. Thomsen, M.S. Gurgel, C.F.C. Bradshaw, C.J.A. Poloczanska, E.S. Connell, S.D. 2011. Seaweed Communities in Retreat from Ocean Warming. Current Biology 21: 1828-1832 (Ricardo Anadon, University of Oviedo)	The issue of range shifts is now addressed in the rocky shores section (including for macroalgae) and very little detail is provided due to the limited allocation of words.
970	47533	5	27	53	27	54	These statements on macroalgae are contradictory and need to be rectified. (Alexander Kolker, Louisiana Universities Marine Consortium)	Done.
971	45961	5	28	0	0	0	Section 5.4.2. Impacts on Human Systems -- while the impacts directly on humans in coastal systems is covered here, is this also the place to include at least a couple of sentences on how those changes could affect human systems far inland that depend on the services of these coastal communities? Overall the chapter could benefit from a more spatially integrated view of inter-relationships. Cascading affects of impacts (on human and/or ecosystems) in one region on distant regions that depend on those services/trade/production. Most text is local effects oriented not multiscalar effects. Given the globalized economy and the high % pop. and productivity coastal human communities, the multi-scalar effects should be treated somewhere. (maybe this is this included in another section/chapter?) (Sybil Seitzinger, International Geosphere-Biosphere Programme)	A global approach is given first. There is some information related inland human systems in Table 5.5 and more local information is given in the various subsections under the human systems.
972	37442	5	28	1	28	5	There seems to be much repetition on seagrass, much of this has been said already and the same reference used (Colin Woodroffe, University of Wollongong)	Section has been re-structured to avoid repetition
973	52636	5	28	3	28	5	Is the positive effects of increased water CO2 levels on macroalgal growth on coral reefs due to positive effects on the macroalgae per se or due to negative effects on corals? (Else Marie Løbersli, Norwegian directorate for nature management)	Both but this had to be deleted to save space.
974	38746	5	28	4	0	0	The impacts must be extended to all calcifiyng organisms for a near future, with uncertainties associated to evolutionary processes, not yet solved. (Ricardo Anadon, University of Oviedo)	One cannot generalize as we now know that some calcifiers do not respond to ocean acidification.
975	43282	5	28	8	30	38	One wonders whether the scope of (some of) these projections can be quantified more. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	We don't understand this comment.
976	54377	5	28	10	0	0	Section 5.4.2.1: There is overlap in this section with 5.5.3, and the author teams should consider ways to make these sections complementary. (Michael Mastrandrea, IPCC WGII TSU)	Yes. We have merged these sections now.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
977	37443	5	28	12	28	15	I think this is well said - and I agree with the ordering of sea-level rise and storms. This would be a good way to order impacts in other sections of the chapter, giving the reader a clear idea of the relative priorities, or the order in which impacts need to be considered. (Colin Woodroffe, University of Wollongong)	Yes. Thanks.
978	44155	5	28	12	28	15	redundant, compare with Sec. 5.3.2.1 (Anne Holsten, Potsdam Institute for Climate Impact Research)	These sections have now been merged.
979	47534	5	28	12	28	41	I think that the report needs to focus on impacts to human systems that will occur on shorter time scales. Very few decision makers act on the 70-90 year time scale that is presented here. While it would be nice if they did, it would be easier for the authors to discuss impacts on shorter time scales. The authors should spend more time discussing climate impacts to human systems on time scales of less than 30 years, which is a reasonable planning time frame for some decision makers. (Alexander Kolker, Louisiana Universities Marine Consortium)	This is correct, but also a gap in assessments, which we now mention.
980	44156	5	28	16	28	16	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	This sentence has been removed.
981	37444	5	28	16	28	18	There is that repeated vague sentence again, see my comments page 2, line 50. (Colin Woodroffe, University of Wollongong)	This sentence has been removed.
982	37445	5	28	20	28	26	The reader needs to be told what rates are being used here and their source (Colin Woodroffe, University of Wollongong)	Done.
983	39444	5	28	20	28	26	Some grammatical checks needed. This paragraph also assesses risks and costs - material relevant to the next section of the chapter. (Sarah Cornell, Stockholm Resilience Centre)	Sections have now been restructured accordingly
984	44157	5	28	20	28	26	it is not clear, if the references at the end refer to the entire paragraph; be more specific and provide additional reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	Yes. Done.
985	40382	5	28	21	0	0	Is "trebled" supposed to be "tripled?" (Laura Petes, National Oceanic and Atmospheric Administration)	Yes. Thanks.
986	49052	5	28	25	28	25	"The total assets exposed in 2005 across all cities are estimated to be US$ 3,000 billion……." Does "all cities" refer to the "136 port cities around the world" mentioned in line 20? (Oyvind Christophersen, Climate and Pollution Agency)	Yes. This was reworded to be clear.
987	37446	5	28	28	0	0	It would be useful to use the term relative sea level rise here, subsidence contributes to the enhanced relative sea level rise rate. These guidelines would be useful to clarify this point, Nicholls, R.J. et al., 2011. Constructing sea-level scenarios for impact and adaptation assessment of coastal areas: a guidance document Intergovernmental Panel on Climate Change Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA). (Colin Woodroffe, University of Wollongong)	Yes. Done.
988	49053	5	28	28	28	29	Line 28-29 states "……For example, parts of Jakarta are subjected to regular flooding on a near-monthly basis……" This regular flooding must have damage cost, which will increase with a sealevel rise. This aspect is not alaborated, only the damage from extreme floods - 100 and 1000 year floods. Could something be said about the summarized costs of the frequent floodings (Oyvind Christophersen, Climate and Pollution Agency)	Theses sentences have now been removed due to space restrictions.
989	44158	5	28	28	28	31	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	Theses sentences have now been removed due to space restrictions.
990	37447	5	28	31	0	0	which scenario? (Colin Woodroffe, University of Wollongong)	Theses sentences have now been removed due to space restrictions.
991	37448	5	28	35	28	41	This is not a very clear description of the process Hunter described in this paper (Colin Woodroffe, University of Wollongong)	Theses sentences have now been removed due to space restrictions.
992	40383	5	28	35	28	41	Contains too much detailed information on methodology as opposed to an assessment of major findings. (Laura Petes, National Oceanic and Atmospheric Administration)	Yes. Theses sentences have now been removed due to space restrictions.
993	44159	5	28	35	28	41	what is the point? (Anne Holsten, Potsdam Institute for Climate Impact Research)	Theses sentences have now been removed due to space restrictions.
994	48711	5	28	35	28	41	There is also the more recent Hunter (2012) paper that outlines an approach where it is preferable to base future allowances for SLR inundation on estimates of the expected frequency of exceedances rather than on the probability of at least one exceedance. Citation Ref: Hunter, J. 2012: A simple technique for estimating an allowance for uncertain sea-level rise. Climatic Change (2012) 113:239–252. (Robert Bell, NIWA)	Theses sentences have now been removed due to space restrictions.
995	35308	5	28	37	28	40	Neither the Schwierz nor the Woollings (not Woolings) references talk about future tropical cyclone projections. The Knutson et al. (2010) conclusions should be cited here, and it is not correct that there is no consensus on future TC intensity or frequency. This sentence should be aligned with the relevant part of the WGI report. (Patrick Nunn, University of New England)	Theses sentences have now been removed due to space restrictions.
996	36400	5	28	39	28	41	What are the implications of these results (= values of scale parameter ranging between 0.05 and 0.20m) for the impacts of human settlements? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Theses sentences have now been removed due to space restrictions.
997	46859	5	28	44	28	44	Better to use 'infrastructure' rather than 'infrastructures'. (Genevra Harker, HarmonicQuay Ltd)	Done. See new section 5.4.3.2.
998	36401	5	28	46	0	0	Should we also not worry about "storm surges" to impact coastal infrastructures? (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Included in new section 5.4.3.2.
999	36402	5	28	54	0	0	Please, explain "extreme flood return periods" (Catharina Philippart, Royal Netherlands Institute for Sea Research)	It is an estimate of the likelihood of an extreme flood to occur

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1000	36405	5	29	0	0	0	There is so much more to be said on this topic than briefly citing a FAO report. There is a wealth of information on projected changes in the scientific literature, e.g. the more southern fish coming in, the increase in fish stocks in the north, the changing role of coastal systems as nurseries, the opening of polar seas for exploration, the expected changes in size structure, etc. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	We agree on the importance of fisheries. However, they are properly and extensively treated in other chapters in AR5
1001	36406	5	29	0	0	0	This section appears to be an extension (and partly a repetition) of the projected impact on rocky shore section. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Observed and projected impacts have been included under one single section in order to avoid repetitions
1002	38180	5	29	0	0	0	section 5.4.2.4 see comment on page 22, line 36 (THOMAS SPENCER, University of Cambridge)	See response to comment #804.
1003	36403	5	29	1	0	0	Please, explain "design critical elevations of infrastructure" (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Refers to design conditions
1004	37667	5	29	4	0	0	I think this section should include the more recent studies. Add(?): Further, the U.S. National Research Council (2012) and Sallenger et al., (2012) study show large variation in the seal level rise among U.S. coastal areas, with similar variation expected globally. [National Research Council, 2012: Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future. Committee on Sea Level Rise in California, Oregon, and Washington; Board on Earth Sciences and Resources; Ocean Studies Board; Division on Earth and Life Studies, The National Academies Press, Washington DC, 250 pp.] [Sallenger, A.H., K.S.Doran, P.A. Howd, and Peter A. 2012. Hotspot of accelerated sea-level rise on the Atlantic coast of North America. Nature Climate Change,1758-6798 http://dx.doi.org/10.1038/nclimate1597] (George Backus, Sandia National Laboratories)	The section is mostly on direct impacts on infrastructure
1005	49055	5	29	6	29	7	To improve the meaning of the sentence I suggest to change "……will degrade carbonate reef structures under a scenario of >500 ppm (+3°C)…" to "……carbonate reef structures under a scenario of >500 ppm (+3°C) will degrade…" (Oyvind Christophersen, Climate and Pollution Agency)	This refers to page 30, lines 5-6. Paragraph has been deleted.
1006	39445	5	29	11	29	13	Beneficial' is likely a rather short-term and narrow assessment of the situation - eg Corbett et al's 2010 analysis shows how shipping in the Arctic could accelerate climate change with negative impacts in the region and elsewhere. (Sarah Cornell, Stockholm Resilience Centre)	This example tries only to balanced most of the negative impacts assessed in the rest of the section. Further development is included in the AR5 chapter covering the Arctic
1007	40245	5	29	15	29	17	After a 10 year moratorium for the construction of hard coastal structures, since 2004 chains of offshore breakwaters are under construction around the coasts of Cyprus. Climate parameters are not taken into consideration, as deign characteristics, and this is mainly due to lack of field data and lack of awareness among the engineers and the decision makers. (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	Thank you for your valuable comment
1008	36404	5	29	16	0	0	Please, explain "earthquake liquefaction" (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Liquefaction is a common terms in soil mechanics. We believe that readers interested in this part to the assessment are very familiar with this term. Unfortunately, the assessment has not spece to explain all the sectorial terminology.
1009	37449	5	29	19	0	0	Replace the word 'lifeline' here and elsewhere (Colin Woodroffe, University of Wollongong)	Done
1010	45878	5	29	23	29	25	Table 5-3 could be more specific, especially on energy infrastructure, see also other chapters e.g. WG2 Chapter 23 where much literature on energy provision on coasts is given. (Laurens Bouwer, Vrije Universiteit Amsterdam)	the intention was to cover several sectors instead of providing too detailed information for one sector only
1011	38556	5	29	31	0	0	Section 5.4.2.3. Again, consideration of the effects of ocean acidification on the multi-million dollar shellfish aquaculture industry would be worth including. (Christopher Harley, University of British Columbia)	Ocean acidification has a substantial coverage in the new version of the SOD. Impacts on aquaculture are broadly covered in Chater 7 on Food Security (7.2.2.)
1012	50266	5	29	31	0	0	Section 5.4.2.3. For this section, the chapter team should consider and cross-reference chapters 6 and 30. Additionally, further citations need to be provided. (Katharine Mach, IPCC WGII TSU)	The section has been redrafted and extended including several references and keeping the content to the coastal zone
1013	49054	5	29	31	5	38	This paragraph describes the projected impacts on Fisheries, Aquaculture and Agriculture in only 7 lines, hardly containing anything concrete information . The observed impacts on these sectors, 5.3.2.3. on pages 21-22 covers a page with substantial information. It seems hard to believe that there is not more information about projected impacts from climate change towards 2100. The stated positive impacts on aquaculture in the tropics and subtropics could need an explanation. (Oyvind Christophersen, Climate and Pollution Agency)	Some references where added and the two sections 5323 nad 5423 were merged
1014	35312	5	29	31	29	38	The title of Section 5.4.2.3 should have these words in alphabetical order, or at least have agriculture first. This paragraph needs extending; the mention of food security implies subsistence food production and food for domestic consumption, whereas coasts are often the main area(s) for export food production and therefore hugely important to national economies, especially in poorer countries. I think especially of rice in southeast Asian nations and sugar cane in Fiji. (Patrick Nunn, University of New England)	The order was not reversed, we think fisheries and aquaculture are more specific to coastal zones than agriculture is. Food security word isnot in the reduced text anymore
1015	39446	5	29	31	29	38	For many other useful resources, see the following outputs from QUEST-Fish, an international consortium project: http://www.quest-fish.org.uk/publications.html (Sarah Cornell, Stockholm Resilience Centre)	References consulted and used as appropriate
1016	43280	5	29	31	29	38	Balancing of information with chapters 6 and 30 needed. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	OK

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1017	44363	5	29	31	29	38	In this section there are no references to projected impacts on agriculture and fisheries. Regarding impacts on coastal agriculture, a recent paper assesses the future impacts of climate change and sea-level rise on rice production and prices (Chen et al. 2012). This study concludes that global rice production is projected to be reduced by 1,60% to 2,73% and global rice price to be increased by 7.14% to 12.77%; another conclusions is that sea-level is particularly a risk factor in Bangladesh, Japan, Taiwan, Egypt, Myanmar and Vietnam. Regarding impacts and projections of climate change on coastal fisheries, several papers have been published recently that could be commented in this section: Cinner et al. (2012), Meynecke and Lee (2011), Last et al. (2011), Hare et al. (2010), Vinagre et al. (2009). Result show that depending on the latitude, location and climatic factor the fisheries may be impacted either negatively or positively. (Ibáñez Carles, IRTA)	Some references where added including some of the ones provided
1018	40384	5	29	33	29	38	It would be helpful if this paragraph included some information on projected impacts to fisheries (even just some examples of changes to particular stocks in particular locations). (Laura Petes, National Oceanic and Atmospheric Administration)	Done
1019	38747	5	29	36	0	0	As reflect previous comments acidification could reduce calcification on mollusc species (Ch. 5-p 25 -L. 12) and I suggest to incorporate as a predict impact for the near future. Also changes in coastal hidrography (i.e upwelling frecuence and intensity have strong signals on mussel productivity and growth [Álvarez-Salgado, X.A. Fernández-Reiriz, M.J. Labarta, U. Filgueira, R. Peteiro, L. Figueiras, F.G. Piedracoba, S. Rosón, G. 2009. Influencia do cambio climático no cultivo de mexillón das rías galegas. En: Evidencias e impactos do cambio climático en Galicia (Pérez Muñuzurri, V. Fernández, M. Gómez, J.L., eds.). Xunta de Galicia, Santiago de Compostela. 373-389. ISBN: 978-84-453-4782-9] with economic significant importance. (Ricardo Anadon, University of Oviedo)	Acidification was taken into account. The references cited could not be traced.
1020	47685	5	29	36	0	0	More intense cyclones are also likely to affect aquaculture in tropical regions by causing destruction of shrimp farms located close to the coast. (Bob Pokrant, Curtin University)	Yes
1021	44767	5	29	44	29	44	"…, and increased frequency and intensity of tropical storms." The current consensus on the future tropical storm activity is that the intensity of tropical storms will increase, but the frequency will decrease (Bender et al., 2010; Knuston, 2010). (Keqi Zhang, Florida International University)	See response in #1023.
1022	44773	5	29	44	29	44	Bender, M.A., Knutson, T.R., Tuleya, R.E., Sirutis, J.J., Vecchi, G.A., Garner, S.T., & Held, I.M. (2010). Modeled impact of anthropogenic warming on the frequency of intense Atlantic hurricanes. Science, 327, 454-458 (Keqi Zhang, Florida International University)	See response in #1023.
1023	50267	5	29	44	29	44	The chapter team should consider a more qualified or conditional description of changes in tropical storms here, ensuring consistency with the findings of the working group one contribution to the 5th assessment report (potentially with cross-reference to them). (Katharine Mach, IPCC WGII TSU)	Revised to read : "changes in extreme events (e.g. flooding, tropical storms, storm surges, heat waves) and climate variability (e.g. drought and prevailing winds accelerating coastal erosion)"
1024	37450	5	29	45	0	0	I do not like the description 'loss of beaches'; I feel it is unnecessarily emotive. As the sea rises and cuts back into dunes the beach will translate landwards and in most cases there will still be a sandy beach (they survived rapid rates of postglacial sea-level rise and coastal processes keep sand in the intertidal zone). In front of seawalls beaches may be lost, but nature is very good at making a beach, and most will not be lost. This is the kind of comment we see in the popular media but not the scientific literature. (Colin Woodroffe, University of Wollongong)	Amended to "coastal erosion".
1025	35313	5	30	1	30	8	At the end of line 2, there should be some specific mention of dive tourism and the impacts of climate change on it in countries like the Maldives that are heavily dependent on it. I know this issue is mentioned in the next paragraph, but I regard this as weak and lacking focus on tourism per se. Suggest citing Becken's book chapter (2011) on climate change effects on tourism in Maldives (see note above). Also some of the interesting literature recently published on dive tourism impacts of climate change, in Vanuatu (see Klint et al, 2012, Tourism in Marine Environments) and the Egyptian Red Sea (see Marshall et al, 2011, Current Issues in Tourism), for instance. (Patrick Nunn, University of New England)	Interesting details but cannot be included here due to lack of space.
1026	50268	5	30	4	30	8	The author team should cross-reference section 5.4.1.6 for the statements. (Katharine Mach, IPCC WGII TSU)	Cross-referenced is made to the cross-chapter box on ocean acidification and its impacts on coral reefs.
1027	43281	5	30	5	30	8	Sentence is incomplete? (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Sentence has been deleted.
1028	40244	5	30	10	30	14	In several tourist areas (eg Cyprus) a relation of accommodation drop when coastal structures are constructed is not proved. In contrary, field surveys showed a preference of beach users to hard coastal structures. Attachment 2, page 7, reports and comments the results from a field survey carried out during the EUROSION project. http://ec.europa.eu/ourcoast/download.cfm?fileID=1168 (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	A secondary response from tourists and also not from peer-reviewed source – not relevant to climate change impact.
1029	47686	5	30	11	0	0	The statement that tourism will be affected negatively by dykes by reducing accommodation prices, appears to take the tourist operator' point of view. Lower prices would be welcomed by tourists. (Bob Pokrant, Curtin University)	Minor point – not considered.
1030	37927	5	30	11	30	11	Schleupner, C. 2008 was working in Martinique, so who did the work in the S-H with dykes and accommodation costs (rent or purchase?)? (Julian Orford, Queen\\\'s University, Belfast)	NA as the example has been deleted in the SOD.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1031	50269	5	30	17	0	0	Section 5.4.2.5. For this section, the chapter team should consider and cross-reference the findings of chapter 3. (Katharine Mach, IPCC WGII TSU)	This part has been removed. Only water resources in connection with coastal aquifers are discussed in new 5.4.2.5. Cross-references to Chap. 29 have been included
1032	44364	5	30	17	30	24	A recent study carried out in the Evergades National Park (Todd et al. 2012) found that climate change will cause mean annual precipitation to decrease across the Park, leading to a marked hydrologic change and a shift in the vegetative makeup of the region. (Ibáñez Carles, IRTA)	This section has been removed. Material is covered in Chap. 6
1033	47535	5	30	19	30	24	This section is on water resources is woefully lacking. Are the authors discussing all water resources of just groundwater? The authors are not clear about why they are discussing Guyana, and the significance of Guyana to a global audience. (Alexander Kolker, Louisiana Universities Marine Consortium)	Thi section has been removed. Material is covered in Chap. 6. Only coastal aquifers are covered in SOD (5.4.2.5)
1034	50270	5	30	27	0	0	Section 5.4.2.6. For this section, the chapter team should consider and cross-reference the findings of Chapter 11. (Katharine Mach, IPCC WGII TSU)	Health is now discussed in a single section that deals with observed and projected impacts
1035	46960	5	30	30	30	31	What is the source of this information? Is there any study support this statement that increase salinity will increase diarrhea and skin diseases? (A K M Saiful Islam, Bangladesh University of Engineering and Technology)	Deleted.
1036	37928	5	30	33	30	33	Repetition of the same information on consequences of embankments in Bangladesh (Julian Orford, Queen\\\'s University, Belfast)	Deleted.
1037	40246	5	30	41	0	0	Interesting method and prognosis is done through the CORI project http://coastal.web.auth.gr/ssm_Med.htm, and the article “Coastal inundation in the north-eastern Mediterranean coastal zone due to storm surge events”, Y. N. Krestenitis, Y. S. Androulidakis, Y. N. Kontos & G. Georgakopoulos, J. Coast. Conserv., DOI 10.1007/s11852-010-0090-7, 2010. (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	These sections have been completely re-written, re-organised and expanded to improve coverage.
1038	43283	5	30	41	34	43	These sections on beaches, deltas, mangroves, salt marshes have again system level assessments and less reference to species sensitivites to climate, except for 5.4.2.7.. The level of available information should be mentioned. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	These sections have been completely re-written, re-organised and expanded to improve coverage.
1039	43285	5	30	41	38	3	The length of the following text on vulnerabilities (and beyond) appears excessive in relation to the earlier treatment of effects and projections, but covers similar ground (relatively high redundancy). Some better integrationand harmonization appear feasible and should be considered. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	These sections have been completely re-organised in order to get rid of these redundancies.
1040	39447	5	30	43	0	0	This section needs to be informed by the text on vulnerability definition in chapter 1. In line 48, 'including adaptation within an impact model' needs to be explained - in terms of what these models might be, how they are used, and exactly how adaptation might be 'included'. Similarly, 'generic indicators' of adaptive capacity needs explanation. (Sarah Cornell, Stockholm Resilience Centre)	We have now removed this length treatment of vulnerability and refer to the other Chapters including Chapter 1.
1041	41693	5	30	43	0	0	Section 5.5.1. Maybe they do not need to introduce the "approaches" in such detail. The introduciton of assessing approaches should be treated in previous chapter in general. (Rui Zhang, Xiamen University)	Yes., we have now shortened this significantly.
1042	53854	5	30	43	0	0	Please ensure consistency with chapter 2. (Kristie L. Ebi, IPCC WGII TSU)	Done.
1043	41730	5	30	45	30	46	Reference should be made to the currently published IPCC-SREX and some of the original early work referenced in this report. Full references: IPCC (2012): Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. University Press, Cambridge.; Weichselgartner, J. (2001): Disaster mitigation: the concept of vulnerability revisited. Disaster Prevention and Management 10 (2): 85-94.; Luers, A.L., Lobell, D.B., Sklar, L.S., Addams, C.L. & Matson, P.A. (2003): A method for quantifying vulnerability, applied to the Yaqui Valley, Mexico. Global Environmental Change 13 (4): 255-267. (Juergen Weichselgartner, University of Kiel)	We now cut the discussion on vulnerability due to restrictions in space.
1044	35627	5	30	45	30	52	Romieu et al. 2010 migth be relevant in this discussion. Romieu, E., Welle, T., Schneiderbauer, S., Pelling, M., and Vinchon, C.: Vulnerability assessment within climate change and natural hazard contexts: Revealing gaps and synergies through coastal applications, Sustainability Science, 5, 159-170, 10.1007/s11625-010-0112-2, 2010. (Goneri Le Cozannet, BRGM)	Indeed, thanks. We now cut the discussion on vulnerability due to restrictions in space.
1045	37287	5	30	46	30	46	Please add: "Other studies concentrate on assessing approaches with multiple dimensions to measuring risk and vulnerability to hazards of natural origin by means of developing indicators and indices with the overall objective to discuss their applicability and usefulness and derive its policy implications.", Full citation: Birkmann, J.: Risk and vulnerability indicators at different scales:. Applicability, usefulness and policy implications (2007) Environmental Hazards, 7 (1), pp. 20-31. (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	The sentence the reviewer suggests is hard to understand and it is not clear what it would add. Multidimensional indicators are already included.
1046	49784	5	30	46	30	46	"the IPCC definition" - which? The SREX report (which seems barely acknowledged in this chapter except for its Chapter 3) used different or modified definitions for some of the key terms, and vulnerability certainly has been developed more than any previous assessments. The reference should be clear, and ideally, this chapter should catch up with the SREX definitions (see Chapter 1 and the glossary there). (Susanne Moser, Susanne Moser Research & Consulting)	We now refer to the definitions of SREX and the Glossary.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1047	37643	5	30	46	30	48	With respect to Section 5.5 Page 30 lines 46-48 and Page 37 Section 5.5.5. lines 12-13 and 43-44 "When following the IPCC definition of vulnerability, assessments of vulnerability ought to go beyond assessments of potential impacts in that they also include information on adaptation." "Only few studies consider adaptation in the estimation of vulnerabilities and risks, which gives an incomplete Picture." "Most studies assess risks of single hazards. Integrated studies assessing multiple hazards and trade-offs between adaptation options are rare." In complete agreement with these statements, and arguably the issue is broader than that: 1) the three components of exposure, sensitivity, and adaptive capacity tend to be viewed in isolation and not as an integrated whole; and 2) perhaps we are approaching the problem wrong – we should not start with exposure (typically one element) and then look at sensitivity (impacts). Rather, we should start with the system/entity we are interested in and its associated elements of sensitivity then work our way back to exactly what is it in terms of multiple exposure and adaptive capacity elements that are relevant. I would offer the following in support of this suggestion. "The usage of the three components of the IPCC definition for assessing vulnerability made sense in that they follow the global, top-down line of thought: first climate models are run to assess the exposure, then damage functions or impact models are applied to assess the sensitivity of the exposed entities and finally the potential impacts thus attained are "corrected" by asses adaptive capacity". "…many of assessments have focused on assessing the three arguments of this function (i.e., exposure, sensitivity and adaptive capacity) separately, paying less or not attention to how to combine these arguments. This combination is essential, just as is the way tires, engine, and coachwork are combined in order to attain a car." From Hinkle, J., Indicators of vulnerability and adaptive capacity: Towards a clarification of the science-policy interface. Global Environmental Change 21 (2011) 198-208. Also, with respect to the tendency to look at at one forcing/exposure parameter and one impact/sensitivity parameter, Doney et al, 2011 might be an exception. Doney, Scott C., Mary Ruckelshaus, J. Emmett Duffy, James P. Barry, Francis Chan, Chad A. English, Heather M. Galindo, Jacqueline M. Grebmeier, Anne B. Hollowed, Nancy Knowlton, Jeffrey Polovina, Nancy N. Rabalais, William J. Sydeman, and Lynne D. Talley. Climate Change Impacts on Marine Ecosystems. Annual Review of Marine Science Vol. 4: 11-37 (Volume publication date January 2012) DOI: 10.1146/annurev-marine-041911-111611 (John J. Marra, NOAA)	We fully agree (I am actually the author of the paper mentioned), but due to restrictions in space we now shortened the treatment of vulnerability here.
1048	37451	5	30	47	0	0	'ought to' seems unnecessarily prescriptive for IPCC. Surely IPCC has deifnitions of terms such as risk, is the detail in this section needed? (Colin Woodroffe, University of Wollongong)	We agree and now shortened the treatment of vulnerability here.
1049	38181	5	30	49	30	49	Two interpretations of risk. But the two are interlinked - it was RWG Carter who talked abiout this 'potent mix'. There is a Thames Barrier because successive storm surge events in the Thames show as progressively higher spikes in the sea level record because they are superimposed on an underlying sea level rise driven by subsidence + eustatic sea level rise. (THOMAS SPENCER, University of Cambridge)	The discussion on risk concepts was cut due to restrictions in space.
1050	37452	5	31	1	31	27	This seems a novel approach which I rather like. I wondered if it would be better tabulated. If Table 5.5 represents the tabulation of these ideas, then it seems rather slim in comparison with the text. Some interesting ideas here which can be edited to produce a nice summary (Colin Woodroffe, University of Wollongong)	Thanks.
1051	38718	5	31	1	31	27	Early Warning Systems are under development and they are also used to define overwashed areas/floods/erosion/overtoping, etc. They predict vulnerability and risk based on modeling, indicators and GIS (integrated approach). An integrated EWS was demonstrated at MICORE europen project and applied at 9 sites. For further infoprmation see: Storm impacts along European coastlines. Part 2: lessons learned from the MICORE project, E n v i r o n m e n t a l s c i e n c e & P o l i c y, 1 4 (2 0 1 1), 924-933. Paolo Ciavola, Oscar Ferreira, Piet Haerens, Mark Van Koningsveld, Clara Armaroli (Oscar Ferreira, University of Algarve)	EWS are not approaches for assessing vulnerability/risk and are not considered.
1052	49785	5	31	1	31	27	Heberger et al.'s (2009) work - later published in a special issue of Climatic Change - is an other good example of the flood exposure approach; Biging et al (2012) in a peer-reviewed report published on July 31, 2012 by the California Energy Commission (available for download online) is a significant improvement and should make its entry into this list, maybe under the hydrodynamic approaches, but it is rather unique, so should be reviewed and then included here. (Susanne Moser, Susanne Moser Research & Consulting)	Thanks, but due to space restrictions we had to shorten this section significantly,
1053	44768	5	31	3	31	5	Change "Submergence exposure approaches that use GIS to assess the exposure…(e.g., Dasgupta et al., 2008; Boateng, 2012)." into "Submergence exposure approaches that use GIS to assess the exposure…(e.g., Dasgupta et al., 2008; Zhang et al., 2011; Boateng, 2012)." (Keqi Zhang, Florida International University)	Done. Thanks.
1054	42042	5	31	3	31	6	GIS is not the only component, you should mention DEM and lidar analyses. (Liette Vasseur, Brock University)	Yes, but GIS is the defining component of these approaches.
1055	40385	5	31	3	31	27	These are very focused on flooding. What about risks associated with other climate-related drivers (e.g. temperature change)? Also, this section emphasizes methodologies but doesn't really provide any assessment. (Laura Petes, National Oceanic and Atmospheric Administration)	We have now added this. The assessments follow in the subsequent sections. Due to restrictions in space we can not further go into how elevation data is aquired.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1056	37288	5	31	9	31	9	Please add: "An advanced approach makes use of a multi-variate statistical analysis of storm surge events by means of jointly analysing the dominant storm surge parameters “highest turning point”, "wave height" and “intensity” based on Archimedean Copula functions. This novel methodology allows derivation of reliable and realistic exceedance probabilities and can be considered (among others) for integrated flood risk analyses.", Full citation: Wahl, T., Mudersbach, C., Jensen, J.: Assessing the hydrodynamic boundary conditions for risk analyses in coastal areas: A multivariate statistical approach based on Copula functions, (2012), NHESS - Natural Hazards and Earth System Science, 12 (2), pp. 495-510 (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	This point is well taken but to detailed to be included here. Given the limit in space, we can not sub-type approaches according to how probability distributions of extreme water levels are attained.
1057	41731	5	31	29	31	35	It should be mentioned that also mitigation measures - despite having net benefits - are not cost free. Full reference: Benson, C. & Twigg, J. (2004): Measuring mitigation: methodologies for assessing natural hazard risks and the net benefits of mitigation. ProVention Consortium, Geneva. (Juergen Weichselgartner, University of Kiel)	Yes. Done.
1058	38557	5	31	38	0	0	Section 5.5.2 needs kelp forest content. It could go in with the seagrass content (as sort of happens elsewhere in this chapter), but I think kelp forests or "macroalgal systems" in general deserve their own subsections throughout. (Christopher Harley, University of British Columbia)	Kelp forests have now been added
1059	41694	5	31	38	0	0	Section 5.5.2. Why the subsections are not consistent with previous ones, e.g. missing deltas? (Rui Zhang, Xiamen University)	We now have merged this section with the previous one you mention to make them consistent.
1060	41695	5	31	38	0	0	Section 5.5.2.I think there are important coastal ecosystems (e.g. coral reefs), components (e.g. fishes and other animals) or impact factors (e.g. OA) missing in this section. The structure of this section is strange to me. (Rui Zhang, Xiamen University)	Old sections 5.3. 5.4 and 5.5 into single section and various ecosystems treated in more balance way for observed and projected impacts.
1061	52637	5	31	38	0	0	Lack own paragraph on macroalgae. Since this is an important coastal ecosystem type, and also has potential as increasingly used food resource for humans, it merits its own paragraph. (Else Marie Løbersli, Norwegian directorate for nature management)	Macroalgal beds are under section 5.4.2.3 Wetlands and seagrasses.
1062	50271	5	31	40	31	40	The chapter team should ensure these overlaps are resolved as noted here. (Katharine Mach, IPCC WGII TSU)	Done.
1063	40386	5	31	42	0	0	The paragraph starts by implying that new work has not been done but then proceeds to describe examples of new work. Could the first sentence be reworded to indicate that new assessments have been conducted in a diversity of locations throughout the world? (Laura Petes, National Oceanic and Atmospheric Administration)	The paragraph starts with saying that no new GLOBAL work has been done.
1064	37453	5	31	42	31	52	This seems out of place here. I don’t think sea level 5 m higher ought to be used. (Colin Woodroffe, University of Wollongong)	We now have removed this study.
1065	44365	5	31	42	31	52	Although the majority of work on the vulnerability of coastal systems is carried out at local scales, there are recent publications that perform the analysis at regional scale. For instance, Heberger et al. (2011) analyzed the impacts of coastal flooding in California and estimated that by the end of this century, coastal flooding would, under a high scenario regions that currently are home to approximately 480,000 people and $100 billion worth of property would be threatened. (Ibáñez Carles, IRTA)	Thanks, but due to space restrictions we had to shorten this section significantly,
1066	50272	5	31	42	31	52	The chapter team may wish to consider if this introduction is overly specific. (Katharine Mach, IPCC WGII TSU)	Yes. This paragraph was now moved into a subsection.
1067	36408	5	32	0	0	0	Finally, some words on benthic macroafuna! (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Benthic macrofauna is addressed in the unified rocky shore section, without a lot of detail as the whole section is allocated 800 words.
1068	36409	5	32	0	0	0	Please, explain why you here only address "temperate lagoons" (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Good point (also made before) - amendment made.
1069	36410	5	32	0	0	0	As for most other sections in 5.5, also this one tends to be more about the impacts and sometimes repeats what is already said before. (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Has merged with new section 5.4.2.2 Rocky coasts
1070	38182	5	32	0	0	0	section 5.5.2.1 see comments and references on page 13, line 33 and page 25, line 9 (THOMAS SPENCER, University of Cambridge)	Reference Brooks and Spencer 2012 included.
1071	35314	5	32	1	32	25	It is not clear from this section whether or not "Rocky Shores" include those composed of soft rock or mixed lithologies. Clarification needed. Irrespective of this, I think mention is needed of the singular situation found along many atoll island coasts at present; where the hard rock (emergent reef) foundations are exposed, retreating and having their superficial sand cover stripped off them. Excellent reference is Dickinson (2009) in GSA Today "Pacific Atoll living". (Patrick Nunn, University of New England)	Revised to include wide range from lithified coasts to unlithified coasts and to include abrasional platforms.
1072	39281	5	32	3	0	0	Section 5.5.2.1 Rocky shore pag. 32 – the literature background of this section could be updated with a recent paper Milanese, M., Sarà, A., Sarà, G., Murray, J.H. 2011. Climate change, marine policy and the valuation of Mediterranean intertidal ecosystems. Chemistry and Ecology 27 (2), 95-105. In that paper, which is the first paper on this topic for the Mediterranean, authors described a gap in the qualitative and quantitative knowledge of the provision of benefits to humans from the intertidal ecosystems of the Mediterranean and offered a framework for quantification of the benefits provided by these systems. (Gianluca SARA, University of Palermo)	Not relevant as this section is about rocky coasts.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1073	39282	5	32	3	0	0	The identification of such benefits, understanding their spatial distribution and their subsequent quantification is critical to the design of policy responses to future climate change, sea level rise and seawater acidification. A baseline understanding of the current state of ecosystem functions, as well as of the provision of related ecosystem services, was therefore judged as needed. Milanese and co-authors emphasized that research must strive to generate forecasts of the changes in these functions and services conditional on policy responses and the range of expectations for climate change. (Gianluca SARA, University of Palermo)	It seems that the referee provided the wrong page or line number and the specific text to which this comment reltes is unclear.
1074	46860	5	32	3	32	3	Explain what 'FAR' is. (Genevra Harker, HarmonicQuay Ltd)	OK
1075	50273	5	32	3	32	3	A more specific citation to the 1st assessment report should be provided here. (Katharine Mach, IPCC WGII TSU)	Sure
1076	40387	5	32	3	32	25	This is all about physical impacts, not ecological. This should be revised to better reflect the wealth of literature on climate-related risk and vulnerability in rocky coast ecosystems (both intertidal and subtidal). (Laura Petes, National Oceanic and Atmospheric Administration)	But this has been partially addressed in previous sections
1077	50274	5	32	4	32	4	"likely" -- If being used as calibrated uncertainty language per the guidance for authors (reflecting a probabilistic basis for assignment), this term should be italicized; casual usage of the reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Done
1078	42043	5	32	14	0	0	appear to have smaller effects on rocky shores: smaller than what? (Liette Vasseur, Brock University)	Done
1079	38748	5	32	19	0	25	I think is interesting to reflect the retreat of the arctic coast due to melting of the premafrost and the subsequent ecoastal erosion. This erosion cause severe damages in local villages and economic and social disturbances in local populations. A referecnce could be [Forbes, D.L. (editor). 2011. State of the Arctic Coast 2010 – Scientific Review and Outlook. International Arctic Science Committee, Land-Ocean Interactions in the Coastal Zone, Arctic Monitoring and Assessment Programme, International Permafrost Association. Helmholtz- Zentrum, Geesthacht, Germany, 178 p. http://arcticcoasts.org] (Ricardo Anadon, University of Oviedo)	Valid and interesting point - but all coasts in the Arctic and Antarctic are dealt in Chapter 28 Polar regions.
1080	36276	5	32	29	32	36	I would recommand to add a little more results in this paragraph, by explaining the results obtained in the cited papers. (Déborah Idier, BRGM)	Has been better addressed after the merging of the sections.
1081	37454	5	32	30	32	36	Given the continued wide use of Bruun, this seems a far too short section that adds nothing new. The discussions between Cowell and Cooper in Journal of Coastal Research in response to the Cowell et al 2006 paper, and the probabilistic approaches that have been trialled, need some discussion. Cowell, P.J., Thom, B.G., Jones, R.A., Everts, C.H. and Simanovic, D., 2006. Management of uncertainty in predicting climate-change impacts on beaches. Journal of Coastal Research, 22: 232-245. (Colin Woodroffe, University of Wollongong)	However, I would think that this is not the place to extensively discuss the Bruun rule, especially when considering length limitations for this section
1082	47536	5	32	30	32	43	This section would be improved if instead of listing studies that examined the response of beaches and sand dunes to climate change it described the findings of these studies. (Alexander Kolker, Louisiana Universities Marine Consortium)	Correct - done
1083	36407	5	32	32	0	0	Please, explain "the widely employed Bruun rule". (Catharina Philippart, Royal Netherlands Institute for Sea Research)	Done
1084	48273	5	32	32	0	0	Bruun Rule has to be explained properly, too technical to be included w/o explanation (Malini Nair, Indian Institute of Science)	Reference to the Bruun rule has been added
1085	41696	5	32	32	32	36	Most people will ask what is "Bruun rule"? Why it is good or bad? (Rui Zhang, Xiamen University)	See previous response.
1086	38749	5	32	38	0	43	I think this paragraph could be contraductory with the chapter 6,2,2,4,5, in the sea turtles subparagraph (Ricardo Anadon, University of Oviedo)	NA - sea-turtles are not considered.
1087	37289	5	32	48	32	48	Please add another full citation: Zorndt, A.C., Wurpts, A., Schlurmann, T.: The influence of hydrodynamic boundary conditions on characteristics, migration, and associated sand transport of sand dunes in a tidal environment: A long-term study of the Elbe Estuary (2011) Ocean Dynamics, 61 (10), pp. 1629-1644 (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	This section has been drastically cut (250 words for observed impacts on estuaries and coastal lagoons) and the author team felt that this issue was not critical to add.
1088	47554	5	32	48	32	51	Changes in estuary geomorphology due to climate related wind and wave driven processes are also relevant here (see for example, the French et al (2008) and Brunneau et al (2011) studies mentioned above although there are other papers that could be cited). (Jon French, University College London)	Changes in sediment supply is mentioned in the SOD but more detail could not be added die to lack of space (see reply to previous comment).
1089	47537	5	32	48	33	11	This section needs a major revision. The authors need to be specific about what the project impacts to estuaries will be, given various IPCC scenarios. The authors also need to be specific about which studies they cite are predictions and which are analyses of past information. For example, it sounds like the Levinton et al., (2011) study is an analysis of previous salinity changes in the Hudson River, not future changes. That study may prove useful for studies of projected impacts, and perhaps Levinton has done such an analysis. However, as written, such a linkage has not been established. (Alexander Kolker, Louisiana Universities Marine Consortium)	I would think that there is NOT enough space to look at various scenarios! If the lead authors decide to assign the space, we would be happy to do so. The comment regarding Levinton is not correct, it is explicitly mentioned in the text that these results are from simulations.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1090	38183	5	33	0	0	0	section 5.5.2.4 lagoons will be affected by landward retreat of the enclosing barrier, which will reduce laggon area, and by the potential for more frequent breaching under high water levels associated wuith increased storminess, which will change lagoon water chemistry. see Spencer T and Brooks SM 2012 Methodologies for measuring and modelling coastal habitat change: saline lagoons of the Suffolk coast, eastern England. Hydrobiologia 693, 99-115 [doi: 10.1007/s10750-012-1089-x] (THOMAS SPENCER, University of Cambridge)	This is addressed in general terms in the revised version.
1091	37929	5	33	5	33	5	Where is western Moreton Bay? Ensure that complete locations are used. (Julian Orford, Queen\\\'s University, Belfast)	OK, this citation was omitted anyway in the SOD.
1092	46861	5	33	11	33	11	"moving to" rather than "moving in"? (Genevra Harker, HarmonicQuay Ltd)	This section has been merged into a unified rocky shore section and the expression referred to has disappeared.
1093	39284	5	33	14	0	0	Only at pag 15 line 10, there is a hint to this as deriving from the alteration of seasonal precipitation pattern (Canu et al. 2010), while SLR clearly will affect the ratio between inorganic and organic matter inside the POM. Such a fact will have important repercussions on the ecological response of animals important for human consumption like bivalves, crustacean and fish. At pag. 45, the concept of “organic matter accretion” is used in another way as deriving from the outcome of Kirwan et al. 2010 paper (line 27-29), but I think that the potential effects of sediment alteration coming from SLR deserves major attention along this research line. (Gianluca SARA, University of Palermo)	This sentence part had to be cut to save space (the whole section must be 800 words).
1094	46391	5	33	14	0	0	I raised this in the review of the zero order draft and raise it again here. The use of "Temperate" lagoons is in my opinion used to describe lagoons in climates with milder temperatures. There exist many lagoons in tropical locations…are these excluded?. In my opnion I would rename this section "Coastal lagoons" as the text in the subsection talks about coastal lagoons . (Andrew Mather, eThekwini Municipality)	Lagoons are included in Section 5.4.2.6 Estuaries and lagoons.
1095	47538	5	33	14	33	27	Why is this section about temperate lagoons, and why have tropical and arctic lagoons been excluded? (Alexander Kolker, Louisiana Universities Marine Consortium)	See previous response
1096	47539	5	33	30	33	54	This section presents something of a regression in our scientific understanding of coastal response to sea level rise. Look at the lines 35-36, “Accelerating sea-level rise rates may therefore result in marsh submergence, retrogressive vegetation succession, or complete drowning of the marsh (Craft et al., 2009).” This statement should be compared to one made by Orson et al., (1985), who wrote that, “There are three major responses a salt marsh could have to a rising sea level: (1) the marsh system could drown if rates of coastal submergence exceed the ability marshes ability to accrete vertically, (2) the marsh may remain stable if the inputs of sediments equal the rates of coastal submergence so that surface elevations are maintained, and (3) the marsh can actively expand both vertically and laterally if accretion rates are higher than rates of coastal submergence.” (See Orson, R., W. Panageotou, and S. P. Leatherman (1985), Response of tidal salt marshes of the U.S. Atlantic and Gulf coasts to rising sea levels, Journal of Coastal Research, 1(1), 29-37.) I am disturbed by the fact that the 1985 paper is actually more complete than the current report. The 1985 paper statement provides boundary conditions on when a marsh may or may not drown, and the potential for the marsh to expand, which is not mentioned at all in the current document. I am not sure at all why this section, as currently written, is so perfunctory and why so many excellent studies in this field have been ignored. I know that predicting wetland response to climate change and sea level rise is a difficult task, but more work is clearly needed here. (Alexander Kolker, Louisiana Universities Marine Consortium)	The results of the 1985 paper are well established by now. The line citing Craft et al. (2009) is simply an introductory line for the section. The reviewer should note the extreme space limitations for 5.5.2. However, some text on SLR rates and how these influence salt marshes will be added (following comments by Spencer). The section has been re-written, re-organised and expanded to improve coverage
1097	37455	5	33	32	0	0	reword -- development here presumably means natural evolution of a marsh, and risks is too vague (Colin Woodroffe, University of Wollongong)	OK
1098	50275	5	33	32	33	34	It would be helpful to clarify the logic of this statement further. Equilibrium as mentioned on line 33 is with current sea level? (Katharine Mach, IPCC WGII TSU)	OK
1099	38965	5	33	33	33	34	Should read "….modelled salt-marsh accretion rates lag behind…" Kirwan and Temmerman's paper was a modelling exercise. (Neil Saintilan, Office of Environment and Heritage)	Done
1100	37456	5	33	39	33	43	Update, these are very old references, there has been much more recent work on marshes, see my comment page 26, 15-50 (Colin Woodroffe, University of Wollongong)	The section has been re.written, re-organised and expanded to improve coverage
1101	38966	5	33	40	33	40	Might be worth noting here that increased drought (an outcome of climate change in some regions) also promotes subsidence in saltmarsh and may locally contribute to higher rates of relative sea-level rise (Rogers K., and Saintilan N. (2008). Relationships between groundwater and surface elevation in SE Australian wetlands. Journal of Coastal Research, 24: 63-69) (Neil Saintilan, Office of Environment and Heritage)	This comment has escaped our attention; it will be addressed in the next version.
1102	37457	5	33	45	0	0	Horrible sentence; what is the concern about storms on marshes, is there a reference? (Colin Woodroffe, University of Wollongong)	Yes, reference is provided a couple of lines later. Will rephrase however to emphasise that changes in storms may enhance the ability of marshes to accrete. - The section has been re.written, re-organised and expanded to improve coverage
1103	38184	5	33	48	33	48	see comment on page 13, line 40 (THOMAS SPENCER, University of Cambridge)	See reply to that comment
1104	52123	5	33	48	33	48	The author team could consider providing a cross-reference to the report glossary for the term "coastal squeeze." (Katharine Mach, IPCC WGII TSU)	Coastal squeeze is already in the AR5 Glossary.
1105	38185	5	33	50	33	51	see comment on page 26, line 26 (THOMAS SPENCER, University of Cambridge)	Agree, this was not meant to contradict this statement. Will reword to explicitly include this aspect

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1106	40643	5	34	1	34	15	Impacts of wind and swell waves has also been studied and reported. However how climate change will influence in those waves and then on the mangroves is a different matter. This knowledge is crucial because no adaptation strategies will be fully efficient without knowing how waves will change and how mangroves can respond to those changes. For information on studies on waves and mangroves see McIvor, A.L., Möller, I., Spencer, T. and Spalding. M. (2012) Reduction of wind and swell waves by mangroves. Natural Coastal Protection Report 2012-01. Cambridge Coastal Research Unit Working Paper 40. Published by The Nature Conservancy and Wetlands International. 27 pages. Natural Coastal Protection Series ISSN 2050-7941. URL: http://www.naturalcoastalprotection.org/documents/reduction-of-wind-and-swell-waves-by-mangroves (Carmen Lacambra Segura, Grupo La era)	Similar to storms - however climate change and swell waves is indeed a topic where there is little information - not sure to what extent this can be addressed here as the link is not strong / The section has been re.written, re-organised and expanded to improve coverage
1107	38967	5	34	3	34	3	"sea-level poses the greatest challenge to mangrove". I disagree. Mangroves are highly opportunistic and are likely to occupy coastal lowlands as sea-level ries, repalcing tidal saline and freshwater wetlands, and lowlying agricultural lands (unless prevented by protective structures). Mangroves are already doing this in Australia (Williamson G.J., Boggs G.S. and Bowman D.M.J.S. (2011). Late 20th century mangrove encroachment in the coastal Australian monsoon tropics parallels the regional increase in woody biomass. Regional Environmental Change 11: 19-27; Saintilan N. and Williams R. 1999. Mangrove transgression into saltmarsh environments in New South Wales, Australia. Global Ecology and Biogeography 8 117-124) and in doing so have increased in area. The Lovelock paper cited did not cover a period of sea-level rise, and so it is difficult to extrapolate from this observation to how the mangroves might perform under sea-level rise. (Neil Saintilan, Office of Environment and Heritage)	This part has been rephrased in the SOD.
1108	38186	5	34	14	34	15	Saintilan, N., Rogers, K., McKee, K., 2009. Salt marsh – mangrove interactions in Australasia and the Americas. In: Perillo, G.M.E., Wolanski, E., Cahoon, D.R., Brinson, M.M. (Eds.), Coastal wetlands: An integrated ecosystem approach. Elsevier, Amsterdam, pp.855-883. (THOMAS SPENCER, University of Cambridge)	The section has been re.written, re-organised and expanded to improve coverage
1109	38187	5	34	14	34	15	There has been some discussion in Australia on the possibility of rainfall controls changing mangrove / saltmarsh extents. See Saintilan, N., Rogers, K., McKee, K., 2009. Salt marsh – mangrove interactions in Australasia and the Americas. In: Perillo, G.M.E., Wolanski, E., Cahoon, D.R., Brinson, M.M. (Eds.), Coastal wetlands: An integrated ecosystem approach. Elsevier, Amsterdam, pp.855-883. (THOMAS SPENCER, University of Cambridge)	yes, but we have space limitations
1110	43284	5	34	37	0	0	The nature of indirect effects need to be defined. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	This sentence has been removed.
1111	39448	5	34	46	0	0	Also check for coherence with vulnerability definition in ch 1. (Sarah Cornell, Stockholm Resilience Centre)	Done.
1112	54378	5	34	46	0	0	Section 5.5.3: There is overlap in this section with 5.4.2.1, and the author teams should consider ways to make these sections complementary. (Michael Mastrandrea, IPCC WGII TSU)	Yes, we now have combined these two sections.
1113	49786	5	34	46	36	49	These two sections are strangely separated, and it's not clear why. There are cost estimates in section 5.5.3 but then more are in 5.5.4, and then later in Section 5.6 we have yet another whole section on adaptation costs. These three sections should be carefully reviewed for clearer distinction and possibly integration or streamlining so that material is not duplicative and the messages emerging are clear and consistent. (Susanne Moser, Susanne Moser Research & Consulting)	Yes, we now have combined sections 5.5.3 and 5.5.4 and leave the discussion on adaptation costs for the section on adaptation.
1114	39453	5	35	0	37	0	Much of these pages are very 'Nicholls-centric' (and to a considerable extent framed in rather European perspectives on integrated coastal zone management). That group does produce very influential science, but there should be more effort to broaden the perspectives here, especially since the social and economic costs are calculated using a very narrow set of tools/methodologies in these studies. The text here (and elsewhere in the chapter) refers very frequently to Nicholls et al 2007, the AR4 analysis - it would be particularly helpful if this section framed the recent work as advances on those well-accepted statements. Also, the methodological basis of DIVA (and FUND) should be made a little clearer here - e.g. global vuln/cost assessments not a simple aggregate of national ones because of the treatment of ~spatial geodynamics in DIVA, etc. - which also means that the reader can have some idea of how the findings reported here might relate to coastal/flood risk information given in the later regional chapters. (Sarah Cornell, Stockholm Resilience Centre)	We agree, but to our knowledge there is not more at the continental and global scales. There are many local scale studies, but space does not allow to present them. DIVA and FUND are now described in some more detail, but space restrictions do not allow to go into a lot of detail.
1115	39449	5	35	6	0	0	Check details against page 28 line 20 - how many cities? Avoid repetition. (Sarah Cornell, Stockholm Resilience Centre)	Done.
1116	50276	5	35	7	35	7	For sea level rise described here, it would be helpful to clarify the scenario used in the analysis. (Katharine Mach, IPCC WGII TSU)	Done.
1117	39450	5	35	12	0	0	see comment re page 30 section starting line 43 - where text refers to models, a brief and concise description of what the model is/contains is needed. Hinkel and Klein 2007 on integration is probably the best ref for DIVA, but it still leaves it unclear what kind of model it is, and the extent to which its simulations can be taken as projections for the 21st century (cf explorations with users of what-if possibilities). (Sarah Cornell, Stockholm Resilience Centre)	Space does not allow us to describe DIVA and other modles in detail.
1118	54376	5	35	12	35	19	It would be useful to be more specific about what is meant by adaptation in this context. (Michael Mastrandrea, IPCC WGII TSU)	Done.
1119	39451	5	35	16	0	0	Careful with tenses in model simulation discussion - these people 'would be' from Asia, not 'are'; Adaptation (indicatively, what options does DIVA allow?) 'would reduce' rather than 'reduces' (Sarah Cornell, Stockholm Resilience Centre)	Thanks. Done.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1120	37458	5	35	21	35	29	Hard to follow this paragraph; we need to know whether these are all from the same model. There is sea-level commitment, it is well documented that sea level is not very sensitive to mitigation in early decades (Colin Woodroffe, University of Wollongong)	This paragraph now has been rewritten and there is a table that includes the models.
1121	48110	5	35	21	35	29	It would be useful to note that mitigation (during this century) will probably have bigger effects on impacts beyond 2100 (even if those were not considered in the literature), because most of the SLR commitment associated with a given warming may appear only after 2100 (a link to sections 5.5.5 and 5.6.5 may then provide further information). The difference between scenarios (benefits of mitigation) may increase during the next centuries. The links between mitigation and impact reduction require a more extensive discussion. (Philippe Marbaix, Université catholique de Louvain)	Done. The links between mitigation and adaptation are also treated in Section 5.6
1122	50277	5	35	24	35	25	It would be helpful to clarify the timeframe relevant here--23-29% reduction compared to what the baseline timeframe of analysis (also, with flood risk defined by what metric)? (Katharine Mach, IPCC WGII TSU)	Done.
1123	39452	5	35	31	0	0	Recent studies do not 'underpin' the prior conclusions of AR4 - they might provide further support or be consistent with them. (Sarah Cornell, Stockholm Resilience Centre)	Thanks. Done.
1124	46862	5	35	35	35	35	Economic growth may increase the resources available to enable adaptation, but often includes a political reluctance to adapt naturally. This statement needs qualification. (Genevra Harker, HarmonicQuay Ltd)	This point is well taken and addressed in section 5.6 on barriers to adaptation
1125	54383	5	35	47	0	0	Section 5.5.4: In this section, it would be useful to explain further the basis for the robust findings that emerge given the difficulties mentioned in terms of comparing across studies. This, in the context of introducing the assignment of high confidence to the corresponding Executive Summary finding, would enhance the traceable account this section provides. In addition, "adaptation" and "protection" seem to be equated at times in this section, and it would be useful to ensure clarity of wording to avoid confusion. (Michael Mastrandrea, IPCC WGII TSU)	Yes. Done.
1126	48471	5	35	47	35	47	Add citations to the Neumann et al. coastal property model SLR damage/adaptation estimates: DOI: 10.1002/wcc.90 and DOI: 10.1080/08920753.2010.496105 (Marcus Sarofim, US EPA)	We only report on global cost estimates in this section, but we now have included this study in the table of regional studies.
1127	48472	5	35	47	35	47	Please discuss the limitations of some of these damage models: if they don't take into account storm surge and stochastic events, they are going to underestimate real-world future damages. The assumption of perfect foresight in these models will similarly lead to underestimates. (Marcus Sarofim, US EPA)	We now have added two paragraphs on these limitations.
1128	49787	5	35	47	36	49	Several times dollars are cited but it is not clear whether these are discounted or undiscounted by 2100. I am also very much missing a very careful review undertaken by Neumann (2010), published in WIREs Climate Change that reviewed what is and isn't known about the costs of SLR impacts and adaptation costs. It's an important omission that would lead to some modified conclusions. (Overall this review is far too rosy if one considers the different approaches to cost assessments (top-down, bottom-up) and what is and isn't included, and how the assumptions guide these estimates. I am missing some critical reflection here!) (Susanne Moser, Susanne Moser Research & Consulting)	We now have have added whether amounts are discounted or not. We also considered Neumann (2010) and include two paragraphs that discuss shortcomings.
1129	50278	5	36	2	36	2	It would be beneficial to specify what these robust findings are--for example, could calibrated uncertainty language be assigned in table 5-5? (Katharine Mach, IPCC WGII TSU)	Yes, Done.
1130	44148	5	36	7	36	8	provide reference (Anne Holsten, Potsdam Institute for Climate Impact Research)	The specific references are provided in the sentences that follow this introductory sentence.
1131	40388	5	36	7	36	49	Do any of these assessments include valuation of coastal ecosystem services? If so, should indicate. If not, should include some text on the importance of considering and valuing ecosystem services when assessing adaptation options and tradeoffs. (Laura Petes, National Oceanic and Atmospheric Administration)	FUND includes valuation of wetlands. We have added a sentence on this point.
1132	44149	5	36	9	36	9	what is FUND? (Anne Holsten, Potsdam Institute for Climate Impact Research)	We do explain this now.
1133	50279	5	36	15	36	15	For the result characterized on this line, it would be helpful to clarify that this is an outcome of the analysis, not just an aspect of the scenarios themselves. (Katharine Mach, IPCC WGII TSU)	Done.
1134	50280	5	36	18	36	18	Where the chapter team states that "the most valuable areas are protected 1st" it would be helpful to clarify if this is an assumption or outcome of the analysis. (Katharine Mach, IPCC WGII TSU)	This is an assumption, but we now have removed this sentence.
1135	37459	5	36	22	0	0	I suggest the word 'dike' be avoided. My dictionary defines a dike as a seawall and as a ditch. The term has not been used in the section on the Netherlands, I feel it is unclear what is meant by the term and a more widely understood term should be used instead. (Colin Woodroffe, University of Wollongong)	We considered this, but on the other hand a lot of literture uses this term.
1136	49788	5	36	25	36	27	This statement requires a review of an important recent paper by Martinich et al (2012) (sent to TSU) which will most certainly lead to a rather different conclusion. (Susanne Moser, Susanne Moser Research & Consulting)	This statement was removed as it was ambiguous. Thanks.
1137	42795	5	36	25	36	29	A protection strategy also increases the risk of maladaptation, in cases where more population and assets are attracted to these highly exposed areas and the coastal defenses fail - this was the case of Eastern Japan during the recent tsunami. Learning from this experience, the municipal governments have now promoted more holistic adaptation strategies which include also retreat to higher areas, and vegetative solutions. (Sofia Bettencourt, World Bank)	We now acknowledge that protection attracts people and increases exposure.
1138	47555	5	36	26	0	0	Surely it is not so much the risk of a low probability high impact event that is meant here, but its consequence when the coastal zone is maintained in a meta-stable state by higher and higher standards of protection and these fail (e.g. failure of the Thames flood barrier). (Jon French, University College London)	Yes. We have rephrased this sentence

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1139	37460	5	36	31	36	36	is it really meaningful to talk of coastal protection on atolls. It is clearly not viable to put seawalls around the entire perimeter of low-lying atoll reef islands. Look at chapter 29, the first paragraph in section 29.2, page 5, line 12-23 of FOD for a neat summary, and an earlier IPCC comment about the futility of protection works in view of their cost. (Colin Woodroffe, University of Wollongong)	We now reference this in our chapter.
1140	46863	5	36	33	36	33	Which is the 'later' country that is referred to? (Genevra Harker, HarmonicQuay Ltd)	This sentence has been removed.
1141	42796	5	36	38	36	49	Again, I'm concerned about the inferred implication of these global studies that protection is the only adaptation option, when in many cases a mixture of soft and hard solutions (as well as retreat) is much more cost-effective. This is mentioned later in page 346 but it should already be caveated in this section (as well as in the executive summary) (Sofia Bettencourt, World Bank)	We agree and have done so.
1142	44150	5	36	38	36	49	L. Costa et al. 2009 could be relevant (Costa L, V. Tekken and J. Kropp, Threat of sea-level rise: Costs and benefits of adaptation in the European Union Coastal Countries, Journal of Coastal Research, 2009, SI56, 223-227) (Anne Holsten, Potsdam Institute for Climate Impact Research)	We focus on global studies here.
1143	45880	5	36	38	36	49	This paragraph has considerable overlap with regional chapters in WG2, e.g. the Hinkel et al. 2010 study is also discussed at length in WG2 Chapter 23. Possible this could be cut here, and cross-refs made to the regional volume. (Laurens Bouwer, Vrije Universiteit Amsterdam)	Yes, we have removed this now.
1144	52849	5	36	44	0	0	Section 5.6.5. Links between Adaptation and Mitigation: Following reference discusses adaptation/mitigation synergies for tourism sector: Climate Change and Tourism: From Policy to Practice, By Susanne Becken and John Hay; Published June 14th 2012 by Taylor and Francis/Routledge - 280 pages (John Hay, University of the South Pacific)	Thanks.
1145	40389	5	36	45	0	0	Should be "adaptation" (not "adaption"). (Laura Petes, National Oceanic and Atmospheric Administration)	Done.
1146	38750	5	37	4	0	6	Between uncertainties I suggest to incorporate one as Vulnerability of coastal populations to economic impacts due to changes in marine resource exploitation linked with climate change driven effects. (Ricardo Anadon, University of Oviedo)	We have removed this paragraph now.
1147	44769	5	37	7	37	8	Change “Only few assessments consider global mean sea-level rise scenarios beyond the range of given AR4, thus excluding…” into “Only a few assessments (e.g., Zhang 2011; Zhang et al, 2011) consider global mean sea-level rise scenarios beyond the range of given AR4, thus excluding…” (Keqi Zhang, Florida International University)	We have removed this paragraph now.
1148	44780	5	37	7	37	8	Zhang, K. (2011). Analysis of non-linear inundation from sea-level rise using LIDAR data: a case study for South Florida. Climatic Change, 106, 537-565 (Keqi Zhang, Florida International University)	We have removed this paragraph now.
1149	35315	5	37	7	37	9	There is now a lot of assessments for beyond 2100. This section should articulate with Chapter 13 in WGI, where many of these are reviewed. (Patrick Nunn, University of New England)	These assessments focus on sea-level-rise and not on impacts.
1150	45879	5	37	12	37	19	Please include this study on changes in projected loss of life from flooding, due to sea-level rise, increased flood frequency and socio-economic developments: Maaskant, B., Jonkman, S.N., & Bouwer, L.M. (2009). Future risk of flooding: an analysis of changes in potential loss of life in South Holland (The Netherlands). Environmental Science & Policy, 12(2), 157-169. (Laurens Bouwer, Vrije Universiteit Amsterdam)	We have removed this paragraph now.
1151	35316	5	37	12	37	20	Maybe mention of adaptation strategies should be confined to section 5.6. Also I am not sure whether "retreat" any more captures what is needed in most situations - perhaps "re-location"? (Patrick Nunn, University of New England)	Discussing which adaptation strategies assessments include is necessary in order to discuss uncertainties of risk and vulnerability assessments.
1152	42797	5	37	12	37	20	Perrhaps the authors should mention that the studies referred to in this section concern economic analyses. There are many other studies that focus on adaptation which consider a wider range of options than protection. (Sofia Bettencourt, World Bank)	Yes, Done.
1153	37930	5	37	28	37	28	There is a need to differentiate between the different versions of Hanson et al 2011 (Julian Orford, Queen\\\'s University, Belfast)	We mean: Hanson, S.; Nicholls, R.; Ranger, N.; Hallegatte, S.; Corfee-Morlot, J.; Herweijer, C. & Chateau, J. A global ranking of port cities with high exposure to climate extremes Climatic change, Springer, 2011, 104, 89-111
1154	47540	5	37	28	37	30	It may be worth mentioning that subsidence rates in a key location in the Mississippi River Delta have slowed since ~1980 as the regional rates of oil and gas exploration have also slowed over the same time period. (Alexander Kolker, Louisiana Universities Marine Consortium)	We have removed this paragraph now.
1155	47541	5	37	28	37	30	For the above comment, see: Kolker, A. S., M. A. Allison, and S. Hameed (2011), An evaluation of subsidence rates and sea-level variability in the Northern Gulf of Mexico, Geophysical Research Letters, 38(L21404).Morton, R. A., and J. C. Bernier (2010), Recent subsidence-rate reductions in the Mississippi Delta and their geological implications, Journal of Coastal Research, 26(3), 555-561. (Alexander Kolker, Louisiana Universities Marine Consortium)	We have removed this paragraph now.
1156	37461	5	37	29	0	0	I don’t think policy measures can stop subsidence, they can stop extraction which may reduce subsidence (Colin Woodroffe, University of Wollongong)	We have removed this paragraph now.
1157	42044	5	37	36	0	0	There seems that some literature was not looked at. E.g. Bernatchez et al. (2011, Ocean & Coastal Management) (Liette Vasseur, Brock University)	We have removed this paragraph now.
1158	50281	5	37	39	37	39	As calibrated uncertainty language, "low confidence" should be italicized. (Katharine Mach, IPCC WGII TSU)	Done.
1159	37290	5	37	46	37	46	Specific wording is misinterpreted: …Furthermore, coastal armoring in one location may have negative consequences on other locations as REDUCED long-shore sediment transport through protection (…). Here the word REDUCED can be easily misintertreted in this context since artificial coastal or port infrastructures HAMPER or HINDER the long-shore sediment transport processes as blocked obstructions that may often lead to sediment accretion upstream and severe erosion problems downstream of the infrastructure. (Torsten Schlurmann, Franzius-Institute for Hydraulic, Waterways and Coastal Engineering)	Thanks. Done.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1160	44366	5	37	50	38	3	As mentioned before, some global sea-level projections beyond this century have been carried out recently (Jevrejeva et al. 2012), as well as some projections specific for deltas like the case of The Netherlands (Katsman et al. 2011). (Ibáñez Carles, IRTA)	These assessments focus on sea-level-rise and not on impacts.
1161	45881	5	37	50	38	3	This section should be based on and cross-refer to AR5 WG1, rather than AR4 / Meehl et al. 2007 (Laurens Bouwer, Vrije Universiteit Amsterdam)	Yes, Done.
1162	49789	5	38	0	39	0	Box 5-4: SREX Chapter 1 had a very similar box; you should review it and make sure at least that you are consistent. (Susanne Moser, Susanne Moser Research & Consulting)	The box in chapter 1 of SREX is on Adaptation to rising levels of risks treated historically. The box in this chapter focuses on the Paradigm shift in adapatation to rising sea levels with a figure to summarize future projects. There is little overlap of text.
1163	47542	5	38	6	40	54	It may be worth noting that the state of Louisiana recently release its comprensive master plan for coastal restoration and flood protection. This $50 Biliion, 50 year project incorporates projected changes in land area in Louisiaana that will results from numerous factors, including accelerated sea level rise caused by climate change. The plan then calls for major coastal restoration projects to reduce the flood risk and create habitat in the Mississippi Delta. While I recognize that not all plans can be cited in this document, the report may be worth examining. (Alexander Kolker, Louisiana Universities Marine Consortium)	Thanks, we tried to include this in the adaptation practice section.
1164	42798	5	38	6	41	54	This section would benefit from a box explaining in practical terms how coastal adaptation options are normally grouped, for example, between "hard" and "soft" solutions, and between retreat, protection and accomodation strategies. The authors could also include here the benefits of property insurance in developed countries (where premiums are higher or non-obtainable in high risk areas) and the benefits of long-term planning of public infrastructure in developing countries - e.g. placing schools, roads, and health centers in lower-risk areas, thus gradually "pulling" settlements away from low-lying areas. (Sofia Bettencourt, World Bank)	We now have a classification of adaptation options in Section 5.5.2
1165	43698	5	38	8	0	0	I think that this section should include reference to: Reeder, T., and Ranger, N., 2011: How do you adapt in an uncertain world? Lessons from the Thames Estuary 2100 project. World Resources Institute. http://www.worldresourcesreport.org/files/wrr/papers/wrr_reeder_and_ranger_uncertainty.pdf which is a very good example of anticipatory planning. When we ran a conference on sea level rise in Wellington NZ this year Tim Reeder was one of the speakers who got lot of questions from local government experts who want to develop their planning frameworks. (Martin Manning, Victoria University of Wellington)	Thanks. We now actually have a box on the TE2100 project.
1166	53855	5	38	8	0	0	References are needed to support the statements in this section. (Kristie L. Ebi, IPCC WGII TSU)	Yes. Some sentences have been removed and others have been referenced.
1167	38751	5	38	10	0	0	In a recent report [Vafeidis, A. Neumann, B. Zimmermann, J. Nicholls, R.J. 2011 Migration and Global Environmental Change. MR9: Analysis of land area and population in the low-elevation coastal zone (LECZ). Government Office for Science, UK Government. 172 p] this authors present the surface ocupied by LECZ in all countries. I suggest to incorporate as reference for adaptations for the future in coastal areas, and probably incorporate some graphs with the projected changes as method to remember the risk for future severe impacts in these areas (Ricardo Anadon, University of Oviedo)	We are aware of this report (Vafeidis is a Contributing Author to this chapter), but we find that we do not need to include this gray literature as there are sufficient journal publications available on this. LECZ is introduced in section 5.2 Coastal systems and used as a basis involving coastal population and area in section 5.3.4.1 Socioeconomic development.
1168	39454	5	38	10	0	0	At last!! Governance and real-world decision-making processes get a mention. Even though this is addressed in detail in chapter 2, it would be useful to explain more clearly earlier in this chapter (perhaps on page 4) just how vital scientific and technical insights are to coastal zone management, and how coastal zones provide excellent exemplars of long standing experience of integrative management. This would set the context for the science described in the main body text, much of which has been developed in close engagement with policy decision-makers and practitioners/communities. The framing of the social-ecological system gets a second mention here (previously on page 20 line 28) - it might also be worth setting out this framing explicitly right in the start of the chapter. (Sarah Cornell, Stockholm Resilience Centre)	We agree and now introduce the notion of the coastal SES at the beginning of the Chapter, where we define the coastal zone (Section 5.2)
1169	42045	5	38	10	38	31	These paragraphs refer to some studies but there is no reference. This should be corrected. (Liette Vasseur, Brock University)	Indeed. We have removed this paragraph.
1170	37462	5	38	12	0	0	the terms best and worst are subjective, aren't they? (Colin Woodroffe, University of Wollongong)	Indeed. We have removed this paragraph.
1171	35317	5	38	17	38	24	Prefer "governments, communities and individuals" in the first sentence in acknowledgement of the fact that the issue of governance for adaptation is not quite so simply polarized. In the list within (long) sentence #2, I would add "long-term aspirations of coastal communities, particularly those contextualized within traditional (subsistence-dominated) systems". (Patrick Nunn, University of New England)	We have removed this paragraph.
1172	50282	5	38	17	38	31	It would be beneficial to provide background citations for this material. (Katharine Mach, IPCC WGII TSU)	We have removed this paragraph.
1173	37463	5	38	18	0	0	what does this mean? (Colin Woodroffe, University of Wollongong)	We have removed this paragraph.
1174	38188	5	38	26	38	30	This is a really important piece of text which should be moved to the front of this chapter. Contexts are everything. It should not make its first appearance on page 38. (THOMAS SPENCER, University of Cambridge)	Coast as complex socio-ecological system (SES) is acknowledged in Section 5.2 Coastal systems and in new section 5.5.4 Adaptation practice.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1175	37464	5	38	35	38	54	it is good to see a box on the Netherlands, they are an obvious case study worthy of discussion. I recommend some closer scrutiny of the terms used in this box. Surely coastal defence, coastal protection and flood protection all refer to the same thing, so use just one of these terms (Colin Woodroffe, University of Wollongong)	Use “coastal protection” (replaced “coastal defence”) and “flood protection” which have different functions.
1176	46864	5	38	43	38	43	Use 'structures' rather than 'infrastructures'. (Genevra Harker, HarmonicQuay Ltd)	Amended in text.
1177	43286	5	39	2	39	19	This is a very interesting case study but the conclusions are not very clear in terms of what effort would cover which sea level rise. Is there a limit to adaptability and what would it be, i.e. which sea level rise can be compensated for? (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Inserted : “This takes into account a sea-level rise of as high as 0.65-1.3 by 2100” as in Stive et al. 2008 paper.
1178	40390	5	39	3	39	4	Should reorder so says "namely addressing coastal protection through 'working with nature' and providing 'room for the river' instead of only 'fighting' the forces of nature with engineered structures." (Laura Petes, National Oceanic and Atmospheric Administration)	Amended to read as suggested
1179	50283	5	39	13	39	13	It would be helpful to specify the geographic area to which this economic damage corresponds. (Katharine Mach, IPCC WGII TSU)	Inserted : “based on differentiation according to water depth of all 53 dyke rings” as in Aerts et al. 2008 paper.
1180	50284	5	39	23	39	27	The author team should consider providing background citations for this paragraph. (Katharine Mach, IPCC WGII TSU)	This has been removed.
1181	46865	5	39	24	39	24	The meaning of 'adjudicated among' is unclear, could this be 'assessed'? (Genevra Harker, HarmonicQuay Ltd)	This has been removed.
1182	37465	5	39	29	0	0	Three goals -- which are the three? (Colin Woodroffe, University of Wollongong)	This has been removed.
1183	35318	5	39	38	40	5	ICZM works effectively only in countries where top-down (national-community-individual) management works, which it does not in many developing/poorer countries, particularly those (like archipelagic countries) where information dissemination is hindered further by geography. I suggest this point is reflected in the first paragraph, because ICZM is not a universal panacea. The same point might be reiterated on lines 53-4, as in "actors is low, stakeholder buy-in is low, the operation .." (Patrick Nunn, University of New England)	In the FOD, the first paragraph does not mention the effectiveness of ICZM. Rather it starts by discussing the definition of ICZM, and ends with difficulties of implementing ICZM. The second paragraph illustrates the difficulties. Thus, these paragraphs indicate not a panacea but many challenges of ICZM for those countries trying to adopt this concept. As noted in the last sentence of the first paragraph: the presence of difficulties in both developed and developing economies indicates no assurance of the success of top-down management. Furthermore, geographic barriers depending on the level of transportation and information technology development can be overcome.
1184	52124	5	39	41	39	41	In introducing ICZM, the author team could consider providing a cross-reference to the report glossary for the term. (Katharine Mach, IPCC WGII TSU)	Good idea - suggestion made to the TSU for inclusion into the glossary.
1185	46866	5	39	42	39	42	Use 'various' rather than 'varying' sectors. (Genevra Harker, HarmonicQuay Ltd)	Amended in the text.
1186	37466	5	40	12	40	16	the Bangladesh case, could be reworded, and does forested buffer zones mean mangroves? (Colin Woodroffe, University of Wollongong)	Reworded, forested buffers to include “wetlands and mangroves”.
1187	40391	5	40	18	40	26	Seems like these sentences should be core text in the Adaptation section, as opposed to being included in Box 5-5. (Laura Petes, National Oceanic and Atmospheric Administration)	Various broad approaches are discussed in Section 5.5.1. Framing and approaches. Here, some measures are indicated for possible use in developing countries.
1188	37467	5	40	23	0	0	Reword sentence on scale (Colin Woodroffe, University of Wollongong)	Sentence corrected as in the text.
1189	37931	5	40	28	0	0	Here lies a major issue in this analysis. The headline approaches of macro scaled analyses are not assisting in the way that individual developing countries can approach the issues of adaptation. E.G. The macro-scaled data analyses of the last 5 years are too coarse for the singularities of individual coastal units There is a need for more detailed understanding of the science of coastal change, before one has a better chance of moving to an understanding of the physical-cultural basis by which adaptation can be both brought and bought in by local coastal communities. This is where the urge for ICZM is lost at many local community levels, in that the basics of CZM are uncertain, so how can emphasis on the "I" have real relevance. (Julian Orford, Queen\\\'s University, Belfast)	Good point. Added a line after the last sentence of the paragraph. “Furthermore, there is a need for more detailed understanding of the science of coastal change at the local level that can be coupled with existing adaptation strategies of coastal communities.”
1190	46714	5	40	40	40	43	May also want to add a sentence about the relatively recent Yale study on public perceptions on Global warming (Leiserowitz et al. 2012. Global Warming's Six Americas, March 2012 & Nov 2011. Yale University and George Mason University. New Haven, CT). The report lists public perceptions about drinking water quality and how global warming has contributed to events like Hurricane Irene and the Mississippi flooding. The report suggests we still have a long way to go before we can get full public support of anything that deals with climate change. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	This ICZM box refers to actual practices rather than perceptions. The cited reference may be a good example but not appropriate for this box.
1191	39455	5	40	45	0	0	Table 5-6 would be more useful earlier in this section, before the case study boxes. It gives a quick overview, making the subsequent navigation of the text easier. The text in this section needs minor style revision to ensure that the key messages are clear. (Sarah Cornell, Stockholm Resilience Centre)	Indeed, thanks. We now have removed the table and describe the approaches in the text that comes before the boxes. Table 5.6 has been removed and merged with the text in Section 5.5 where relevant.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1192	49790	5	40	48	40	51	This is NOT reflected in the Executive Summary. In fact the key message there is rather different than the tone of this passage. (Susanne Moser, Susanne Moser Research & Consulting)	Yes. We now have completely revised the executive summary. The ES deals with the Adaptation section and not specially on the boxes in this chapter which serve as examples or amplifications.
1193	37468	5	41	1	41	30	I found this very poorly worded and it needs significant edits to make it understandable (Colin Woodroffe, University of Wollongong)	See #1194.
1194	43287	5	41	1	47	7	The length of this discursive text again appears excessive compared to the earlier treatment of effects and projections. The harmonization of style and coverage across the chapter may be improved further. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Replaced by new section 5.5.4 Adaptation practices with clear focus.
1195	39456	5	41	13	0	0	Should 'tenants' be 'tenets'? (Sarah Cornell, Stockholm Resilience Centre)	This paragraph has been removed.
1196	39457	5	41	14	41	30	The discussion of models here isn't exactly 'practices', and should really precede the sections relying on model outputs (eg around page 35-37). Can a section 5.2.3 be inserted on methods for analysis of coastal systems? (Sarah Cornell, Stockholm Resilience Centre)	This paragraph has been removed.
1197	46867	5	41	20	41	21	Rephrase to "…strategies need to combine scenarios…" (Genevra Harker, HarmonicQuay Ltd)	This paragraph has been removed.
1198	40392	5	41	27	0	0	Should be "LiDAR." (Laura Petes, National Oceanic and Atmospheric Administration)	NA.
1199	44770	5	41	27	41	28	Change “Inundation models benefits from the increased availability of more accurate lidar data of coastal elevations (Gesch, 2009),…” into “Inundation models benefits from the increased availability of more accurate lidar data of coastal elevations (Gesch, 2009; Zhang 2011),…” (Keqi Zhang, Florida International University)	This paragraph has been removed
1200	44781	5	41	27	41	28	Zhang, K., Dittmar, J., Ross, M., & Bergh, C. (2011). Assessment of sea level rise impacts on human population and real property in the Florida Keys. Climatic Change, 107, 129-146 (Keqi Zhang, Florida International University)	NA – see #1199.
1201	37932	5	41	48	0	0	I can appreciate the concern expressed at this stage over the lack of information to sustain some of these integrative models even for developed coasts, but the central concern should be how pragmatic models with which developing coasts can move forward, are to be found, given the lack of understanding about the socio-ecological structuring between land and people in developing coastal zones. We are almost back to a basic anthropological requirement of trying to understand how people behave, superimposed upon a need to understand how their coast behaves. I am uncertain after 40 years of studying coasts that I can say we understand the latter dimension in developing (ie often tropical) coasts, but I am certain we do not understand the former dimension, and that is where approaches to adaptation will founder. See M. Mustafa Saroar, Jayant K. Routray 2012 Impacts of climatic disasters in coastal Bangladesh: why does private adaptive capacity differ? Regional Environmental Change. March 2012, Volume 12, Issue 1, pp 169-190 for a supportive viewpoint. (Julian Orford, Queen\\\'s University, Belfast)	Certain principles and examples of best practice have emerged from coastal adaptation to climate change and discussed in Section 5.5.4 Adaptation practice.
1202	48113	5	41	50	41	54	This paragraph should be rewritten; If its focus is on acidification, sea-level rise does probably not need to be mentioned (other effects such as warming might be more relevant). More importantly, it should be made clear that the provided reference (Kelly 2011) is only about local effects that adds to global acidification, not a way to address acidification due to increasing CO2 concentrations itself, so that it cannot replace mitigation (and the term 'local mitigation' should not be used without clarification). A link with chapter 6 may be useful re other aspects of acidification. (Philippe Marbaix, Université catholique de Louvain)	This paragraph has been removed.
1203	39458	5	42	0	42	0	Explain the focus on economic/financial costs. Lines 25-26 need considerable further explanation. (Sarah Cornell, Stockholm Resilience Centre)	This paragraph has been removed.
1204	42922	5	42	2	42	10	There are a number of decision support tools/frameworks emerging for coastal adaptation that deserve a mention e.g. possible reference for mangroves and climate change: http://www.worldwildlife.org/climate/Publications/WWFBinaryitem27746.pdf here or section 5.5.2.6 see also aid agencies developing guidance e.g. USAID pdf.usaid.gov/pdf_docs/PNADO614.pdf -perhaps recognition of the burgeoning (grey) literature in 5.6.1? (Cassandra Brooke, WWF-International)	EBA (with appropriate references) is included with DRR, CBA and ICZM in Section 5.5.4 Adaptation practice.
1205	46868	5	42	4	42	4	Add apostrophe: managers'. (Genevra Harker, HarmonicQuay Ltd)	NA – see #1203.
1206	38592	5	42	13	43	7	Inclusion of a Case Study of The Cost of Adapting to Cyclones in Coastal Bangladesh in a Changing Climate of Bangladesh will enrich the discussion on Adaptation Costs in Section 5.6.3. Please note the following references: World Bank (2012): The Cost of adapting to Extreme Weather Events in a Changing Climate at http://siteresources.worldbank.org/INTBANGLADESH/Resources/BDS28ClimateChange.pdf and World Bank (2010): Economics of Adaptation to Climate Change- Bangladesh at http://climatechange.worldbank.org/sites/default/files/documents/EACC_Bangladesh.pdf (Susmita Dasgupta, The World Bank)	Yes, we have done so. Plus we now have a box on CBA in Bangladesh
1207	38593	5	42	13	43	7	Other examples of adaptation costs in developing countries (Mozambique, Samoa, Vietnam) can also be found in the country case studies conducted by the World Bank (2010): Economics of Adaptation to Climate Change at http://climatechange.worldbank.org/sites/default/files/documents/EACC_Mo (Susmita Dasgupta, The World Bank)	Thanks. As this is a section on global cost, we can not include many national estimates.
1208	42799	5	42	13	43	7	There is a substantial amount of overlap between this section and section 5.5 Suggest merging the two. (Sofia Bettencourt, World Bank)	We now have reduced this overlap.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1209	49791	5	42	13	43	8	Again, refer to Neumann (2010) and modify the text accordingly. (Susanne Moser, Susanne Moser Research & Consulting)	We have now included this study in the table of regional studies.
1210	44160	5	42	15	42	16	skip sentence; further work is needed almost everywhere (Anne Holsten, Potsdam Institute for Climate Impact Research)	Done.
1211	46869	5	42	25	42	25	"assessments" rather than "assessment". (Genevra Harker, HarmonicQuay Ltd)	We have removed this sentence now.
1212	37933	5	42	26	0	0	Exactly as identified above. It is not necessarily an either/or argument as the choice has to be shaded by development status. (Julian Orford, Queen\\\'s University, Belfast)	We have removed this sentence now.
1213	46870	5	42	26	42	26	Replace word "…take a disaggregated…" (Genevra Harker, HarmonicQuay Ltd)	We have removed this sentence now.
1214	42046	5	42	44	42	47	This seems to be a repeat of a previous sections. In fact a large part is becoming redundant and it might be good to simplify. (Liette Vasseur, Brock University)	Yes. We have removed this sentence now.
1215	50285	5	42	45	42	45	"likely" -- If being used as calibrated uncertainty language per the guidance for authors (reflecting a probabilistic basis for assignment), this term should be italicized. The author team should avoid casual usage of this reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Yes, Done.
1216	40393	5	42	46	0	0	Should be "adaptation" (not "adaption"). (Laura Petes, National Oceanic and Atmospheric Administration)	Yes, Done.
1217	50286	5	42	46	42	46	It would be helpful to clarify any scenarios or assumptions relevant to these estimates of adaptation costs. (Katharine Mach, IPCC WGII TSU)	Yes, Done.
1218	38594	5	42	47	42	52	Adaptation deficits (deficits in dealing with current climate-related risks) are of serious concern for a number of low and middle income nations; and it needs more attention in the IPCC WGII AR5 report than just a brief reference (Reference: Line 47-52, page 42). For an example on quantification of adaptation deficits vis-à-vis incremental adaptation to climate change, note the case study of coastal Bangladesh in World Bank (2012): The Cost of adapting to Extreme Weather Events in a Changing Climate at http://siteresources.worldbank.org/INTBANGLADESH/Resources/BDS28ClimateChange.pdf and World Bank (2010): Economics of Adaptation to Climate Change- Bangladesh at http://climatechange.worldbank.org/sites/default/files/documents/EACC_Bangladesh.pdf (Susmita Dasgupta, The World Bank)	We have now added this as an additional reference. As this section is on global costs, we can not include more on this here due to restrictions in space.
1219	40394	5	43	2	43	7	This makes it sound like no work has been conducted on valuation of ecosystem services, when in fact, there have been quite a few efforts, particularly over recent years. This paragraph should include some of those examples. Also, this should emphasize the potential value of integrating ecosystem-based adaptation approaches to avoid additional harm to ecosystems and enhance the resilience of adjacent communities through harnessing nature-based solutions. (Laura Petes, National Oceanic and Atmospheric Administration)	This point is well taken, but there are few efforts at the global scale – which this section is about. We now now mention the benefits of EBA.
1220	35319	5	43	8	43	9	The thrust of section 5.6.3 is that adaptation costs money. Perhaps in a short paragraph here, this should be noted as a fallacy; many (subsistence) communities are accustomed to adapting to environmental change that threaten their food supply, and many are becoming astonished to find that the "costs" of adaptation are exclusively calculated in monetary terms by the global community. (Patrick Nunn, University of New England)	The section on adaptation has been newly drafted. We think that the new version including specific sections on community based adaptation practices may contribute to address your point
1221	40247	5	43	10	0	0	A major constrain is the lack of awareness, knowledge and skills among the engineers and the decesion makers. There is an effort to develop a solution oriented education method and material, that provides these two target groups and the local societies/ NGOs with specific knowledge and implementable solutions to promote ICZM and adaptation to climate changes in local level. The project is LITUSGO, www.litusgo.eu (POLYXENI LOIZIDOU, AKTI PROJECT AND RESEARCH CENTRE)	A new section 5.5.5. on constraints and limits has been drafted. This constraint is properly acknowledge
1222	53856	5	43	10	0	0	Please ensure consistency with chapter 16. (Kristie L. Ebi, IPCC WGII TSU)	Done. See new 5.5.5.
1223	49792	5	43	10	44	36	this section could use updating with more recent references, Biesbroeck et al (2011) in Climate Law; Moser and Ekstrom (2012) (sent to TSU), Eisenack et al (in press) in Mitigation and Adaptation Strategies etc. This then would also affect some good studies that should be listed in Table 5-7. (Susanne Moser, Susanne Moser Research & Consulting)	Referece by Biesbroeck has been included. Table 5.7 has been removed for space limits, but the most representative contents have been included within the text
1224	37469	5	43	12	0	0	I do not think the quote was the principal finding of AR4 chapter 6. Even if it was given some prominence, it seems to have been rather taken out of context of the other things in that chapter (Colin Woodroffe, University of Wollongong)	Removed. New section drafted. 5.5.5.
1225	45882	5	43	18	43	20	Please add this paper on institutional limits to extreme sea-level rise: Olsthoorn, X., Van der Werff, P., Bouwer, L.M. & Huitema, D. (2008). Neo-Atlantis: The Netherlands under a five-metre sea level rise. Climatic Change, 91(1-2), 103-122. (Laurens Bouwer, Vrije Universiteit Amsterdam)	Severl papers on institutional limits are already refer to in the new text.
1226	38189	5	43	25	43	34	This is excellent text but should come earlier in the chapter when saltmarsh dynamics are being discussed. This is not the right place for it. (THOMAS SPENCER, University of Cambridge)	this part of the text has beeen kept at the end of the new 5.5.5. section as an example of natural adaptation limits
1227	48112	5	43	27	43	31	Height of SLR involved in the "conservative" and "aggressive" SLR cases should be clarified (just referring to A1B is insufficient, as for a given emission scenario there is substantial uncertainty). (Philippe Marbaix, Université catholique de Louvain)	Has been partially rephrased.
1228	37470	5	43	30	0	0	reword hard-pressed (Colin Woodroffe, University of Wollongong)	has been reworded
1229	46871	5	43	30	43	30	Explain SLR the first time is appears. (Genevra Harker, HarmonicQuay Ltd)	SLR has been replaced by sea level rise everywhere in the text
1230	37471	5	43	41	0	0	reword thread (Colin Woodroffe, University of Wollongong)	reworded
1231	40647	5	43	52	0	0	Table 5.7, There is also a lack of information on the Latin-America and the Caribbean region. There are examples available (Carmen Lacambra Segura, Grupo La era)	Limited information available in journal papers

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1232	50287	5	44	4	44	36	For the conclusions numbered across these lines, the author team should consider using calibrated uncertainty language to indicate its degree of certainty in the findings. (Katharine Mach, IPCC WGII TSU)	Done. See new 5.5.5.
1233	46716	5	44	11	44	13	Add reference to Leiserowitz et al. 2012. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Contens properly covered in the new section 5.5.5
1234	37472	5	44	30	44	36	Are the points in this paragraph related. Reconsider how this is worded (Colin Woodroffe, University of Wollongong)	Done. See page 49 in SOD
1235	37473	5	44	41	0	0	Coastal areas cannot be preoccupied (except perhaps by previous occupants). (Colin Woodroffe, University of Wollongong)	Does no longer apply
1236	37474	5	44	51	44	52	Reword 'momentum involved in sea level rise' (Colin Woodroffe, University of Wollongong)	Reworded
1237	37934	5	45	8	45	15	Absolutely! (Julian Orford, Queen\\\'s University, Belfast)	OK
1238	37475	5	45	20	0	0	what does that line mean?? (Colin Woodroffe, University of Wollongong)	Table has been removed and contents included within the text
1239	38558	5	45	23	0	0	Section 5.7. This section concerns itself primarily with the uncertainties in the degree (and impact) of sea level rise. I would argue that there is far more uncertainty in the ecological responses of even well studied systems such as rocky shores and coral reefs. The major sources of uncertainty, from an ecological perspective, are: 1) effects of multiple stressors, 2) effects of interacting species, and 3) the degree to which evolutionary processes may overcome some of the potentially negative effects of climate change. (Christopher Harley, University of British Columbia)	Partially addressed in new section 5.6. (page 53, lines 4-13)
1240	52850	5	45	23	0	0	Section 5.7. Uncertainties and Data Gaps Heading is misleading as section covers information gaps rather than just data gaps (John Hay, University of the South Pacific)	Amended to "Information gaps, data gaps and research needs".
1241	38597	5	45	23	45	23	Absence of reliable geo-coded data on coastal adaptation measures in low and middle income countries is another significant data gap. (Susmita Dasgupta, The World Bank)	Not considered; geo-coded data in the form of an 'atlas' would not be critical.
1242	40644	5	45	25	0	0	There is also a need to foster research into coastal ecosystems based adaptation. Mangroves, salrmarshes and reefs are protect natural the shoreline and under normal circumstances could be able to adapt to changing sea levels and recover from storms. There is a need for research at the global, regional and local level on how these ecosystems can act as barriers or protect shorelines. For more details see: -Lacambra, C., Spencer, T., Moeller, I., 2008. Literature review: tropical coastal ecosystems as coastal defences. The Role of Environmental Management in Disaster Risk Reduction and Climate Change Adaptation Annex 1 Case studies. ProAct Network -Spalding, M., Ruffo, S., Lacambra, C., Meliane, I., Hale, L.Z., Shepard, C., y Beck, M. (2012). The role of ecosystems in coastal protection: adapting to climate change and coastal hazards. Journal of Marine research Aceptado en Abril 15 2011(in press). -Lacambra C., Fries., D, Spencer, T. and Moeller I (2013). Bioshields: mangrove ecosystems as resilient natural coastal defences. UNU Bonn -McIvor, A.L., Möller, I., Spencer, T. and Spalding. M. (2012) Reduction of wind and swell waves by mangroves. Natural Coastal Protection Report 2012-01. Cambridge Coastal Research Unit Working Paper 40. Published by The Nature Conservancy and Wetlands International. 27 pages. Natural Coastal Protection Series ISSN 2050-7941. URL: http://www.naturalcoastalprotection.org/documents/reduction-of-wind-and-swell-waves-by-mangroves (Carmen Lacambra Segura, Grupo La era)	EBM considered and combined with DRR. See #1258. Discussed in Section 5.5.4 Adaptation practice.
1243	47556	5	45	25	0	0	Not sure why coastal ecosystems are referred to here - given that the chapter does not purport to be purely concerend wit ecological impacts of climate change. Some sense that ecosystem and system are being used to mean the same thing perhaps … (Jon French, University College London)	Amended without reference to ecosystems – referred to as "soft options".
1244	37476	5	45	31	45	35	Improve this or leave it out - these are bland statements (Colin Woodroffe, University of Wollongong)	Sentences deleted.
1245	44771	5	45	43	45	44	Change "For example, for many sedimentary coasts, one fundamental question is the sediments and rate of sedimentation in response to sea level rise." into "For example, for many sedimentary coasts, one fundamental question is the sediments and rate of accretion and erosion in response to sea level rise." (Keqi Zhang, Florida International University)	Not necessary. Not used in SOD.
1246	38190	5	45	45	45	45	for an example of just such an approach see Brooks SM and Spencer T 2012 Shoreline retreat and sediment release in response to accelerating sea level rise: measuring and modelling cliffline dynamics on the Suffolk Coast, UK. Global and Planetary Change 80-81, 165-179 [doi:10.1016/j.gloplacha.2011.10.008] (THOMAS SPENCER, University of Cambridge)	Too detailed. More general reference, Ashton et al 2008, is used.
1247	42800	5	45	47	45	53	The impact of sea level rise does not require LIDAR data. The European Space Agency (ESA) is carrying out assessments of both sea level rise as well as historical coastline losses using high resolution satelite imagery (which unfortunately, needs to be compared to the lesser resolution imagery available in the past). (Sofia Bettencourt, World Bank)	Not necessary. Not used in SOD.
1248	43699	5	45	50	0	0	LIDAR data is available in countries other than the USA even though it is not immediately available on web pages such as www.csc.noaa.gov and sealevel.climatecentral.org . Much of the Australian coastline has been done and people at NCCARF and CSIRO are thinking about making that more accessible to the public. Then in NZ several local governments have compiled significant amounts of LIDAR data over the last five years and two of them are now using this as a means to develop better public communication about coastal risks. (Martin Manning, Victoria University of Wellington)	Not necessary. Not used in SOD.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1249	37477	5	45	50	45	51	Reword, the US is not the only place to have LiDAR (Colin Woodroffe, University of Wollongong)	Not necessary. Not used in SOD.
1250	41697	5	45	50	45	53	I do not think this example is good. Although it is the truth, IPCC can not indicate this since there are possible not pure scientific reasons why other countries did not distribute the data of their coast. (Rui Zhang, Xiamen University)	Not necessary. Not used in SOD.
1251	42047	5	45	51	0	0	Lidar is used in more than the United States. Large part of Canada Atlantic coast is done. I would revise this. See previous references. (Liette Vasseur, Brock University)	Not necessary. Not used in SOD.
1252	38595	5	45	51	45	53	In the section 5.7 on Uncertainties and Data Gaps, the report mentions “The local data required for SLR assessment are also not easily available. For example, LIDAR data are only available for the USA coasts (NOAA Digital Coast Data Access Viewer website) but not for the rest of the world yet.” (Reference: line 51-53, page 45). In addition, it should be explicitly mentioned that digital elevation (90m SRTM DEM V4 or 30m ASTER) data, commonly used for SLR impact assessments, gives altitude in 1-meter increments, preventing researchers from sub-meter SLR modeling. One can interpolate the elevation data for sub-meter SLR modeling, but in that case, precision of the estimates would be difficult to justify. Elevation prodcuts derived from radar (e.g. SRTM) can capture the height of the features on the ground, which may be above the ground surface elevation. Two land cover classes that are especially susceptible to this height inaccuracy are urban and dense vegetation. (Susmita Dasgupta, The World Bank)	Not necessary. Not used in SOD.
1253	50288	5	46	5	46	5	"likely" -- The chapter team should avoid casual usage of this reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Deleted.
1254	43700	5	46	8	0	0	This paragraph could still be made a bit more specific. Uncertainty in SLR is not going to go away and, as ice sheet loss starts to become a more significant component, the rate of change can become more variable this century. E.g. see the very recent paper on the Greenland ice sheet: Kjær, K.H., et al., 2012: Aerial Photographs Reveal Late–20th-Century Dynamic Ice Loss in Northwestern Greenland. Science, 337, 569-573. (Martin Manning, Victoria University of Wellington)	Too specific and a more general reference, Kettle 2012, is used.
1255	38596	5	46	8	46	10	In the section 5.7 on Uncertainties and Data Gaps, the report mentions “Generally, studies do not consider the full range of possible relative sea-level changes and often exclude a potential large contribution of ice sheet melting to sea-level rise…”. (Reference: Line 8-10, Page 46.) It should also be noted that future projections of sea-level rise in case of a potential large contribution of ice sheet melting is also not readily available. To the best of the reviewer’s knowledge, what is known is “The Greenland and Antarctic ice sheets contain enough water to raise the sea level by almost 70m; and If the Greenland ice sheet were to melt completely, it would raise average sea level by approximately 7 meters.” (Susmita Dasgupta, The World Bank)	See response to #1254 for uncertainty in SLR.
1256	43701	5	46	9	0	0	Uncertainty is also being dealt with by the insurance industry and a major issue is already whether insurance premiums for coastal property will vary from one house to the next one or whether this will become a means for developing community responsibility to risk management. What has happened to Hull city with the UK government and insurance industry initially agreeing in 2007 to cover 10,000 flood prone and low lying homes now looks like it requires this to be an ongoing discussion - eg see http://www.reuters.com/article/2012/07/11/britain-floods-insurance-idUSL6E8IB7J920120711 (Martin Manning, Victoria University of Wellington)	Not necessary. Not used in SOD.
1257	37478	5	46	35	46	38	This risk reduction statement seems to just be inserted here out of context, it then gets picked up again in the conclusion. It needs to be better integrated, particularly if it really is as important as it appears in the final summary of this chapter. (Colin Woodroffe, University of Wollongong)	The text has been revised to look at risk assessment in more general terms.
1258	41698	5	46	35	46	38	Is this paragraph meaningful to the section? (Rui Zhang, Xiamen University)	Not necessary. Used in Adaptation practice section 5.5.4.
1259	42801	5	46	35	46	38	The benefits of combining the two disciplines vastly outnumber the existing challenges, particularly given the limited institutional capacity of most developing countries, and the complementarity of the CCA and DRR bodies of knowledge. This should be reflected more strongly on the statement. As it stands, the sentence gives the impression that the differences need to be resolved before DRR can become a useful tool for CCA. DRR tools are already widely used in coastal CCA. (Sofia Bettencourt, World Bank)	Not necessary. Used in Adaptation practice section 5.5.4.
1260	37479	5	46	47	0	0	Knowledge platform is jargon (Colin Woodroffe, University of Wollongong)	Amended to read “adaptation knowledge network”.
1261	42802	5	46	47	46	53	For the Pacific, restate "SPREP, SOPAC and SPC networks". SOPAC and SPC hold a longer body of knowledge on coastal adaptation practices than SPREP. (Sofia Bettencourt, World Bank)	Amended to read Pacific Islands.
1262	41699	5	46	49	46	53	It is not appropriate for IPCC to say some unions or actions are good and others are not good. (Rui Zhang, Xiamen University)	Amended as in the text.
1263	39459	5	47	0	0	0	In the gaps seciont, it might be worth emphasising that although Earth system models linking physical and biogeochemical process representations at the global level have advanced spectacularly in the last decade, including many conceptual and computational improvements (resolution, regional processes for terrestrial ecosystems/land surface) since AR4, coastal zones are still profoundly problematic, and now present one of the blockage points for future development. Key biogeochemical processes and Earth system exchanges can only be modelled with better conceptual representations of coastal zones. (Sarah Cornell, Stockholm Resilience Centre)	Not considered as this has been mentioned in second and third paragraphs.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1264	37480	5	47	1	47	2	This sentence doesn't seem to say anything (Colin Woodroffe, University of Wollongong)	Sentence deleted.
1265	41700	5	47	2	47	7	This is a good point but should be mentioned with more general angle. The citation of Li et la., 2011 is not convinced. (Rui Zhang, Xiamen University)	An opinion. Reason or alternative reference not given. Other references are given and discussion is extended.
1266	40819	5	47	7	47	7	Delete "mostly caused by increased concentration of CO2 in the atmosphere," WG II i not competent for such statement (Michel Petit, CGIET rue de Bercy)	Deleted.
1267	41701	5	47	10	0	0	Section 5.8. The conclusion section should have more words on the "factors and impacts". (Rui Zhang, Xiamen University)	This section has been removed. Conclusions have been summarized at the end of the relevant sections or included as part of the Executive Summary
1268	52852	5	47	10	0	0	Section 5.8. Conclusion This section needs to be, and can be, more comprehensive and informative (John Hay, University of the South Pacific)	Section removed
1269	39147	5	47	10	47	31	This conclusion is too inconclusive. In particular, the reader will want to know what is new in our knowledge of cc impact on coastal system - given that there has been "much research" since the last report. (Thomas Reuter, University of Melbourne)	Section removed
1270	46873	5	47	10	47	31	The Conclusion needs to have a more definite recommendation. This highlights the uncertainties, and the multitude of possibilities, but it needs to give a more structured opinion on what to do now. (Genevra Harker, HarmonicQuay Ltd)	Section removed
1271	37481	5	47	12	47	14	What a disappointing opening to the conclusion. Of course sea-level rise is critical on the coast. Four IPCC assessments have repeatedly pointed that out. How can this chapter conclude with such a weak observation 'that SLR would seem to be critical'? (Colin Woodroffe, University of Wollongong)	Section removed
1272	38191	5	47	12	47	14	I do think it is difficult to say this and then not say i) how sea level rise thoughts have changes since AR4 and ii) what this chapter sees as the envelope of sea level change (THOMAS SPENCER, University of Cambridge)	Section removed
1273	40395	5	47	12	47	14	Confusing wording; needs to be edited. What does "the rate of sea-level rise would seem to be critical" mean? How is this related to the previous clause on extremes? Needs more clarifty and cohesion. (Laura Petes, National Oceanic and Atmospheric Administration)	Section removed
1274	44189	5	47	12	47	31	As for section 5.8, the conclusion seems too simple or abstract. If I were an ordinary reader or policy maker, I hope to know what the critical or key points are or could be taken. (RONGSHUO CAI, Third Institute of Oceanography)	Section removed
1275	37482	5	47	16	0	0	Jibberish (Colin Woodroffe, University of Wollongong)	Section removed
1276	46872	5	47	16	47	16	Missing word. Is it meant to be "…are more critical than…."? (Genevra Harker, HarmonicQuay Ltd)	Section removed
1277	52851	5	47	16	47	16	Statement is unclear, and thus (potentially) misleading - critical from what perspective? (John Hay, University of the South Pacific)	Section removed
1278	38192	5	47	16	47	17	some might have this the other way around - that climate change exacerbates human impacts… (THOMAS SPENCER, University of Cambridge)	Section removed
1279	40396	5	47	16	47	17	Confusing wording; needs to be edited. Is the intent to say that humans are more important than ecosystems? Could this instead focus on the important interactions between humans and coastal ecosystems - e.g. humans depend on coastal ecosystems for their livelihoods, etc. - but ecosystems are being degraded and depleted by humans, etc. (Laura Petes, National Oceanic and Atmospheric Administration)	Section removed
1280	43288	5	47	16	47	17	This sentence is not clear in what it wants to say (wording) and sounds biased with respect to the importance of ecosystems in relation to human systems. Is such a bias needed? Both ecosystems and human systems are interdependent and at stake. This interdependence indicates none of them is more important than the other. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	Section removed
1281	46692	5	47	27	47	31	Various approaches from DRR and Early Warning has also emerged that blends coastal resilience and risk management. One good example that can be mentioned here which has emerging applications for coastal climate adaptation is the "Coastal Community Resilience (CCR" approach which is often highly prescribed approach/tool for coastal resilience-assessment and preparedness. More information can be found on this at: http://www.csc.noaa.gov/psc/riskmgmt/resilience.html (Atiq Kainan Ahmed, Asian Disaster Preparedness Center (ADPC))	Section removed
1282	49793	5	47	29	47	29	policy=prescriptive language; you can speak to the fact that adaptation is underway instead. (Susanne Moser, Susanne Moser Research & Consulting)	Section removed
1283	50289	5	47	29	47	29	For the statement ending on this line, it would be preferable to use a formulation that avoids potential interpretations of policy prescription. (Katharine Mach, IPCC WGII TSU)	Section removed
1284	42048	5	47	30	47	31	Interesting that CCA and DRR are nly mentiined here. It should have been before no? (Liette Vasseur, Brock University)	Section removed
1285	37483	5	47	31	0	0	If this is so key how come it is only mentioned once, see my comment page 46, line 35-38, (Colin Woodroffe, University of Wollongong)	Section removed
1286	41702	5	47	34	0	0	Section FAQ. To be more logic, change the sequence of 6 FAQs to 5.1, 5.4, 5.2, 5.5, 5.6 and 5.3. (Rui Zhang, Xiamen University)	FAQ #4 and #5 have been deleted as they are more WG1 FAQs. Remaining FAQs sequenced as suggested.
1287	40397	5	47	37	0	0	There are many non-climatic stressors as well. Instead, this should say "The major climate-related stressors affecting coastal ecosystems are. . ." (Laura Petes, National Oceanic and Atmospheric Administration)	Agreed. The SOD has been revised accordingly.
1288	36277	5	47	37	47	37	greenhouse-gaz instead of CO2 ? (Déborah Idier, BRGM)	We prefer to keep the FAQ simple. Hence "CO2 was omitted.
1289	50290	5	47	37	47	38	This statement is not correct for extreme weather and climate events, which require a more conditional or qualified framing here. (Katharine Mach, IPCC WGII TSU)	"extreme weather and climate events" has been deleted

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1290	38193	5	47	39	47	39	I think I would summarize the issue by saying that sea level change alters the accommodation space (both vertically and laterally) and then there is the question of how sediments (carbonates / minerogenic sediments / organic sediments) do, or do not, fill that space (THOMAS SPENCER, University of Cambridge)	This is an FAQ which needs to be kept simple with a non-technical language. Hence, this suggestion was not implemented.
1291	50291	5	47	40	47	40	The author team should consider if use of "all" on this line is overly generalized and would benefit from further qualification. (Katharine Mach, IPCC WGII TSU)	The SOD as been modified to include this perspective..
1292	37935	5	47	44	0	0	This is a reasonable scenario for sand-based temperate systems but is not totally relevent for mud-based tropical systems. To answer this FAQ there is a need to find coastal behaviour models that are appropriate for the hotspots that AR5 is directing attention towards. (Julian Orford, Queen\\\'s University, Belfast)	As a FAQ the scenario is meant to be simple and general and not specific.
1293	52853	5	47	44	47	44	How is climate change INFLUENCING coastal erosion? (John Hay, University of the South Pacific)	Amended as in the text.
1294	38194	5	47	45	47	52	I would have liked to have seen these statements near the beginning of the chapter; they set a useful process framework (THOMAS SPENCER, University of Cambridge)	Amended as a more simple sentence related to climate change for FAQ 2.
1295	35628	5	47	46	47	47	I would write: the forcing agents that create erosion are waves, currents and winds (e.g. during storms) as well as sea level. (For example, the cause of erosion can be a defense structure affecting longshore transport; it might be more precise to discuss the "forcing agents that create erosion".) (Goneri Le Cozannet, BRGM)	Amended as in the text.
1296	42803	5	47	46	47	47	Coastal erosion is also highly dependent on river sediment transport and deposits on coastal/delta areas. As such, it is also dependent on river delta morphology, and flooding. An unsustainable extraction of beach sand (through mining) leads to disequilibrium in the amount that is re-deposited by rivers. Consequently, the beach can be lost, leaving the coast more exposed to erosion. Coastal structures and settlements can also interrupt this flow and lead (indirectly) to erosion. This is why non-climate factors can be major causes of coastal erosion (Sofia Bettencourt, World Bank)	Amended as in the text.
1297	50292	5	47	46	47	47	The author team should consider if further qualification would be beneficial here--the pairing of "any" and "will" in the statement suggests a very high level of certainty that this result applies in all places (and perhaps there may be complexities related to tectonic uplift?). (Katharine Mach, IPCC WGII TSU)	“Any” and “will” deleted.
1298	35629	5	47	46	47	48	This is according to the Bruun rule (1968). However, with small changes in sea level, these processes should be dominated by other (like sediment budget issues). Note (for improving accuracy of the response) that the question here is : "how is climate change contributing to coastal erosion" (not "how WILL climate change affect coastal erosion"). (Goneri Le Cozannet, BRGM)	FAQ is how climate change influences coastal erosion. See below for Bruun rule.
1299	37484	5	47	46	47	48	This Bruun type comment, with no qualification, is a gross over-simplification. It should not be stated as a fact like this in the FAQ (Colin Woodroffe, University of Wollongong)	Amended to read “Based on the simplest model..”
1300	36278	5	47	50	47	52	I do not understand why "Changes in wave … erosion." Indeed, for a constant wave height, if the wave incidence decrease, then the longshore sediment flux will decrease, keeping more or less the same longshore patterns, and thus will have smaller gradients, and thus smaller erosion/accretion. If the wave height is decreasing and the wave incidence is increasing, we can not deduce before hand what would be the results on longshore sediment flux gradients : the longshore sediment flux need to be computed to know if the gradient will increase or not. Thus, I think that the sentence "Changes ... erosion" desserves some improvements/clarification. (Déborah Idier, BRGM)	Amended as in the text.
1301	35452	5	48	0	0	0	FAQ 5.4 it seems odd to have this FAQ posed here and covered so briefly, when it is really a WGI issue and is pretty well discussed in WGI Ch13. (David Vaughan, British Antarctic Survey)	FAQ 5.4 deleted.
1302	52855	5	48	0	0	0	References: National Communications are a rich source of information; this seems to have been overlooked (John Hay, University of the South Pacific)	Agreed.
1303	44772	5	48	0	78	0	References cited by the above comments: (Keqi Zhang, Florida International University)	NA
1304	44774	5	48	0	78	0	References cited by the above comments:: Hallermeier, R.J. (1981). A profile zonation for seasonal sand beaches from wave climate. Coastal engineering, 4, 253-277 (Keqi Zhang, Florida International University)	Included in SOD References
1305	44775	5	48	0	78	0	References cited by the above comments:: Hong, B., & Shen, J. (2012). Responses of estuarine salinity and transport processes to potential future sea-level rise in the Chesapeake Bay. Estuarine, Coastal and Shelf Science (Keqi Zhang, Florida International University)	Included in SOD References
1306	44776	5	48	0	78	0	References cited by the above comments: Knutson, T.R., McBride, J.L., Chan, J., Emanuel, K., Holland, G., Landsea, C., Held, I., Kossin, J.P., Srivastava, A., & Sugi, M. (2010). Tropical cyclones and climate change. Nature Geoscience, 3, 157-163 (Keqi Zhang, Florida International University)	Included in SOD References
1307	44777	5	48	0	78	0	References cited by the above comments: Krauss, K.W., From, A.S., Doyle, T.W., Doyle, T.J., & Barry, M.J. (2011). Sea-level rise and landscape change influence mangrove encroachment onto marsh in the Ten Thousand Islands region of Florida, USA. Journal of Coastal Conservation, 1-10 (Keqi Zhang, Florida International University)	The section has been re-written, re-organised and expanded to improve coverage
1308	44778	5	48	0	78	0	References cited by the above comments: Leatherman, S.P., Zhang, K., & Douglas, B.C. (2000a). Sea level rise shown to drive coastal erosion. Eos, Transactions American Geophysical Union, 81, 55-57 (Keqi Zhang, Florida International University)	Included in SOD References
1309	44779	5	48	0	78	0	References cited by the above comments: Leatherman, S.P., Zhang, K., & Douglas, B.C. (2000b). Sea level rise shown to drive coastal erosion: A reply. Eos, Transactions American Geophysical Union, 81, 437-441 (Keqi Zhang, Florida International University)	Included in SOD References

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1310	44782	5	48	0	78	0	References cited by the above comments: Zhang, K., Douglas, B.C., & Leatherman, S.P. (1997). East coast storm surges provide unique climate record. Eos, Transactions American Geophysical Union, 78, 389-397 (Keqi Zhang, Florida International University)	Included in SOD References
1311	37936	5	48	1	0	0	There is a worrying ethnocentricity in the continual use of the concept of 'planning'. This concept is alien at the grass level of developing coasts - so what should be there instead? This is a major problem for AR5 - its not just terminology, but a radical re-evaluation of how adaptation is to be operationalised in a sustainable way. (Julian Orford, Queen\\\'s University, Belfast)	This is noted and a sentence is added to this FAQ : It should be noted that at the grass-root level of many developing countries, planning does not exist or workable yet but requires a re-evaluation of how to make adaptation in a more sustainable way.
1312	38195	5	48	1	48	7	planning also lessens the chances of responses to the impact of extreme events being simply reactive (THOMAS SPENCER, University of Cambridge)	Amended as in the text.
1313	38196	5	48	9	48	9	what about ongoing land movements from isostatic adjustments? (THOMAS SPENCER, University of Cambridge)	NA - FAQ has been deleted.
1314	35630	5	48	9	48	14	An other important cause of sea level rise spatial variability are coastal subsidences or uplift (see Wöppelmann et al. 2007) Woppelmann, G., Miguez, B. M., Bouin, M. N., and Altamimi, Z.: Geocentric sea-level trend estimates from gps analyses at relevant tide gauges world-wide, Global and Planetary Change, 57, 396-406, 10.1016/j.gloplacha.2007.02.002, 2007. (Goneri Le Cozannet, BRGM)	NA - FAQ has been deleted.
1315	46393	5	48	9	48	14	I would include the factor of subsidence in regard to relative sea level rise as this is what the public generally consider as sea level rise. (Andrew Mather, eThekwini Municipality)	NA - FAQ has been deleted.
1316	46717	5	48	9	48	14	FAQ 5.4: The term sea level rise is used here, yet you seem to forget that relative sea level is decreasing in some regions (e.g. southeast Alaska - see http://tidesandcurrents.noaa.gov/sltrends/sltrends.html). This should be revised to either include a sentence about isostasy in Alaska. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	NA - FAQ has been deleted.
1317	38197	5	48	16	48	16	see comment on page 25, line 23 (THOMAS SPENCER, University of Cambridge)	NA - FAQ has been deleted.
1318	47557	5	48	16	48	16	FAQ 5.4 This answer omits one of the most obvious causes of regional variation in sea-level rise, namely vertical land movements. (Jon French, University College London)	NA - FAQ has been deleted.
1319	43289	5	48	17	0	0	I think the answer to this question should also include other drivers and especially temperature. I would also question whether sea level rise should be called the primary impact. A differentiation of effects would help present a more balanced view. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	NA - FAQ has been deleted.
1320	42804	5	48	19	48	20	See comments above on ensuring consistency with SREX on cyclone intensity trends. (Sofia Bettencourt, World Bank)	NA - FAQ has been deleted.
1321	42908	5	48	19	48	20	Please consider revising the statement “Scientists disagree on whether tropical cyclones will become more intense and/or frequent in the future” in view of the latest scientific findings and relevant assessment in WGI of AR5 (e.g., Box 14.3 of Chapter 14). References : - Knutson, T. R., J. McBride, J. Chan, K. A. Emanuel, G. Holland, C. Landsea, I. Held, J. Kossin, A. K. Srivastava, and M. Sugi, 2010: Tropical cyclones and climate change. Nature Geoscience, 3, doi: 10.1038/ngeo779. - Ying, M., T. R., H. Kamahori, and T. C. Lee, 2012: Impacts of Climate Change on Tropical Cyclones in the Western North Pacific Basin. Part II: Late 21st Century Projections, to be published in Tropical Cyclone Research and Review, Volume 1, No.2 (Sai-ming Lee, Hong Kong Observatory)	NA - FAQ has been deleted.
1322	50293	5	48	19	48	20	For this statement, the chapter team should use the findings of working group 1 (5th assessment report) to indicate overall scientific perspectives on projections of changes in cyclone occurrence. (Katharine Mach, IPCC WGII TSU)	NA - FAQ has been deleted.
1323	52854	5	48	24	48	31	This response needs strengthening - refer to climate-aware policies and plans, including structure and land use plans, EIA, building codes etc; need to highlight importance of monitoring and compliance (John Hay, University of the South Pacific)	Amended as in the text.
1324	39286	5	52	0	0	0	p. 5-52 de groot et al 2002 and not groot (Gianluca SARA, University of Palermo)	Ref not included in SOD
1325	44161	5	60	50	60	51	literature not found: Hinkel et al. 2012 (Anne Holsten, Potsdam Institute for Climate Impact Research)	Hinkel, J., D.P.v. Vuuren, R.J. Nicholls, and R.J.T. Klein, 2012: The effects of mitigation and adaptation on coastal impacts in the 21st century.
1326	36121	5	65	16	65	18	Section 6.4.1.1.1. The general production of 142 billion tons concern both fresh and marine water, focusing on marine water in chapter 4 should be more logical, with 99 billion, among wich 20 % for aquaculture and 80 % from fishing among which 71 % for human consumption consumptions (FAO) (Olivier Le Pape, Agrocampus Ouest)	NA - Wrong chapter??
1327	36122	5	65	30	65	31	Section 6.4.1.1.1. The presented aquaculture production of 52 billion tons concern both fresh and marine water, focusing on marine water in chapter 4 should be more logical, with 20 billion from marine waters With this number the rest of the paragraph is ok but it is false now as aquaculture is mainy continental (FAO) (Olivier Le Pape, Agrocampus Ouest)	NA - Wrong chapter??

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1328	38969	5	78	0	0	0	Table 5.1: I think it unlikely that increased salinity to evaporation is likely to be an important driver of change in mangrove and saltmarsh, given that changes in rainfall are likely to dominate salinity rather than pan evaporation rates. However, higher temperatures are likely to promote the poleward expansion of mangrove of which there is some tentative evidence already (Wilson N.C. and Saintilan N. (2012) The leaf phenology of Rhizophora stylosa at its southern limits in eastern Australia Aquatic Botany 101 8-17). Mangroves replacing saltmarsh may make shorelines more resilient to rising sea-levels(Comeaux R.S., Allison M.A. and Bianchi T.S. 2012 Mangrove expansion in the Gulf of Mexico with climate change: implications for ewetland health and resitacne to rising sea levels Estuarine, Coastal and Shelf Science 96 81-95). Higher temperatures may also inhibit germination of cold-dependent species of saltmarsh (Saintilan N. (2009). Biogeography of Australian Saltmarsh Plants. Austral Ecology 34, 929-937). (Neil Saintilan, Office of Environment and Heritage)	We have now included a section on range shifts and expansion of mangroves
1329	38559	5	79	0	0	0	Table 5.1 desperately needs ocean acidification to be added as one of the "climate system changes". It is probably at least as important as warming, and more imporant globally than the rest of the variables on the list (don't take it from me - see the Halpern et al. 2008 Science paper that is cited in this chapter). (Christopher Harley, University of British Columbia)	This table has been omitted due to lack of space.
1330	38968	5	79	0	0	0	Table 5.1 : Increasing temperate effects on Mangroves: I suggest you make the Organism/ecosystem "Mangroves and Saltmarshes" throughout Table 5.1 as saltmarshes are currently left out, and the impacts described for mangroves generally apply to saltmarshes also. (Neil Saintilan, Office of Environment and Heritage)	The section has been re.written, re-organised and expanded to improve coverage
1331	39129	5	79	0	0	0	Table 5.1. A very useful table. In Seabird section on page 81: Smithers et al 2003 is for Great Barrier Reef (not Western Australia) and does not provide evidence of range changes in seabirds. Wynn et al. 2007 is for the Atlantic region - not Western Australia, as implied by the 4th column. A more recent reference for poleward shifts in seabirds is: Dunlop 2009 Marine Ornithology 37:99-105 (referenced in Chambers et al. 2011: Emu 111:235-251). Chambers et al. 2011 also provides more up to date references for altered breeding seasons and breeding success for seabirds. (Lynda Chambers, Australian Bureau of Meteorology)	This table has been omitted due to lack of space.
1332	39130	5	79	0	0	0	Table 5.1. It would also be good to include impacts on shorebirds throughout the table, i.e. those nesting and foraging in coastal environments. Eg Maclean et al. 2008 Global Change Biology 14:2489-2500. (Lynda Chambers, Australian Bureau of Meteorology)	This table has been omitted due to lack of space.
1333	39131	5	79	0	0	0	Table 5.1. (p 82) Effect of strong winds on seabirds also reviewed in Chambers et al. 2011 (Lynda Chambers, Australian Bureau of Meteorology)	This table has been omitted due to lack of space.
1334	39132	5	79	0	0	0	Table 5.1. (p83) Impact of stratification on seabirds also in Ropert-Coudert et al. 2009 Proc Royal Soc London B Biological Sciences 276: 4105-4109. (Lynda Chambers, Australian Bureau of Meteorology)	This table has been omitted due to lack of space.
1335	39133	5	79	0	0	0	Table 5.1 (p86) under Increasing Intensity of Storms for seabirds also include increased mortality and reduced breeding success, see Chambers et al. 2011 Emu 111: 235-251 for further references. (Lynda Chambers, Australian Bureau of Meteorology)	This table has been omitted due to lack of space.
1336	39134	5	79	0	0	0	Table 5.1 (p86) under Rising Sea Levels, seabirds. Additional reference Chambers et al. 2011 Emu 111:235-251 (Lynda Chambers, Australian Bureau of Meteorology)	This table has been omitted due to lack of space.
1337	47558	5	79	0	0	0	Table 5.1: noted that this is to be revised to focus on coastal rather than marine systems, but revision needs to ensure that coverage of coastal systems is balanced - low latitude coasts are very well represented here at the moment, mid to high latitude coasts rather less so (Jon French, University College London)	This table has been omitted due to lack of space.
1338	50294	5	79	0	0	0	Table 5-1. For the 3rd and 4th columns of this table, the author team should consider presenting information with greater specificity. For expected impacts, where possible it may be desirable to indicate specific changes as projected for different time frames, scenarios, geographic areas, etc. For observed changes, relevant time frames and geographic areas should be specified. Additionally, the chapter team may wish to consider the degree to which it would be preferable to integrate material presented here into the assessment in the chapter text, rather than in the context of this long table. It seems incorporation in the chapter text would increase specificity and rigor of detail in the sections, perhaps in a format more accessible to the reader. (Katharine Mach, IPCC WGII TSU)	This table has been omitted due to lack of space.
1339	46706	5	79	0	86	0	Table 5-1: I would suggest including changes in pH and salinity as climate system changes. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	This table has been omitted due to lack of space.
1340	37485	5	79	1	0	0	this remains a marine table (Colin Woodroffe, University of Wollongong)	This table has been omitted due to lack of space.
1341	38970	5	83	0	0	0	Table 5.1: mangroves (and saltmarsh): "Breakdown in control" not sure what you mean by this- how are currents "controlled"? Changing currents will provide opportunities as well as challenges for existing mangrove populations. (Neil Saintilan, Office of Environment and Heritage)	The section has been re.written, re-organised and expanded to improve coverage
1342	36123	5	83	42	84	40	Section 6.3. this part of the conclusion is only based on few examples but the core of the chapter present more general insights, especially about polar drift and their consequences. I suggest to draw more general patterns. (Olivier Le Pape, Agrocampus Ouest)	The page must be wrong and it is not clear which prt of the FOD the referee is referring to.
1343	38971	5	84	0	0	0	Table 5.1: Mangroves (and saltmarsh): fourth point "Mangrove community distribution increase due to altered salinity, nutrient and sediment loading, (suggest): " with possible decline in saltmarsh with mangrove encroachment". Eslami-Andargoli L, Dale PER, Sipe N, Chaseling J (2010) Local and landscape effects on spatial patterns of mangrove forest during wetter and drier periods: Moreton Bay, Southeast Queensland, Australia. Estuarine, Coastal and Shelf Science 89, 53-61. (Neil Saintilan, Office of Environment and Heritage)	The section has been re.written, re-organised and expanded to improve coverage

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1344	38972	5	84	0	0	0	Table 5.1 fifth point. Suggest in column 3 you add "increased rate of retreat with erosion", and corresponding point in column 4 would be "increased intensity of storms may promote mangrove dieback and shoreline recession". The relevant paper in Column 5 would be Cahoon, D. R., Hensel, P., Rybczyk, J., McKee, K. L., Proffitt, C. E. and Perez, B. C. (2003), Mass tree mortality leads to mangrove peat collapse at Bay Islands, Honduras after Hurricane Mitch. Journal of Ecology, 91: 1093–1105. (Neil Saintilan, Office of Environment and Heritage)	This table has been omitted due to lack of space.
1345	38973	5	86	0	0	0	Table 5.1: Rising sea levels. Mangrove (and saltmarsh): Third point, column 3 suggest "Gains and losses of mangrove habitat" rather than "Loss of mangrove habitat", with the corresponding point in Column 4 being "Increased frequency and severity of extreme sea levels may promote migration, or result in mortality where migration is impeded" (Neil Saintilan, Office of Environment and Heritage)	The section has been revised to address both losses and gains
1346	38974	5	86	0	0	0	Table 5.1 Rising Sea levels (fourth point in column 4): "Landward migration in reponse to slow sea-level ris allowing the maintenance of relative height, though may encroach on saltmarsh", with the reference in Column 5 being Saintilan N. and Williams R. 1999. Mangrove transgression into saltmarsh environments in New South Wales, Australia. Global Ecology and Biogeography 8 117-124 (Neil Saintilan, Office of Environment and Heritage)	This table has been omitted due to lack of space.
1347	36124	5	86	41	86	41	FAQ 6.5. tens or even hundreds of kilometers per decade (as previous text in the chapter, page 48 line 48 speaks about 200 km) (Olivier Le Pape, Agrocampus Ouest)	wrong chapter
1348	37486	5	87	0	0	0	How useful is this table. It has the Maldives listed but not Kiribati or Tuvalu because they fall below the population threshold. Is there a logic to that threshold? (Colin Woodroffe, University of Wollongong)	The table is result of one particular studies, the methodology of which can of course be questioned just like the methodology of any other study. Nevertheless we find it useful to have an exemplary list showing exposed countries.
1349	36125	5	87	8	87	9	FAQ 6.5. cholera seems out of the scope of chapter 5 and is not mentionned in the chapter before thus could not be a conclusion here (Olivier Le Pape, Agrocampus Ouest)	NA - Wrong chapter
1350	36126	5	87	40	87	41	FAQ 6.5. in the chapter this clearly explained that some change in biogeography of PP will occur but there is no concensus about the general decreasing trend (Olivier Le Pape, Agrocampus Ouest)	NA - Wrong chapter
1351	44742	5	89	0	0	0	Table 5-4: I suggest adding the case studies of the impacts of sea level rise on South Florida (Zhang, 2011) and on the Florida Keys (Zhang et al., 2011) to the table. These two studies analyze the nonlinear inundation process and its effect on exposed population and property using LiDAR DEMs. (Keqi Zhang, Florida International University)	US studies (South Florida) added to Table 5.5.
1352	46711	5	89	0	92	0	Table 5-4: North America is missing links to the CVI index (http://woodshole.er.usgs.gov/project-pages/cvi/) and sea level trends data (http://tidesandcurrents.noaa.gov/sltrends/sltrends.html). Individual states also have a number of programs (e.g. http://www.nyc.gov/html/planyc2030/html/home/home.shtml, http://www.climatechange.ca.gov/). At the national park service we are telling park managers to plan for a 1 m SLR. (Maria Caffrey, National Park Service and University of Colorado, Boulder)	US studies (SoVI) added to Table 5.5.
1353	49794	5	92	0	0	0	Table is remarkably incomplete for North America; needs to list Weiss et al.; Tebaldi et al 2012; Martinich et al (2012); Neumann et al (2012) in Coastal Zone Management; and various studies published in a 2011 special issue of Climatic Change on California. In fact thare are many more studies for the US (a thorough search and - soon - the coastal chapter from the US National Climate Assessment (draft to be released on December 1, 2012) will help fill this gap). (Susanne Moser, Susanne Moser Research & Consulting)	US studies (Weiss et al 2011, Newmann et al 2010) added to Table 5.5.
1354	50295	5	92	0	0	0	Table 5-4. As a minor point, the casual usage of "likely" on this page should be avoided. (If the term is being used per the guidance for authors, reflecting a probabilistic basis for its assignment, it should be italicized.) (Katharine Mach, IPCC WGII TSU)	Revised.
1355	40398	5	93	0	0	0	Table 5-6: In community-based adaptation: What does "pro-ppor adaptation" mean? Needs clarification. (Laura Petes, National Oceanic and Atmospheric Administration)	Table deleted.
1356	42629	5	93	0	0	0	Table 5-6: Possible additional traits to consider: planning timeframe, funding entities/mechanisms, information about results? (Erin Coughlan, Red Cross / Red Crescent Climate Centre)	Table deleted.
1357	49795	5	93	0	0	0	Table 5-5 - there is an important bais in only listing global studies, as Neumann (2010) clearly lays out, so I would suggest you plan on a more substantial table or at least discuss its limitations in the text. (Susanne Moser, Susanne Moser Research & Consulting)	Accompany text in Section 5.5.3 to explain Table 5.8.
1358	50296	5	94	0	0	0	Table 5-7. The author team may wish to consider if further categorization of barriers presented in this table would facilitate comparisons across countries. Additionally, it would be helpful to clarify what the bold text represents by moving the note at the end of the table to the figure caption. (Katharine Mach, IPCC WGII TSU)	Table deleted and material used in text.
1359	39460	5	94	0	96	0	This table needs further synthesis - it might be data rich, but it is (comprehensible) info poor. As it stands, it looks like information is presented in a random order - perhaps sort by country/region, or categorise concerns and then 'map' geographical incidence. (Sarah Cornell, Stockholm Resilience Centre)	Table deleted and material used in text.
1360	46715	5	94	0	96	0	Table 5-7: For the references relating to the U.S., the 6 Americas report Leiserowitz et al. 2012 should also be cited as evidence of a lack of public perception about climate change and coastal hazards (flooding and hurricanes in particular). (Maria Caffrey, National Park Service and University of Colorado, Boulder)	Table deleted and material used in text.
1361	46961	5	95	0	0	0	Table 5-7. For Bangladesh, the number of barrier mentioned here are neither appropriate or accurate. For example, one of the barriers mentioned is "Perception that SLR and its impacts are not an immediate threat to livelihood" is not quite correct. I have visited coastal areas and found people are aware of this changes and they want to rise the embankment. (A K M Saiful Islam, Bangladesh University of Engineering and Technology)	Table deleted and material used in text.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1362	35320	5	95	0	95	0	Under Pacific Atolls, I would encourage reference to (and information from) Mortreux and Barnett (Global Environmental Change, 2009). (Patrick Nunn, University of New England)	Table deleted and material used in text.
1363	47559	5	96	0	0	0	Table 5.7: UK entry - there is also a paper by Parrott A & Burningham H (2008) Opportunities of, and constraints to, the use of intertidal agri-environment schemes for sustainable coastal defence: A case study of the Blackwater Estuary, southeast England. Ocean and Coastal Management 51(4), 352-367 doi:10.1016/j.ocecoaman.2007.08.003. that makes some of the same points as Ledoux but with some subtle angles - e.g. mismatch between long-term planning horizon associated with adapting to sea-level rise and short-term time frame for financial compensation offered to agricultural landowners in the UK; and also a questioning of the costs of alternative protection options by landowners. This provides a slightly more nuanced perspective than Ledoux et al 2005 that is also generalisable beyond its immediate case study. (Jon French, University College London)	Table deleted and material used in text.
1364	50297	5	97	0	0	0	Table 5-8. The author team is strongly encouraged to assign calibrated uncertainty language to the findings in the columns for implications of adaptation and mitigation, as noted in a placeholder in the final column. (Katharine Mach, IPCC WGII TSU)	Table deleted and material used in text.
1365	40399	5	99	0	0	0	Figure 5-1: This figure makes it look like low-lying areas or only those at or below sea level, when "low-lying" can also mean above sea level but at low elevation (and these areas are also threatened; not just those at or below sea level). Should be clarified. (Laura Petes, National Oceanic and Atmospheric Administration)	This figure has been revised and simplified.
1366	50298	5	99	0	0	0	Figure 5-1. It would seem preferable to either indicate relevant climatic drivers more comprehensively or remove the incomplete note at the bottom of the figure regarding sea level rise, storm surge, etc. (Katharine Mach, IPCC WGII TSU)	This figure has been revised and simplified.
1367	53909	5	99	0	0	0	Figure 5-1: It is not clear what the arrows (Marine influence and terrestrial influence) are illustrating. If would be more informative if the following statement in the text could be incorporated graphically: “For the purpose of this assessment, coastal systems and low-lying areas include estuaries, coastal plains dominated by mangrove forests and salt marshes, and coastal seas. Its boundary towards the open ocean is at the continental shelf break, which lies between 110 and 146 m depth (…), making the marine part of the coastal zone a narrow band with an average width of 34 km.” (Yuka Estrada, IPCC WGII TSU)	The section has been re-written, re-organised and expanded to improve coverage
1368	35321	5	99	0	99	0	In Figure 5-1, suggest "wetland" instead of "Paddy field". (Patrick Nunn, University of New England)	This figure was largely revised and simplified.
1369	40400	5	100	0	0	0	Figure 5-3: Is there a figure that's easier to understand? Many readers won't be familiar with DIN:PO4 ratios so won't implicitly understand what that's documenting. The pH panel is also a little hard to understand with the 3 different lines - what does each line depict, or is each line just a regression for a particular segment of the time series? (Laura Petes, National Oceanic and Atmospheric Administration)	This figure has been omitted for the sake of space.
1370	43290	5	100	0	0	0	Figure 5-3: has no broken line mentioned in the legend. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	This figure has been omitted for the sake of space.
1371	47560	5	100	0	0	0	Figure 5.3 - there is no broken line in the figure, as alluded to by the caption (Jon French, University College London)	This figure has been omitted for the sake of space.
1372	53910	5	100	0	0	0	Figure 5-3: It would be helpful for readers to have further clarification on this figure. It is not clear which ones are broken lines that are illustrating the change in pH expected from an increase in atmospheric CO2 alone. Abbreviations (e.g, DIN) should be spelled out in the figure itself or in the caption. (Yuka Estrada, IPCC WGII TSU)	This figure has been omitted for the sake of space.
1373	43292	5	100	0	103	0	It seems to me that the chapter would benefit from inclusion of some further conceptual graphs reflecting the contents and inter-dependencies discussed in the various chapter sections. The figures are not uniformly distributed across the chapter. (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	We did try. See Figure 5.6.
1374	39361	5	101	0	0	0	Figure 5-4 What is being attributed? climate change, anthropogenic influences? (Gareth S Jones, Met Office)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.
1375	40401	5	101	0	0	0	Figure 5-4: Seems like there would be "Medium" confidence in attribution of species shifts based on the weight of evidence, but perhaps there's been further analysis of confidence done by the IPCC to indicate that it is only "Low." Why is coastal erosion separated out based on location? That adds a layer of complexity to this figure that will make it more difficult to understand. Perhaps this should just be focused on global impacts, whereas regional variation could be shown in a separate figure? (Laura Petes, National Oceanic and Atmospheric Administration)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.
1376	47561	5	101	0	0	0	Figure 5.4 - agree this needs developing. I like the basic concept here. The coastal types need to be differentiated on a more robust basis - latitude is probably not the best approach here. One might think of key coastal landform types (e.g. soft rock cliff - high confidence in detection, low confidence in attribution; saltmarsh - very high for detection and low for attribution etc) rather than different parts of the world. This could be quite an important figure that ties the findings ofa substantial portion of this chapter together. (Jon French, University College London)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.
1377	49796	5	101	0	0	0	Figure 5-4; I have some serious doubts about the usefulness of this figure. Coastal systems are systemically influenced by multiple drivers, thus attribution of impacts to human-driven climate change/SLR will almost always be low. That sends a very wrong message to decision-makers. (Susanne Moser, Susanne Moser Research & Consulting)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.
1378	35322	5	101	0	101	0	In Figure 5-4, "small islands" are in key but not on figure. (Patrick Nunn, University of New England)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.

#	#	Ch	From Page	From Line	To Page	To Line	Comment	Response
1379	43291	5	102	0	0	0	Figure 5-5: has no A,B,C,D (Hans-O. Pörtner, Alfred-Wegener-Institute for Polar and Marine Research)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.
1380	50299	5	102	0	0	0	Figure 5-5. The chapter team should label the images presented here (A-D) to facilitate their clear introduction in the figure caption (panel by panel). (Katharine Mach, IPCC WGII TSU)	This figure has been revised. New figure shows the selected key DnA phenomena. Attribution is only for the influence of climate change. The explanaton is shown in new sub-section 5.4.4.
1381	40402	5	103	0	0	0	Figure 5-7: Hard to see a "paradigm shift" without understanding what the previous approach was. Perhaps recommend changing the figure description to avoid that phrase unless it shows before and after some kind of shift in governance and approach. (Laura Petes, National Oceanic and Atmospheric Administration)	Title of Figure has been changed.