SROCC First Order Draft Expert Review Comments - Chapter 6							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
258	6	0	0			This chapters lack two key items: (1) examining impacts due to multi-hazards, for example stagnant air with high temperature leading poor air quality, high temperature and extreme winds leading to extreme sand storms, etc. (see Lombardo and Ayyub 2014 https://doi.org/10.1061/AJRUA6.0000812 and Lombardo and Ayyub 2017 https://doi.org/10.1061/AJRUA6.0000909; and (2) providing an economic framework for risk management (see Gilbert and Ayyub 2016 https://doi.org/10.1061/AJRUA6.0000867) [Bilal Ayyub, USA]	Rejected - both air quality and sand storms are considered out of scope as not ocean or cryosphere
1038	6	0	0			Consider replacing "extra-tropical" with "extratropical" throughout the chapter, or alternately replace "extratropical" with "extra-tropical". I suggest the former to be consistent with previous IPCC reports. [Vineel Yettella, USA]	Accepted - using extratropical throughout as this seems like what has been used in previous reports
2264	6	0	0			Chapter 6 should include information on carbon dioxide removal as a means of establishing long-term climate stability and reducing some of the committed warming from past, present, and future emissions. Less carbon dioxide removal (CDR) is necessary with greater mitigation of emissions. Combined with CO2 and SLCP mitigation, CDR will limit cumulative emissions, resulting in a 50% chance of staying under 1.5 ºC and drastically reducing the likelihood of catastrophic warming in the long-term. Without CDR, mitigating CO2 and SLCPs will only result in a 50% probability of staying below 2ºC. (Xu Y. & Ramanathan V. (2017) Well below 2 °C: Mitigation strategies for avoiding dangerous to catastrophic climate changes, PROC. NAT'L. ACAD. SCI. 114(39):10315–10323; Hansen J., et al. (2017) Young people's burden: requirement of negative CO2 emissions, EARTH SYSTEMS DYNAMICS 8:577–616; Committee to Prevent Extreme Climate Change (2017) Well Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change.) [Kristin Campbell, USA]	Rejected - this is discussed at length in the Special Report on 1.5 degrees
2370	6	0	0			Table 6.1: Consider changing Climate component to "committed partial WAIS collapse"—can have higher confidence in committed change, even if collapse doesn't occur within 21st century. Need to capture POTENTIAL for cross critical threshold. [Kristin Campbell, USA]	Rejected - there is not enough suitable literature to address this point. Also, such potential changes are likely to be highly scenario dependent
2374	6	0	0			The Climate and Clean Air Coalition (CCAC) should be included because the CCAC is the only international institution that specializes in reducing SLCPs, which are critical to slowing the rate of warming and near-term climate protection. The CCAC utilizes four strategies in attaining its goals that are similar to the strategies proposed throughout this assessement: enabling transformative action, mobilizing support, increasing financial resources, and enhancing scientific knowledge. (Climate & Clean Air Coalition (CCAC) (2017) ANNUAL REPORT: 2016–2017; see also, e.g., Climate & Clean Air Coalition (CCAC) (2017) Cooling & Refrigeration (HFC) Initiative progress report: 2016–2017; Climate & Clean Air Coalition (CCAC) (2017) Diesel Initiative progress report: 2016–2017.) [Kristin Campbell, USA]	Rejected - considered out of scope for this chapter

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2390	6	0	0			Chapter 6 should include information on carbon dioxide removal as a means of establishing long-term climate stability and reducing some of the committed warming from past, present, and future emissions. Less carbon dioxide removal (CDR) is necessary with greater mitigation of emissions. Combined with CO2 and SLCP mitigation, CDR will limit cumulative emissions, resulting in a 50% chance of staying under 1.5 ºC and drastically reducing the likelihood of catastrophic warming in the long-term. Without CDR, mitigating CO2 and SLCPs will only result in a 50% probability of staying below 2ºC. (Xu Y. & Ramanathan V. (2017) Well below 2 °C: Mitigation strategies for avoiding dangerous to catastrophic climate changes, PROC. NAT'L. ACAD. SCI. 114(39):10315–10323; Hansen J., et al. (2017) Young people's burden: requirement of negative CO2 emissions, EARTH SYSTEMS DYNAMICS 8:577–616; Committee to Prevent Extreme Climate Change (2017) Well Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change.) [Durwood Zaelke, USA]	Rejected - this is discussed at length in the Special Report on 1.5 degrees
2496	6	0	0			Table 6.1: Consider changing Climate component to "committed partial WAIS collapse"—can have higher confidence in committed change, even if collapse doesn't occur within 21st century. Need to capture POTENTIAL for cross critical threshold. [Durwood Zaelke, USA]	Rejected - there is not enough suitable literature to address this point. Also, such potential changes are likely to be highly scenario dependent
2500	6	0	0			The Climate and Clean Air Coalition (CCAC) should be included because the CCAC is the only international institution that specializes in reducing SLCPs, which are critical to slowing the rate of warming and near-term climate protection. The CCAC utilizes four strategies in attaining its goals that are similar to the strategies proposed throughout this assessement: enabling transformative action, mobilizing support, increasing financial resources, and enhancing scientific knowledge. (Climate & Clean Air Coalition (CCAC) (2017) ANNUAL REPORT: 2016–2017; see also, e.g., Climate & Clean Air Coalition (CCAC) (2017) Cooling & Refrigeration (HFC) Initiative progress report: 2016–2017; Climate & Clean Air Coalition (CCAC) (2017) Diesel Initiative progress report: 2016–2017.) [Durwood Zaelke, USA]	Rejected - considered out of scope for this chapter
3614	6	0	0	0	0	To clearly include upfront that rising carbon dioxide (CO2) levels due to human activities such as the burning of fossil fuels have made the world's surface ocean approximately 30% more acidic than in pre-industrial times and the need for long term studies. CO2 reduces the availability of chemical building blocks that are necessary for the shells and exoskeletons of marine organisms that underpin key marine ecosystems and that CO2-related stressors on the oceans include ocean deoxygenation, i.e. the loss of dissolved oxygen from the ocean and ocean warming. Suggest as well to discuss issue of methane sources from the shelf and deep and semi deep waters. [E. Salif Diop, Senegal]	Rejected - these issues are covered in other chapters of the SROCC
5612	6	0	0			In general, although we are not familiar with the state-of-the-art literature concerning climate extremes, we are happy with the wide variety of extremes and abrupt changes that are described in this chapter. Particularly changes in ENSO, the AMOC and coral reefs are topics more widely discussed in mainstream media, so it is good to see these being assessed from a scientific perspective. We also agree with the structure of the chapter. The table summarizing abrup changes, irreversibility and tipping points is also helpful and seems comprehensive. [Roderik Van De Wal, Netherlands]	Noted
5614	6	0	0			The contents of the executive summary seems to properly reflect the contents of the chapter. [Roderik Van De Wal, Netherlands]	Noted

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5696	6	0	0			This review has been prepared in collarboration with , Bram 't Veen, Daan Reijnders and Rupert Holzinger all IMAU, UU [Roderik Van De Wal, Netherlands]	Noted
11124	6	0	0			Recently, the risk of low water temperature by cold wave associated with polar vortex, which should be related with arctic warming, have been increased around the coastal area of mid-latitude. Especially, aquaculture economic losses by low water temperature were frequently occurred. I hope to described about the extreme low water temperature by cold wave related with climate change in this chapter. [Inseong Han, Republic of Korea]	Rejected - this is an interesting topic but we do not have enough space for a comprehensive discussion of the links between Artic climate and weather variability. We expect this will be comprehensively covered in AR6
11756	6	0	0	0	0	It was convenient but not enough [Hanieh Zargarlellahi, Iran]	Noted
12888	6	0	0			Chapter 6 should include information on carbon dioxide removal as a means of establishing long-term climate stability and reducing some of the committed warming from past, present, and future emissions. Less carbon dioxide removal (CDR) is necessary with greater mitigation of emissions. Combined with CO2 and SLCP mitigation, CDR will limit cumulative emissions, resulting in a 50% chance of staying under 1.5 ºC and drastically reducing the likelihood of catastrophic warming in the long-term. Without CDR, mitigating CO2 and SLCPs will only result in a 50% probability of staying below 2ºC. (Xu Y. & Ramanathan V. (2017) Well below 2 °C: Mitigation strategies for avoiding dangerous to catastrophic climate changes, PROC. NAT'L. ACAD. SCI. 114(39):10315–10323; Hansen J., et al. (2017) Young people's burden: requirement of negative CO2 emissions, EARTH SYSTEMS DYNAMICS 8:577–616; Committee to Prevent Extreme Climate Change (2017) Well Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change.) [Gabrielle Dreyfus, USA]	Rejected - this is discussed at length in the Special Report on 1.5 degrees
12994	6	0	0			Table 6.1: Consider changing Climate component to "committed partial WAIS collapse"—can have higher confidence in committed change, even if collapse doesn't occur within 21st century. Need to capture POTENTIAL for cross critical threshold. [Gabrielle Dreyfus, USA]	Rejected - there is not enough suitable literature to address this point. Also, such potential changes are likely to be highly scenario dependent
12998	6	0	0			The Climate and Clean Air Coalition (CCAC) should be included because the CCAC is the only international institution that specializes in reducing SLCPs, which are critical to slowing the rate of warming and near-term climate protection. The CCAC utilizes four strategies in attaining its goals that are similar to the strategies proposed throughout this assessement: enabling transformative action, mobilizing support, increasing financial resources, and enhancing scientific knowledge. (Climate & Clean Air Coalition (CCAC) (2017) ANNUAL REPORT: 2016–2017; see also, e.g., Climate & Clean Air Coalition (CCAC) (2017) Cooling & Refrigeration (HFC) Initiative progress report: 2016–2017; Climate & Clean Air Coalition (CCAC) (2017) Diesel Initiative progress report: 2016–2017.) [Gabrielle Dreyfus, USA]	Rejected - considered out of scope for this chapter
15310	6	0	0			I suggest to addition a page that including the Abbreviations list at the beginning of this chapter [Maitham Sultan, Iraq]	Rejected - a glossary will be included. The IPCC style guidance does not allow this
15312	6	0	0			all figures are good [Maitham Sultan, Iraq]	Noted
15314	6	0	0			Linking the contribution of anthropogenic climate changes with the events that occurred during recent time periods is good thing and depending on the accurate information [Maitham Sultan, Iraq]	Noted
17166	6	0	0			frequently occurred severe hazards (extremes) in cryosphere, such as snowstorm, Drifting Snow, glacial lake outburst, avalanches etc. should be included in this chapter. [Jiahong Wen, China]	Rejected - these topics are discussed in Chapter 2
17290	6	0	0			include from the Paris Agreement issues related to "adaptation" and "loss and damage" sections [Cecilia Conde, Mexico]	Rejected - discussed in cross-chapter box on key concepts

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17292	6	0	0			move 6.4 before 6.3 section: more robust evidence, more structured [Cecilia Conde, Mexico]	Rejected - evidence is of a similar level in both cases. 6.3 comes before 6.4 as the chapter procees from shorter to longer time scales
21520	6	0	0			Examples are given where coordination has been problematic (e.g. Vanuatu and Sendai). Consider giving an example where Governance and Policy Options, Risk Management, Including Disaster Risk Reduction and Enhancing Resilience has been a positive and productive experience--perhaps Greenland? http://www.abc.net.au/news/2018-01-29/greenland-land-of-ice-embracing-climate-change/9365316 [Tseng Rose, USA]	Rejected - information in the report should be based on published literature and other reports. Web sites are not valid sources of information
24282	6	0	0			Please add specific cross-references to other chapters/sections. [Hans-Otto Poertner and WGII TSU, Germany]	We have added more but probably more can be done.
24444	6	0	0			Add Extreme Sea Levels (storm surges) Chapter 4 [Hans-Otto Poertner and WGII TSU, Germany]	Added to Exec Summ statement
24446	6	0	0			The ecosystem section is poorly developed and could focus on specifc abrupt and irreversible changes eg coral reef degradation - chapter 4 and 5, loss of biodiversity in regions (specify which) - chapter 5 [Hans-Otto Poertner and WGII TSU, Germany]	Accepted - this has now been updated in coordination with Ch4 and 5
24462	6	0	0			Improved treatment of risks from mountain cryoaphere change is needed [Hans-Otto Poertner and WGII TSU, Germany]	Accepted - now boosted in Table 6.1 with cross refs to chapter 2
24612	6	0	0			The chapter subsections appear nicely integrated across WGs. A comparison of risks across sectors, e.g. by constructing burning ember diagrams, onsidering adaptation capacity and limits would provide a nice concluding summary. [Hans-Otto Poertner and WGII TSU, Germany]	Accepted - now added section 6.10 summary and knowledge gaps
16014	6	0	34	35		"systems or sectors may be vulnerable at the outset of an extreme event due to the nature or severity of the hazard..." this is a narrow interpretation of the concept of 'vulnerability' , at odds with the definition/framing in AR5: 'the propensity or predisposition to be adversly affected' . I suggest reframing the concept of vulnerability in Chapter 6 to decouple it from event. [Olivia Warrick, New Zealand]	Accepted - we have a consistent framing across the SROCC (see figure 6.1)
11668	6	1	1			Thank you for compiling such a nice draft chapter - congratulations. [Fortunat Joos, Switzerland]	Noted
12836	6	1	1	1	1	General comment - cryosphere-related issues underrepresented (short section 6.2). Cryosphere chapters (2,3) are not adopting a lens (compatible with this chapter) of abrupt changes when presenting these issues. Hence the assessment of abrupt changes is unbalanced across the report. [Stephen Cornelius, UK]	Noted - the assessment of abrupt changes in the other chapters should be enhanced in the SOD
12838	6	1	1	1	1	Ch 6 appears conceptually constrained by the IPCC risk framework, which is geared to disaster risk and management, but is not an adequate means to assess and adequately portray the risks of abrupt changes so they can inform actions to limit global warming (and hence managing the risk of abrupt changes themselves). The chapter focuses on detection and attribution without attempting to point out differences in risk of triggering abrupt changes with different emission/temperature scenarios. There is admittedly often a paucity of science to disentangle this space, but then the risk associated with “what we don’t know” are not taking into account. [Stephen Cornelius, UK]	Noted - we are, to a certain extent, constrained by the literature in this regard as the reviewer notes.
21102	6	1	1	67	1	General Comment on the whole chapter: Are dust and sand storms not considered as extremes? [Pavla Dagsson Waldhauserova, Iceland]	Rejected - yes they are extreme but are out of scope

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13262	6	1	25	1	53	The sub-section on Impacts in Sections 6.3 to 6.7 are all different, although the discussions consider both natural and human systems. Natural Systems should include physical and climate systems and thus there should not be a need to name them seperately. [Zelina Zaiton Ibrahim, Malaysia]	Rejected - the definition of physical system in this report is confined to variables such as temperature, winds, rainfall etc. Natural systems is intended to include e.g. ecosystems
15632	6	1	28	1	55	There is no need to add to points after the number of each section [Hamid Nebdi, Morocco]	Rejected - this is the IPCC style
22928	6	1	31	1	57	Consider more cold-regions oriented chapter, e.g. describing polar lows and ice storms instead of tropical storms [Vasily Smolyanitsky, Russian Federation]	Rejected - this is an interesting topic but we do not have enough space for a comprehensive discussion of such phenomena. We expect this will be comprehensively covered in AR6
13264	6	1	41	2	2	The sub-sections on Risk Management have different titles. Risk managment should already encompass adaptation and resilience. This coverage should be discussed in Chapter 1 and applied consistently across the report. [Zelina Zaiton Ibrahim, Malaysia]	Rejected - we feel that modifying the setion titles in each case gives more information for the reader for what can be found there
13266	6	1	41			Monitoring and evaluation considerations should be included for all of the chapters. [Zelina Zaiton Ibrahim, Malaysia]	Accepted - yes, they are
15630	6	1	42			The abreviation ENSO is used before its defined [Hamid Nebdi, Morocco]	Accepted - rectified
15634	6	2	5	2	5	There is no need to add to points after the number of each section [Hamid Nebdi, Morocco]	Rejected - this is the IPCC style
15636	6	2	9	2	12	A space between FAQ and the number must be done [Hamid Nebdi, Morocco]	Accepted - rectified
16028	6	2	10			Overall, 6.5.1.1 seems to (indirectly) make the assumption that extreme ENSO events cause severe impacts. However, the relationship is not that straightforward (at least, in many Pacific islands) and this should be reflected. Weaker ENSO events can cause significant rainfall anomalies leading to severe and compounding impacts etc. Further, Murphy et al, 2013 show that different types of El Nino event are an important influence on rainfall and temperature impacts. This should be reflected in the section. [Olivia Warrick, New Zealand]	Accepted - this is now addressed in the revised text
622	6	3	0			Replace "ecosystems to" with "ecosystems beyond" [William Clarke, Australia]	Accepted
4764	6	3	0	3		Footnote: Line 1, no need of word 'assessed'. [Qudsia Zafar, Pakistan]	Rejected - this is standard IPCC text
12862	6	3	1	3	5	resilincy or implementation of risk management [Md Enamul Haque, Italy]	Rejected - we prefer the text as is
13926	6	3	1	5	7	This Executive Summary does not inlude specific details/quantification of the changes discussed and therefore may not have much relevance to the policy-maker. Also, relevent region-specific impacts of some of the phenomenon are missing. The impact on human and natural system does not come through. Also, after discussing extreme and abrupt events and their impacts on human and natural systems, what comes next? [Debra Roberts and Durban Team, South Africa]	Taken into account. Hopefully we have included more specific and quantitative information in comparison with the FOD.
23160	6	3	1	3	5	This paragraph should be expanded to introduce or summarize more about this chapter. [Aimé Fournier, USA]	Rejected - space in the Exec. Summary is limited. A full introduction can be found in Section 6.1
24284	6	3	1			Avoid subheadings in ES for each single paragraph [Hans-Otto Poertner and WGII TSU, Germany]	Accepted - now removed
24440	6	3	1			These bullets points are all long and contain multiple key messages, consider splitting [Hans-Otto Poertner and WGII TSU, Germany]	Accepted - we have tried to avoid long sentences

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10122	6	3	3	5	7	As mentioned in page 21, line 15, "major scientific progress in probabilistic extreme event attribution research makes possible to attribute...." ... consider to include a sentence about this in the summary because attribution will be a key tool/element for future understanding of environmental change-associated processes. The term "attribution" just appears in the summary, asociated to Inter-Ocean Exchanges and Global Change (page 4, lines 13-16) [APECS Group Review, Germany]	Accepted - it is now included in the opening sentence on cyclones
11142	6	3	3		5	The first paragraph of an Executive Summary should summarize the general findings of this chapter. The introductory paragraph consisting a single line is too brief. [Mastura Mahmud, Malaysia]	Rejected - the Exec. Summary is a a summary of the general findings of the chapter.
844	6	3	4	3	4	to identifity régional hot spot remplaced by: to identifity régional sensitive to temperature variations [Belkacem Balah, Algeria]	Rejected - climate change is more than just temperature change. We discuss changes in cylones, ocean circulation etc.
14436	6	3	4			and marine ecosystems and natural systems [Maitham Sultan, Iraq]	Rejected - we feel that marine ecosystems are a subset of natural systems
11144	6	3	7			Probably a sub-heading on Impacts on tropical cyclones and extra tropical cyclones: tracks, intensity and frequency would be better. There should be a smooth flow/continuity with the next sub-heading of "Changes in tracks, intensity, and frequency of tropical and extra-tropical cyclones" [Mastura Mahmud, Malaysia]	Rejected - we have now removed sub-headings in accordance with IPCC style guidance
22918	6	3	7	3	20	I really do not understand the point about unexpected nature of tracks, warnings not well heeded and poor disaster coordination. One of the great developments of the past few decades (since the 1953 storm surge in the southern North Sea) has been the development and progressive improvement of storm forecasts including winds, precipitation, surges and extreme sea levels and waves. These predictions continue to improve and I see no reason to assume that this will not continue. So while the climatology may not be so good in the short-term mode of weather and event prediction we should have a few days or more prediction of where the storms will track. So even if we have worst storms we will know they are coming and know their track more precisely than we do today. Please consider what you are concluding. [Robert Nicholls, UK]	Taken into account - we have modified the text. Here wer refer not just to the forecast but the infrastructure in place to act on that forecast
230	6	3	9	3	9	This is a problematic statement. There are no long-term trends in tropical and extra-tropcal storms to back this up. Rather, ocean cycles like the AMO influence the torm frequency. See e.g. Weinkle et al. 2012 (doi: 10.1175/JCLI-D-11-00719.1) [Sebastian Luening, Portugal]	Taken into account - now clarified to note that this conclusion is based on event attribution studies
846	6	3	9	3	20	I think that what is specific about the use of statistical laws (example of the law GEV, Weibull or Gumble ,,,,,) that are displayed on the functions of increasing density of distribution (is with this idea, we will reach at the end of the universe and at the end of the world that is right is with the use of these laws), I think, it is better to speak, the cyclicity of the phenomena is to rationalize the results, or to validate the statistical laws extreme values by statisticians who deal with the natural phenomena of the twentieth century. [Belkacem Balah, Algeria]	Rejected - it is difficult to understand the meaning of this reviewer comment
4746	6	3	9	3	9	Trend' increasing or decresing ?....here 'Trend' should be replaced with 'changes'. [Qudsia Zafar, Pakistan]	Rejected - we feel that it is obvious (i.e. based on previous IPCC reports) that trends are increasing in SST and sea level
15638	6	3	9	3	25	The word FOOTNOTE must be deleted in the two cases [Hamid Nebdi, Morocco]	Rejected - this is standard IPCC text

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24964	6	3	9	3	20	At least two issues are important comment by the authors: are tropical cyclones going to be more severe and are they going to be less frequent. There is a confidence level for "stronger tropical cyclones are likely" but the there is no confidence rating on frequency. Could the authors consider this? [Elizabeth Weatherhead, USA]	Accepted - confience level now included
22450	6	3	11	3	11	you may want to specifi what a "extreme sea level event" is. [Timothée Ourbak, France]	Rejected - this is defined in the main text. There is not enough space in the ES to give lengthy defintions
10114	6	3	12	3	13	Text mentions that "sustainable and resilient plans exist for these storms although the implementation of the plans is sometimes lacking". Clarification of the scale at which this occurs would be helpful (i.e. local/regional/national/international/all of these. [APECS Group Review, Germany]	Accepted - text now modified. Examples of scale are given in the main text
17412	6	3	12	3	13	The paragraph mixes scientific findings and discussions on response measures (e.g. Sustainable and resilient plans exist to prepare for these storms although the implementation of the plans is sometimes lacking). It is recommended to clearly separate scientific discussion from others in different paragraphs to increase the readability. This is true with other paragraphs in the executive summary [Kanamaru Hideki, Thailand]	Rejected - we have been encouraged to produce a report which connects WGI and WGII topics
22454	6	3	12	3	12	the concepts of "Sustainable and resilient plans" are far from my personal knowledge, I know of sustainable plans, adaptation plans, but not sustainable and resilient plan,". You might want to expend hat you mean by this. [Timothée Ourbak, France]	Accepted - text modified
24962	6	3	12	3	12	Consider changing "...relient plans exist" to "resilient plans exist for some locations." [Elizabeth Weatherhead, USA]	Accepted - text modified
4748	6	3	13	3	14	No need of sentence part "either they may be fewer in number" [Qudsia Zafar, Pakistan]	Accepted - text now revised
10120	6	3	13	3	13	E1a...plans is sometimes lacking, ADD ..."overall in developing countries" [APECS Group Review, Germany]	Rejected - we would not wish to make a disctiction between developed and developing countries here
16006	6	3	13	46	9	Two words 'Tropical Cyclone' and 'Extratropical Cyclone' are used many times with no abbreviations of 'TC' and 'ETC' here and there. [Sunghyun Nam, Republic of Korea]	Rejected - we try to avoid too many acronyms
17168	6	3	13	3	20	risk management should be mentions. [Jiahong Wen, China]	Rejected - in the sentence on resilience plans, risk management is implicit
17882	6	3	13	3	13	The statement "In the future, stronger tropical cyclones are likely" contrasts with the statement given in the AR5 WG1 table SPM.1 that gives "low confidence" to stronger cyclones in early 21st century. The statement should either conform to the AR5 or provide clear underlying text saying why what was found in the AR5 is now obsolete; however, the next statement in this paragraph states that the AR5 assessment remains valid? Looking at the underlying text in 6.3, there is a paragraph at the end of 6.3.3.1 that supports likely, but it does not include references and is unclear if this is simply sumarizing model results or is it assessing all lines of evidence and uncertainties. [Haroon Kheshgi, USA]	Accepted - this is a new assessment. Statement about AR5 now removed.
22456	6	3	13	3	14	The phrase starting by "In the future" and ending at "number" should be headline or at least be highlighted. [Timothée Ourbak, France]	Accepted
23162	6	3	15	3	15	"leave" should be "leaves" [Aimé Fournier, USA]	Noted
11146	6	3	16		16	Is this statement applicable to the rich and poor, marginalized countries? [Mastura Mahmud, Malaysia]	Noted - this sentence has now been removed

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20614	6	3	16	3	20	In the executive summary: It is not only social media but also community radio, High Frequency (HF), satellite phones that can be used as a tool to transfer information and provide real time response. Information and communications technologies (ICTs) can also be used to reduce loss of life in the event of a storm. ICTs can provide weather forecasts to large group of people through mobile phone networks as well as communicate date, time and location-specific SOS to local emergency response authorities and pre-defined personal contacts etc. Examples of these in the fishery sector are: Abalobi and Coastal Livelihoods Foundation in South Africa; mFisheries developed by CIRP in the Caribbean. Still in the fishery sector, one of the most dangerous occupations in the world, strengthening safety at sea measures can reduce risks, including: stability of vessels, safety equipment, safety information and culture, safety regulations etc. (Cattermoul, B.; Brown, D. & Poulain, F. (eds). 2014.Fisheries and aquaculture emergency response guidance. Rome, FAO. 167 pp.) [Florence Poulain, Italy]	Noted - this sentence has now been removed as we felt it wasn't strongly supportted by the literature
12864	6	3	17	3	18	social media not only for emotional support, sometimes it gives us real information [Md Enamul Haque, Italy]	Noted - this sentence has now been removed as we felt it wasn't strongly supportted by the literature
15298	6	3	17	3	18	Social media as a new tool for information transfer provide emotional support and real-time responses when they are Accurate and reliable, [Maitham Sultan, Iraq]	Noted - this sentence has now been removed as we felt it wasn't strongly supportted by the literature
17294	6	3	17	3	17	remove "more" leave only "chaotic" [Cecilia Conde, Mexico]	Noted - this sentence has now been removed
4750	6	3	18	3	18	Replace 'but also' with 'however' [Qudsia Zafar, Pakistan]	Noted - this sentence has now been removed as we felt it wasn't strongly supportted by the literature
11148	6	3	18			Please clarify this statement, especially the "wrong information" [Mastura Mahmud, Malaysia]	Noted - this sentence has now been removed as we felt it wasn't strongly supportted by the literature
15640	6	3	20			Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
20616	6	3	22	3	39	In the Executive summary: Marine heat waves or marine heatwaves in one word? The literature is divided (50/50). Some scientists (e.g. Alistair Hobday) prefer marine heatwaves, in one word. [Florence Poulain, Italy]	Noted - we adopt 'heatwaves' throughout
15300	6	3	24			Marine heat waves have very likely become more frequent in recent decades fordefferent reasons and ..... [Maitham Sultan, Iraq]	Noted - text now changed
20620	6	3	24	3	39	In the Executive Summary: You may want to mention the new classification system proposed/recommended by some scientists to separate marine heatwaves into categories of intensity: http://www.marineheatwaves.org/ as well as some adaptation measures as you did in the previous paragraph on Cyclones [Florence Poulain, Italy]	Noted - the classification scheme is now mentioned in the main text. Added sentence on adaptation measures.
20618	6	3	25	3	27	In the Executive summary: Impacts of marine heatwaves are also extend to socio-economic impacts. The record landings of lobsters as a result of the 2012 marine heatwave in the Gulf of Maine outstripped the processing capability and the demand for this product leading to a price collapse (Mills, K.E., A.J. Pershing, C.J. Brown, Y. Chen, F.-S. Chiang, D.S. Holland, S. Lehuta, J.A. Nye, J.C. Sun, A.C. Thomas, and R.A. Wahle. 2013. Fisheries management in a changing climate: Lessons from the 2012 ocean heat wave in the Northwest Atlantic. Oceanography 26(2):191–195, https://doi.org/10.5670/oceanog.2013.27) [Florence Poulain, Italy]	Noted - this study is cited in the main text
11114	6	3	26	3	27	I hope to change the sentence "~push marine organisms and ecosystems~" to "~push marine organism, ecosystems and fisheries~". As we know well, recent marine heat wave are caused of mass mortality of aquaculture organisms. [Inseong Han, Republic of Korea]	Accepted - now mentioned

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
23164	6	3	26	3	27	"to the limits" should be "to or beyond the limits" [Aimé Fournier, USA]	Accepted
4752	6	3	27	3	29	The sentences give the feeling that reason of increased frequency are the satellite observations rather than any anthropogenic factors. [Qudsia Zafar, Pakistan]	Noted - now re-worded
848	6	3	28	3	28	persist for days-months replace by dozens of days [Belkacem Balah, Algeria]	Rejected - sentence now re-worded anyway
10116	6	3	30	3	30	Phrase "over the last few decades" is vague. Can a value (precise or approximate) be provided? [APECS Group Review, Germany]	Accepted - sentence modified to be more precise
850	6	3	31	3	31	replace the on coral reefs and other marine ecosystems by living creatures of the marine environment [Belkacem Balah, Algeria]	Noted - hopefully the new sentence covers this. We prefer to mention corals specifically here because of major bleaching events
4754	6	3	32	3	32	sentence repeat: "Marina heat....place" has already been mentioned from page 3, lines 25-26. [Qudsia Zafar, Pakistan]	Accepted - now re-worded
4756	6	3	33	3	33	sentence "The probability ... (36-45)" should be replaced with "The probabability .... will be larger by 41% (36-45%) under 3.5 deg global warming scenario....times" [Qudsia Zafar, Pakistan]	Noted - we now use return periods to express this probability
15582	6	3	35	3	36	consider revising to "If global warming relative to preindustrial is kept below 2 degC, the probability of occurrence of marine heat waves is reduced to xx%. [Jasmin John, USA]	Noted - we now use return periods to express this probability
4758	6	3	36	3	36	"40% of that at 3.5°C" should be replaced with "40% of 3.5°C" [Qudsia Zafar, Pakistan]	Noted - we now use return periods to express this probability
11150	6	3	36		39	Basically, what is discussed here are the impacts on the life in oceans: marine ecosystems and marine organisms. What about their implications on society? [Mastura Mahmud, Malaysia]	Rejected - we did not feel there was enough literature to support an ES statement on this
15642	6	3	39			Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
232	6	3	41	3	47	ENSO has been naturally fluctuating also in the past 1000 years, this needs to be mentioned here. See Conroy et al., 2008; Henke et al., 2017: temperature ensemble; Mann et al., 2009; Moy et al., 2002; Rustic et al., 2015; Yan et al., 2011 [Sebastian Luening, Portugal]	Accepted - the most recent papers from 2015 and 2017 i.e. published since AR5 are now cited in section 6.5
5616	6	3	41	3	41	Perhaps this title should include "Extreme ENSO Events" to better reflect the content of the section. Interannual to Decadal Climate Variability does not capture Extreme ENSO [Roderik Van De Wal, Netherlands]	Rejected - we have now removed sub-headings in accordance with IPCC style guidance
22458	6	3	41	4	5	why only citing ENSO, what about PDO and other interdecadal signals? + ENSO should be defined at the begining of the paragraph, noit at the end [Timothée Ourbak, France]	Noted - the PDO is discussed in the next ES statement. For other modes, we did not feel there was anything really new to discuss. It seemed approproate to define ENSO at that point of the statement.
17296	6	3	43	4	5	Include Extreme La Niña examples also [Cecilia Conde, Mexico]	Accpeted - now included
17414	6	3	43	4	5	The first sentence in the pargaraph indicates "medium confidence" but subsequent sentences say "These factors also limit confidence in future projections.", making the reader wondering whether the headline sentence is really valid. [Kanamaru Hideki, Thailand]	Accepted - now re-worded
24966	6	3	43	4	5	The confidence ratings in this summary point are a bit confusing: "likely to occur more frequencty" on line 43 and "it has not bee possible to determine if there has been an anthropotenic influence" on line 3. Please be careful here and consider clarifying. [Elizabeth Weatherhead, USA]	Accepted - now re-worded
17416	6	3	44	3	46	Most of the paragraph talks about scieintific findings but there is one sentence about strategies ("Warning systems and risk management strategies exist, and can be adapted and improved to ameliorate the impacts of extreme El Niño events."), which seems totally out of place. Strategies discussion should be summarized in a different paragraph. [Kanamaru Hideki, Thailand]	Rejected - we have been encouraged to produce a report which connects WGI and WGII topics

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4760	6	3	45	3	45	"Ameliora" should be replaced with an easier word. [Qudsia Zafar, Pakistan]	Accepted - we now talk about managing the risks
4762	6	3	46	3	47	Sentence "There have been…period" should be replaced with "Recently most pronounced El Nino events are ….." [Qudsia Zafar, Pakistan]	Rejected - we prefer this sentence construction
10118	6	3	46	4	1	Unclear why rainfall the equatorial East Pacific is specifically highlighted (other than the area being important for ENSO), when El Nino events have other major climatic impacts globally. Given that this is an executive summary statement it may be better to keep the focus on either global or local scale changes that are particularly important/notable (with a brief explanation of why for the latter). [APECS Group Review, Germany]	Accepted - we now note that this is the defintion of an extreme El Nino
4766	6	4	2	4	4	Sentence "Because of ….. and impacts" should be replaced with "" Till date, large uncertainties exist in climate model outputs in assessing ENSO variabilities occurring either naturally or under influence from anthropogenic factors" [Qudsia Zafar, Pakistan]	Noted - the statement has been re-worded
5618	6	4	2	4	2	What is meant with 'active'? A higher frequency or amplitude? [Roderik Van De Wal, Netherlands]	Accepted - this sentence now deleted as not clear
10124	6	4	2	4	2	Is there not a better phrase than "model inadequacies"? Perhaps reword to "Because of large natural variability and the inability of models to capture this, it has not been possible…" [APECS Group Review, Germany]	Noted - the statement has been re-worded
4768	6	4	4	4	5	Sentence: "Literature on … is sparse" shoul be replaced with "Also present literature on projections …… is found to be sparse till date. [Qudsia Zafar, Pakistan]	Noted - the statement has been re-worded
15644	6	4	5			Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
3238	6	4	8	4	8	… Global change… replace by Global Scale change. Due the Global Change is refered as Climate Change plus Biosphere changes, etc. [Mercedes Andrade-Velazquez, Mexico]	Noted - subheadings now deleted
4770	6	4	11	4	11	"transports" should be relplaced with "transport" [Qudsia Zafar, Pakistan]	Accepted
1042	6	4	13			Capitalize t in "throughflow" [Vineel Yettella, USA]	Accepted
11152	6	4	16		17	What possible solution can be suggested if there is evidence but not one model can simulate this. [Mastura Mahmud, Malaysia]	Noted - we prefer to include this statement nevertheless as it is highly policy relevant
15646	6	4	16	4	17	Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
1044	6	4	21			The acronym AMOC has been used before indicating what it stands for. Therefore, replace "AMOC" with "Atlantic Meridional Overturning Circulation" [Vineel Yettella, USA]	Accepted - rectified
11154	6	4	21		22	Full name of the AMOC acronym should be placed in line 21, not in line 24 [Mastura Mahmud, Malaysia]	Accepted - rectified
15648	6	4	21	4	22	Abbreviation AMOC must be defined before using it [Hamid Nebdi, Morocco]	Accepted - rectified
10622	6	4	22	4	24	This statement incorrect. Changes in the AMOC in this period have been reported by Smeed et al. (20140 and Smeed et al. (2018). However, although a reduction in the AMOC has been observed since 2004, the record of observation is not yet long enough to distinguish a long-term decline from natural decadal variability [David Smeed, UK]	Accepted - this point is now made
11156	6	4	22		28	The sentence is too long [Mastura Mahmud, Malaysia]	Accepted - sentence now broken up
5318	6	4	23	4	25	The statement that there is no significant trend is not strictly correct and needs to be revised in light of Smeed et al. (2018) - see previous comments [Meric Srokosz, UK]	Accepted - this point is now made (see comment 123)
22502	6	4	24	4	26	I think this sentence of the executive summary does not reflect what appears in the core text p. 33 lines. 19-20 [Juliette Mignot, France]	Accepted - statement revised with the addition of a confidence assessment
4772	6	4	25	4	25	SST' should be replaced with 'Sea Surface Temperature (SST)' [Qudsia Zafar, Pakistan]	Accepted - rectified

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10126	6	4	28	4	28	The phrase "very rapid" is (on its own) vague, and has different meaning across disciplines. Can a value (precise or approximate) be assigned to this statement? [APECS Group Review, Germany]	Accepted - now change to 'abrupt'
22500	6	4	28	4	35	what is substantial as compared to the "weakening' and "abrupt"key words mentioned in the sentence before. If linked to abrupt, not worth 8 lines because it is "unlikely". This long paragraph gives a biased image of the relevance of these impacts. [Juliette Mignot, France]	Rejected - we feel it is important to state the wide-ranging impacts even if it is a low-probability scenario
4774	6	4	29	4	29	"surface climate and natural and human systems" should be replaced with "natural climate variability" [Qudsia Zafar, Pakistan]	Rejected - natural climate variabilityis narrower than the meaning we wish to convey
4776	6	4	30	4	30	"and associated" should be replaced with "in turn affecting" [Qudsia Zafar, Pakistan]	Accepted
10128	6	4	30	4	30	E1a...more...ADD..." and probably more intense" [APECS Group Review, Germany]	Rejected - not supported by the literature
5172	6	4	31	4	31	Please clarify the term "tropical storm", whether it is referring to tropical cyclone in general or specifically for tropical cyclone of tropical storm strength. [Sai Ming Lee, China]	Accepted - tropical cyclones
4660	6	4	33	4	33	It has been shown that in all climate models, a weakening of the AMOC will lead to a "warming hole" in the North Atlantic, despite somewhat large differences in model mean ocean states. However. the precise location of the warming hole within the North Atlantic remains model dependent, and may result in different associated consequences. This is shown in Menary & Wood (2017). Clim. Dyn. "An anatomy of the projected North Atlantic warming hole in CMIP5 models" which is very relevant here. [Matthew Menary, UK]	Noted - this phenomena now discussed in the main text
4778	6	4	35	4	35	"quantified" should be replaced with "quantified yet" [Qudsia Zafar, Pakistan]	Rejected - we do not know if they will be quantified
15650	6	4	35	4	41	Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
4662	6	4	37	4	41	This draft text is (in part) based on an analysis in which only a few models actually showed this abrupt SPG cooling (Sgubin 2017). It would be good to emphasise the uncertainty here. [Matthew Menary, UK]	Accepted - confidence level now assessed
4780	6	4	38	4	41	Whole para not clear. The atmospheric features of SPG should be mentioned here on line 39. A comparison with AMOC should be defined more clearly. [Qudsia Zafar, Pakistan]	Noted - hopefully this has been clarified in the reviosed version of this statement. Atmospheric features are not well chariacterised in the literature so not more detailed statement is possible.
10130	6	4	43	4	51	Consider to add a sentence that include human and animal disease outbreaks potential (and invasive species) since these important hazards are visited in the chapter but not mentioned in the summary. [APECS Group Review, Germany]	Rejected - we don't feel we have enough space to get into all the imapcts discussed in these three case studies.
17298	6	4	43	4	43	Introduce a paragraph that supports the "high confidence" stated. 3 examples are not related enough to climate change [Cecilia Conde, Mexico]	Noted - this statement has been revised. It should be clear that the high confidence statement refers to these case studies as being examples of cascading impacts and compund risk
4782	6	4	45	4	45	"increasingly exacerbating extreme events" shouldbe replaced with "increasing the intensity of extreme weather events resulting in multiple hazards...." [Qudsia Zafar, Pakistan]	Noted - statement has been re-worded now
17418	6	4	45	4	46	This sentence "Climate change is increasingly exacerbating extreme events and causing multiple hazards, often with compound or sequential characteristics" seems to be a very general statement. Are you sure you can support this statement? It is better to specify which extreme events are being exacerbated by climate change, with confidence level indication. There is a risk that this sentence is taken out of context and quoted alone. [Kanamaru Hideki, Thailand]	Noted - statement has been re-worded now

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
15652	6	4	51			Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
12866	6	4	53	4	54	Risk identification or Risk analysis [Md Enamul Haque, Italy]	Rejected - we mean risk reduction here
4784	6	4	56	4	57	"proves necessary" should be replaced with "is utmost need of the hour" [Qudsia Zafar, Pakistan]	Rejected - this statement has been completely re-written
20622	6	4	56	5	7	What is being proposed is not clear. [Florence Poulain, Italy]	Noted - now completely re-written
24968	6	4	56	5	7	The private sector conginues to be involved in this subject through identificaiton of risk, engineering of infrastructure solutions, insurance and re-insurance. This advancement changes the way issues have been handled in the past. Please consider covering this more closely in the chapter and highlighting this advancement. [Elizabeth Weatherhead, USA]	Noted - we use the term "stakeholder" to include the private sector
5620	6	4	57	4	57	deepen extremes and abrupt changes' may be changed into 'increase the risk of extremes and abrupt changes', since 'deepen' is an ambiguous term. [Roderik Van De Wal, Netherlands]	Noted - now completely re-written
22462	6	4	57	5	4	this phrase does not add anything to the document: too broad, too general, difficult to draw any conclusions form that sentence. [Timothée Ourbak, France]	Noted - now completely re-written
624	6	5	0			After "{6.9}" add "However, some methods for cooling the ocean surface are likely to be more effective at reducing catastrophic effects than are those of enhancing resilience and other forms of adaptation." [William Clarke, Australia]	Rejected - we do not discuss geo-engineering here (not in scope)
22460	6	5	2	5	2	a "risk" is missing, should be disaster risk management. [Timothée Ourbak, France]	Noted - now completely re-written
15302	6	5	4			promote and support [Maitham Sultan, Iraq]	Noted - now completely re-written
17300	6	5	4	5	4	perhaps use ".. regonal adaptation strategies" to jump from "global network" to multi national, or subnational regions [Cecilia Conde, Mexico]	Noted - now completely re-written
11158	6	5	7			How can this information be shared within the global network and what help in terms of monetary compensation given to poor countries [Mastura Mahmud, Malaysia]	Noted - Loss and Damage now discussed in section 6.9
15654	6	5	7			Point after the closing brace [Hamid Nebdi, Morocco]	Rejected - IPCC style says not to do this
20624	6	5	9	5	12	In para. 6.1.1.: Extreme events also refer to weather or climate events that can lead to extreme impacts or disasters, even if not extreme in a statistical sense (see Seneviratne, S.I., N. Nicholls, D. Easterling, C.M. Goodess, S. Kanae, J. Kossin, Y. Luo, J. Marengo, K. McInnes, M. Rahimi, M. Reichstein, A. Sorteberg, C. Vera, and X. Zhang, 2012: Changes in climate extremes and their impacts on the natural physical environment. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 109-230) [Florence Poulain, Italy]	Noted - now completely re-written
13010	6	6	0	9		Maintain consistency with definitions of tipping elements and tipping points. Kopp R., et al. (2016) Tipping elements and climate–economic shocks: Pathways toward integrated assessment; Lenton T. M., et al. (2008) Tipping elements in the Earth's climate system. Note also that most ocean and cryosphere tipping elements are clustered between 1.5-2.0°C warming. (Drijfhout S., et al. (2015) Catalogue of abrupt shifts in Intergovernmental Panel on Climate Change climate models, PROC. NAT'L. ACAD. SCI. 112(43):E5777–E5786, E5784.) [Gabrielle Dreyfus, USA]	Here we adopt definitions that have evolved over several IPCC assessment cycles, including the SR15. There is a plan to hae a common glossary across AR6, hence we stick with the current defintion.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16012	6	6	0			Figure 6.1 - the terms 'single' and 'multi vulnerability' require explanation. Is this refering to characteristics of people/populations that determine vulnerability e.g. gender, age, wealth etc? Further, although the risk framing reflected in this figure has been adapted from AR5 to better reflect the dynamic and compounding nature of risk, it does not explicitly capture peoples' resilience, coping or adaptive capacity. It therefore does not acknowledge the underlying reasons why those who are most vulnerable are unable to reduce (multi) risks or cope with (cascading) impacts [Olivia Warrick, New Zealand]	Multi-risk is now dropped and we have clarified the definitions of these terms
23168	6	6	0	6		I find Figures like 6.1 to be mostly useless, just words, shapes and arrows that don't send a clear message. Powerpoint puff. [Aimé Fournier, USA]	Noted
11532	6	6	6	6	6	The Introduction states that this chapter is not comprehensive treatment of extremes/abrupt chages. It would be helpful to know which phenomena have been excluded from the review and on what basis the exclusion was made. [Taehyun Park, Republic of Korea]	The list is amlost endless. However, some phenomena from other chapters are discussed in Table 6.1. Land extremes, for example, will be covered in th SRCCL
1046	6	6	7			Replace "it" with "this chapter" [Vineel Yettella, USA]	Rejected - article is obvious
17276	6	6	10	6	10	link the definition of SREX and AR5 to the Glossary or include as a footnote [Iulian Florin Vladu, Germany]	Rejected - these are standard IPCC terms
4786	6	6	17	6	17	word "approximately" should be removed. [Qudsia Zafar, Pakistan]	Accepted
23166	6	6	17	6	17	"approximately organised" should just be "organised", which is always approximate [Aimé Fournier, USA]	Accepted
4788	6	6	18	6	18	"tropical cyclones, which last for days-weeks", should be replace with "cyclones (days-weeks), to the global scale AMOC (decades to centuries). [Qudsia Zafar, Pakistan]	Rejected - we prefer this sentence construct
4790	6	6	18	6	19	"Atlantic Meridional Overturning Circulation (AMOC)" should be replaced with AMOC only, as the abbreviation has been described before. [Qudsia Zafar, Pakistan]	Rejected - we prefer to define again as the Exec Summary will be eventually in a slightly different format to the main text
5320	6	6	18	6	19	Based on RAPID 26N observations there has been substatial variation of the AMOC on interannual timescales too - see McCarthy, G. et al. Observed interannual variability of the Atlantic meridional overturning circulation at 26.5°N. Geophysical Research Letters 39, L19609, doi:10.1029/2012GL052933 (2012) [Meric Srokosz, UK]	Publication assessed in section 6.7
15656	6	6	18	6	19	As the abreviation AMOC is already defined in page 4 so it's better to use it [Hamid Nebdi, Morocco]	Rejected - we prefer to define again as the Exec Summary will be eventually in a slightly different format to the main text
4792	6	6	19	6	20	"is adopted, based on that used in AR5 and introduced in Chapter 1" replace with: " A common risk framework is further adopted based on AR5". [Qudsia Zafar, Pakistan]	Rejected - not required
11534	6	6	21	6	22	Legend to Figure 6.1 could be expanded to explain how the figure "works" in practice otherwise it is very difficult to understand [Taehyun Park, Republic of Korea]	Accepted - caption now expanded
4794	6	6	23	6	24	replace with:" Risk framework for assessing the role of extremes, abrupt changes, tipping points, cascading or multi-risks and impacts, based on AR5." A mention of reversible and irreversible tipping points should be made to explain the outer grey arrows and inner wider blue and purple arrows. [Qudsia Zafar, Pakistan]	Figure now simplified
4796	6	6	26	6	29	replace with: "The chapter mainly discusses large-scale atmosphere-ocean dynamics and associated risks and policy options. Drawing information from the previous five chapters, extreme and abrupt events in the cryosphere are discussed in section 6.2 while in atmosphere (tropical and extra-tropical cyclones) are briefly discussed in section 6.3." [Qudsia Zafar, Pakistan]	rejected - current wording is clear

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10132	6	6	26	6	29	The lack of discussion of rapid sea level rise driven by Antarctic ice sheet instability is a major omission from this chapter that needs to be rectified. Having seen drafts of Chapters 3 and 4, I can see how this has occurred given that it describes the collapse of W Antarctica as occurring on a timescale of centuries, which would fall outside the definition of “abrupt climate change” as given in C6-P7, L5-7. However, Chapter 3 section 3.2.3.2 currently omits that initiation of W Antarctic collapse could lead to substantial sea level change on decadal timescales. Model projections that include both the marine ice sheet and marine ice cliff instabilities (MISI and MICI respectively) provide sea level rise estimates of approx. 0.7-0.8m by 2100, with nearly all of this occurring in the period 2050-2100 (DeConto and Pollard, 2016). This rapid rate of sea level change over decadal timescales was also projected to continue several centuries beyond 2100, and would be irreversible over millennial timescales, with significant implications for oceanic/atmospheric circulation and ecosystems. West Antarctic ice sheet collapse therefore falls within the scope of being an “abrupt climate change” and needs to be covered in this chapter. It should also be noted that there is currently significant uncertainty (i.e. low confidence) that such an event may occur, though there is emerging evidence for MICI having occurred during previous deglacial episodes (Wise et al., 2017). Even without MICI, model simulations that exclude this process still project sea level contributions on the order of 10 centimetres by 2100 (Favier et al., 2014; Joughin et al., 2014; Cornford et al., 2015; Ritz et al., 2015). Given the scale, potential rapidity and human/climate impact of MICI driven ice sheet collapse its omission from this chapter would be a significant oversight. Cornford, S.L., Martin, D.F., Payne, A.J., Ng, E.G., Le Brocq, A.M., Gladstone, R.M., Edwards, T.L., Shannon, S.R., Agosta, C., van den Broeke, M.R. and Hellmer, H.H., 2015. Century-scale simulations of the response of the West Antarctic Ice Sheet to a warming climate. The Cryosphere, 9(4), pp.1579-1579. DeConto, R.M. and Pollard, D., 2016. Contribution of Antarctica to past and future sea-level rise. Nature, 531(7596), p.591. Favier, L., Durand, G., Cornford, S.L., Gudmundsson, G.H., Gagliardini, O., Gillet-Chaulet, F., Zwinger, T., Payne, A.J. and Le Brocq, A.M., 2014. Retreat of Pine Island Glacier controlled by marine ice-sheet instability. Nature Climate Change, 4(2), p.117. Joughin, I., Smith, B.E. and Medley, B., 2014. Marine ice sheet collapse potentially under way for the Thwaites Glacier Basin, West Antarctica. Science, 344(6185), pp.735-738. Ritz, C., Edwards, T.L., Durand, G., Payne, A.J., Peyaud, V. and Hindmarsh, R.C., 2015. Potential sea-level rise from Antarctic ice-sheet instability constrained by observations. Nature, 528(7580), p.115. Wise, M.G., Dowdeswell, J.A., Jakobsson, M. and Larter, R.D., 2017. Evidence of marine ice-cliff instability in Pine Island Bay from iceberg-keel plough marks. Nature, 550(7677), p.506. [APECS Group Review, Germany]	This is discussed at length in Chapter 4 and the new cross-chapter box 2.
11162	6	6	26		29	The sentence contains too much information that makes it unclear. [Mastura Mahmud, Malaysia]	Accepted - now re-worded
11160	6	6	28			Should be" in the atmosphere" rather than "and the atmosphere" [Mastura Mahmud, Malaysia]	Accepted - text now modified
20626	6	6	31	7	48	In 6.1.1: You may want to add a definition for disasters. [Florence Poulain, Italy]	Definition is included in the glossary. Here we focus on the main terms used
15304	6	7	0			may be need to Definitions of other Terms such as El Niño, La Niña [Maitham Sultan, Iraq]	Definitions included in the glossary
11164	6	7	3			AR5 (IPCC, 2014) [Mastura Mahmud, Malaysia]	Here we refer to all three working group reports
5322	6	7	5	7	7	Paleo data suggests abrupt changes can occur over shorter time scales of a few years - see Alley, R. B. Wally Was Right: Predictive Ability of the North Atlantic “Conveyor Belt” Hypothesis for Abrupt Climate Change. Annual Review of Earth and Planetary Science 35, 241-272 (2007) [Meric Srokosz, UK]	Assessed in section 6.7

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4992	6	7	9	7	12	Definition of extreme weather/climate event is not complete in my mind. My suggestion for the definition: An extreme event is an event that is either severe, or rare at a particular place or time of year. [Outi Meinander, Finland]	We adopt the standard IPCC definition from the Glossary
6406	6	7	9	7	12	Is there a difference between weather extreme and climate extreme? That is a question that journalists frequently ask, and that report could be an opportunity to make the distinction. [François Massonnet, Belgium]	We now clarify this
4798	6	7	10	7	11	"as rare as or rarer than the 10th or 90th percentile" replace with "less than the 10th or greater than the 90th percentile" [Qudsia Zafar, Pakistan]	We adopt the standard IPCC definition from the Glossary
4800	6	7	11	7	11	remove "estimated from observations" [Qudsia Zafar, Pakistan]	We adopt the standard IPCC definition from the Glossary. However, this is a good point that needs to be discussed with the Glossary team
4802	6	7	12	7	12	"what is called an extreme event" replace with "extreme events" [Qudsia Zafar, Pakistan]	We adopt the standard IPCC definition from the Glossary
4804	6	7	14	7	17	Replace with: "At a given time scale, a perturbed state of a dynamical system becomes irreversible when the recovery timescale from this state due to natural processes takes significantly longer than usual for the system to reach at a stable state. In the context of this report, the time scale of interest is centennial to millennial." [Qudsia Zafar, Pakistan]	We adopt the standard IPCC definition from the Glossary
4664	6	7	16	7	17	Would "hundreds to thousands of years" be easier to understand for a lay reader? [Matthew Menary, UK]	Accepted
1380	6	7	19	7	28	Can you add some more information/references on how you define tipping points (differences of tipping point in), including also adaptation tipping point [Thomas Thaler, Austria]	See section 6.8.1
3196	6	7	19	7	24	The definition of tipping point is problematic and can be confusing to a general audience. See critique in R. E. Kopp, R. Shwom, G. Wagner, and J. Yuan (2016). Tipping elements and climate-economic shocks: Pathways toward integrated assessment. Earth's Future 4, 346-372. doi:10.1002/2016EF000362. [Robert Kopp, USA]	We adopt the standard IPCC definition from the Glossary
12840	6	7	19	7	24	While ch 6 indicates conceptual openness about tipping points appearing (also) in the context of governance and adaptation, such aspects are not explored further in the rest of the chapter. With a report focus on people and communities (see e.g. title of ocean chapter) the choice of selected abrupt changes in the rest of the chapter creates further imbalances (and is partly also an effect of adopting the IPCC risk framework) [Stephen Cornelius, UK]	See section 6.8.1
4806	6	7	21	7	22	"from one stable state to another stable state" replace with "shifts from one stable state to another" [Qudsia Zafar, Pakistan]	We adopt the standard IPCC definition from the Glossary
4808	6	7	22	7	24	Replace with: "Tipping points are often used to discuss the need of various adaptation options as a result of approaching climate tipping point. An adaptation tipping point is reached when an adaptation option no longer remains effective." [Qudsia Zafar, Pakistan]	Now re-worded, thanks
13928	6	7	22	7	24	The definition of tipping point to adapation is not quite clear [Debra Roberts and Durban Team, South Africa]	Now re-worded
17302	6	7	25	7	25	Include the definition of feedback (positive or negative) that is used further in the text. [Cecilia Conde, Mexico]	This is a standard term
4810	6	7	26	7	28	No need of this para. [Qudsia Zafar, Pakistan]	We certainly believe that there is

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11536	6	7	26	7	28	The text outlines the extension of the concept of tipping points to natural and human systems. Whil the concpet is commonly applied to eg regime shifts in marine and terrestrial ecosystems is there a basis on which the concept can be applied to eg governance systems. Explanation needed somewhere in the Chapter [Taehyun Park, Republic of Korea]	See e.g. section 6.8.1
1048	6	7	27			Delete "and" in "which causes and irreversible changes in an ecosystem" [Vineel Yettella, USA]	Accepted
4812	6	7	30	7	48	In this para figure 6.1 should be discussed with focus on cyclic flow and how feedbacks are flowing in a cycle. Also no account on socioeconomic aspects in terms of adaptation / mitigation options is given. [Qudsia Zafar, Pakistan]	Figure now simplified
10134	6	7	30	7	48	These new terms should be defined in the same format as the existing terminology highlighted in bold on this page. That is to say each should have its own paragraph of explanation. It should also be clarified whether multi-risk and compound risk refer to the same thing. If so, for the sake of simplicity and consistency only one of these terms should be used. [APECS Group Review, Germany]	Accepted - text modified
12868	6	7	30	7	37	Great idea for multi risk [Md Enamul Haque, Italy]	Multi-risk is now dropped and we have clarified the definitions of these terms
20628	6	7	30	7	48	In 6.1.1.: Cascading impacts also include: outbreaks of harmful algae blooms, aquatic disease etc. (for example as a consequence of marine heatwaves) [Florence Poulain, Italy]	Yes - but did not have space to list all possibilities here
16018	6	7	34	35		"systems or sectors may be vulnerable at the outset of an extreme event due to the nature or severity of the hazard..." this is a narrow interpretation of the concept of 'vulnerability' , at odds with the definition/framing in AR5: 'the propensity or predisposition to be adversly affected' . I suggest reframing the concept of vulnerability in Chapter 6 to decouple it from event. [Olivia Warrick, New Zealand]	Definitions now simplified
852	6	7	39	7	39	why precisely target corals [Belkacem Balah, Algeria]	Text now deleted
3198	6	7	40	7	48	In the English language, "multi-risk" has the form of an adjective, not a noun, and grates excessively on the native ear when used as a noun. In addition, it is not defined here, but described in an imprecise way that is very hard to follow, and also seems to be used (even more awkwardly then as a noun) as a noun that is identical in its singular and plural forms. I urge you to please stick to using 'multi-risk' as an adjective. [Robert Kopp, USA]	Multi-risk is now dropped and we have clarified the definitions of these terms
24286	6	7	51			Is a subheading for a single table necessary? Suggest to include this under 6.1 [Hans-Otto Poertner and WGII TSU, Germany]	Rejected - it isn't really part of the introduction
4814	6	7	53	7	55	replace wiith "Specific potentially abrupt and irreversible events are discussed in the previous chapters. Table 6.1 presents their cross-chapter summary. Subsection numbers indicate where detailed information may be found". [Qudsia Zafar, Pakistan]	Rejected - the point is that some are discussed within this chapter
13930	6	7	53	7	53	Delete 'the following' [Debra Roberts and Durban Team, South Africa]	Accepted
22658	6	7	53	9	1	Table is not clearly explained - particularly the last column, for the projected likelihood or confidence: is it meant to be the likelihood for occurrence of the effect generally, it's irreversibility, or the abruptness of the event? Please explain more clearly. [Eva Kruemmel, Canada]	Accepted - now clarified

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11656	6	7	57			Table 6.1 I am puzzled that release of CH4 from permafrost and clathrates is irrversible for millennia as perturbation life time of CH4 is about 12 years. The produced amount of CO2 with a much longer perturbation life time spectrum is likely relatively small, at least for permafrost. Note that the paleorecords of methane and isotopes does not support the hypothesis of rapid CH4 release to the atm. from clathrates. [Fortunat Joos, Switzerland]	Accepted - now changed to reversible
11658	6	7	57			Table 6.1 Mention risk of release of CO2 from permafrost and peatlands (both tropical and high lat) [Fortunat Joos, Switzerland]	Accepted - now added
11660	6	7	57			Table 6.1 deoxygenation: see Battaglia and Joos, ESD, 2018 for recovery time scales and abruptness of change [Fortunat Joos, Switzerland]	Accepted - now clarified
20630	6	7	57	8	1	Table 6.1: Impacts on human systems need to be better addressed. E.g. Mass mortality and changes in recruitment patterns of commercially important species such as abalone and lobsters due to marine heatwaves have had socio-economic impacts in https://theconversation.com/marine-heatwaves-are-getting-hotter-lasting-longer-and-doing-more-damage-95637 [Florence Poulain, Italy]	Accepted - this is addressed in section 6.4
24442	6	7	57			The subheading Climate in the table does not cover all the changes below, eg sandy shore changes [Hans-Otto Poertner and WGII TSU, Germany]	Accepted - headings now modified
626	6	8	0			The likelihood and confidence of Methane release from ocean subsurface hydrates should be amended to "Very likely/high confidence" as it is already happening and rapidly escalating. With ice thickening it is not necessarily irreversible if addressed promptly and at scale, see https://unfccc.int/documents/65014. [William Clarke, Australia]	Rejected - not confirmed by the assessment in Chapter 5
1050	6	8	0			Table 6.2: 1) in heading of first column, delete "system" in "ecosystem system component", 2) note that table entries are missing for three rows in the ecosystem subsection [Vineel Yettella, USA]	Accepted - headings now modified
4816	6	8	0	8		Table row 1: in "Change in climate or ecosystem system" remove word "system" [Qudsia Zafar, Pakistan]	Accepted - headings now modified
4818	6	8	0	9		Table rows 16, 19,21 & 22. please check if any information is missing. [Qudsia Zafar, Pakistan]	Accepted - topics now deleted due to lack of literature
10140	6	8	0	8		Table 6.1 Row Rapid Sea Ice Retreat - Why is this change the only row which presents confidence intervals? I suggest consistency in confidence interval presentation within this table. [APECS Group Review, Germany]	Accepted - now included likelihood statement
10142	6	8	0	8		Table 6.1 Row Rapid Permafrost thermokarst - There are ecosystem impacts resulting from permafrost thaw and karsting. See Mallory and Boyce. 2018. "Observations and Predicted Effects of Climate Change on Caribou and Reindeer" Environmental Reviwe 26 (1) 13-25 DOI: 10.1139/er-2017-0032 or similar. Center for northern studies in Canada has been completing work on caribou migration changes. [APECS Group Review, Germany]	Accepted - but citation passed to Ch2
10144	6	8	0	9		Table 6.1 Rows Sandy Shore, hypoxic events, higher trophic level and loss of endemic species - Rows blank [APECS Group Review, Germany]	Accepted - now deleted due to lack of literature
11166	6	8	0			Table 6.1. No information for Sandy shore changes [Mastura Mahmud, Malaysia]	Accepted - now deleted due to lack of literature
11168	6	8	0			Table 6.1, No information on Hypoxic events and deoxygenation [Mastura Mahmud, Malaysia]	Accepted - now deleted due to lack of literature
12628	6	8	0	8		Switch to different state in river communities - in Table 1 should say river communities in glacier-fed rivers [Alexander Milner, UK]	Accepted

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
12630	6	8	0	9		Why are there gaps in this table - could combine biodiversity with endemic species and loss of [Alexander Milner, UK]	Accepted - now deleted due to lack of literature
13932	6	8	0	9		Table 6.1 please emphasise the irreversibility of extinction of species [Debra Roberts and Durban Team, South Africa]	Accepted - now noted
15306	6	8	0	9		excellent [Maitham Sultan, Iraq]	Noted
17304	6	8	0			use AMOC instead of Atlantic MOC [Cecilia Conde, Mexico]	Accepted
23170	6	8	0	8		"Rapid sea-ice retreat ... Reversible within years to decades" and other entries in this column seem dubious. Does " if forcing reversed" refer only to anthropogenic or also to secondary forcing like warmed oceans? Also even if sea ice returns, erosion won't reverse as quickly. And what does "Yes" mean in column 3? [Aimé Fournier, USA]	Accepted - text modified
24972	6	8	0			The "Ecosystem" portion of the table table needs to include a) irreversible loss of Arctic sea ice endemic biota, b) shifts in benthic-pelagic coupling in the Arctic Ocean and c) ocean acidification (irreversible for centuries, possibly longer). [Elizabeth Speer, USA]	Accepted - add ocean acidification
3200	6	8	1	8	1	Somewhere in the text needs to clearly explain why some get likelihood statements and others confidence statements. [Robert Kopp, USA]	Accepted - now explained that likelihood assessments are not possible in the case of low confidence

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10136	6	8	1	8	1	Within the table on this page, the 'Collapse of the W Antarctic Ice Sheet' row should be labelled as abrupt, given that multiple projections forecast sea level rise on the order of up to 10 cm or more by 2100 (Favier et al., 2014; Joughin et al., 2014; Cornford et al., 2015; Ritz et al., 2015), while DeConto and Pollard (2016) project up to 0.8 m of sea level rise occurring between 2050-2100 alone (i.e. significant change over decadal timescales that are irreversible over millennial timescales). This would have significant impact on global sea level, global oceanic and atmospheric circulation, and oceanic ecosystems. This fits the definition of abrupt climate change given at the start of Chapter 6, while the scale of change associated with this climate system component and range of impacts means that its current omission from discussion within this chapter is a major oversight. The absence of discussion of the wider impacts of rapid mass loss from Antarctica (and Greenland) in Chapters 3 and 4 means that there is a need for this topic to be covered in Chapter 6. Cornford, S.L., Martin, D.F., Payne, A.J., Ng, E.G., Le Brocq, A.M., Gladstone, R.M., Edwards, T.L., Shannon, S.R., Agosta, C., van den Broeke, M.R. and Hellmer, H.H., 2015. Century-scale simulations of the response of the West Antarctic Ice Sheet to a warming climate. The Cryosphere, 9(4), pp.1579-1579. DeConto, R.M. and Pollard, D., 2016. Contribution of Antarctica to past and future sea-level rise. Nature, 531(7596), p.591. Favier, L., Durand, G., Cornford, S.L., Gudmundsson, G.H., Gagliardini, O., Gillet-Chaulet, F., Zwinger, T., Payne, A.J. and Le Brocq, A.M., 2014. Retreat of Pine Island Glacier controlled by marine ice-sheet instability. Nature Climate Change, 4(2), p.117. Joughin, I., Smith, B.E. and Medley, B., 2014. Marine ice sheet collapse potentially under way for the Thwaites Glacier Basin, West Antarctica. Science, 344(6185), pp.735-738. Ritz, C., Edwards, T.L., Durand, G., Payne, A.J., Peyaud, V. and Hindmarsh, R.C., 2015. Potential sea-level rise from Antarctic ice-sheet instability constrained by observations. Nature, 528(7580), p.115. [APECS Group Review, Germany]	Accepted (in consultation with revelant experts)

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10138	6	8	1	8	1	Within the table, 'Greenland Ice Sheet decay' should be labelled as a potentially abrupt change. On reading of Chapter 3, section 3.2.4.1 I can see why this has been labelled as non-abrupt given the limited discussion of tidewater driven/iceberg calving driven changes in ice sheet volume. However, there are approximately 200 iceberg producing glaciers in Greenland (Murray et al., 2015), which account for between 30-50% of mass loss from Greenland (van den Broeke et al., 2009; Enderlin et al., 2014), and their contribution to future sea level change (and hence freshwater contribution to the upper ocean) is likely under-represented in ice sheet model projections (Chapter 3, P17, L48-51; Nick et al., 2013; Shepherd and Nowicki, 2017). These glaciers are known to exhibit highly non-linear responses to climate forcing, with the last century of behaviour overwhelmingly dominated periods of stability punctuated by decadal periods of rapid (i.e. >1km/yr) retreat of outlets (Kjeldsen et al., 2014). Therefore they have the potential to rapidly contribute significant volumes of freshwater to the N Atlantic as icebergs (on decadal to sub-decadal timescales), with ramifications for the potential energy and freshwater budgets of the upper ocean (e.g. Jongma et al., 2013), and hazards to shipping. Accelerated mass loss from Greenland driven by calving is well documented and likely to continue into the future (e.g. Nick et al., 2009; Chapter 3, P12, L18-20), while it is likely that previously stable major outlets such as 79 North, and Zachariae Isstrom may contribute substantial amounts to sea level change by 2100 (Choi et al., 2017). Similar to Antarctic driven sea level change and climate system impacts, I would argue that potential Greenland mass loss due to calving also needs to be discussed in this chapter. The absence of discussion of the wider impacts of rapid mass loss from Greenland (and Antarctica) in Chapters 3 and 4 means that there is a need for this topic to be covered in Chapter 6. Choi, Y., Morlighem, M., Rignot, E., Mouginot, J. and Wood, M., 2017. Modeling the Response of Nioghalvfjerdsfjorden and Zachariae Isstrøm Glaciers, Greenland, to Ocean Forcing Over the Next Century. Geophysical Research Letters, 44(21). Enderlin, E.M., Howat, I.M., Jeong, S., Noh, M.J., Angelen, J.H. and Broeke, M.R., 2014. An improved mass budget for the Greenland ice sheet. Geophysical Research Letters, 41(3), pp.866-872. Jongma, J.I., Renssen, H. and Roche, D.M., 2013. Simulating Heinrich event 1 with interactive icebergs. Climate Dynamics, 40(5-6), pp.1373-1385. Kjeldsen, K.K., Korsgaard, N.J., Bjørk, A.A., Khan, S.A., Box, J.E., Funder, S., Larsen, N.K., Bamber, J.L., Colgan, W., Van Den Broeke, M. and Siggaard-Andersen, M.L., 2015. Spatial and temporal distribution of mass loss from the Greenland Ice Sheet since AD 1900. Nature, 528(7582), pp.396-400. Murray, T., Scharrer, K., Selmes, N., Booth, A.D., James, T.D., Bevan, S.L., Bradley, J., Cook, S., Llana, L.C., Drocourt, Y. and Dyke, L., 2015. Extensive retreat of Greenland tidewater glaciers, 2000–2010. Arctic, antarctic, and alpine research, 47(3), pp.427-447. Nick, F.M., Vieli, A., Andersen, M.L., Joughin, I., Payne, A., Edwards, T.L., Pattyn, F. and van de Wal, R.S., 2013. Future sea-level rise from Greenland's main outlet glaciers in a warming climate. Nature, 497(7448), p.235. Shepherd, A. and Nowicki, S., 2017. Improvements in ice-sheet sea-level projections. Nature Climate Change, 7(10), p.672. van den Broeke, M., Bamber, J., Ettema, J., Rignot, E., Schrama, E., van de Berg, W.J., van Meijgaard, E., Velicogna, I. and Wouters, B., 2009. Partitioning recent Greenland mass loss. science, 326(5955), pp.984-986.	Rejected (in consultation with relevant experts)
22284	6	8	1	8	1	Table 6.1 could use some slight adjustments in future iterations to make it easier to read. For example, reducing the number of lines, changing text size to make sure words can all fit on one line, and making the headings in the first row more distinct/easier to pick out. [Andra Garner, USA]	Accpeted - format modified
4666	6	8	20	8	24	"Positive" feedback sounds like it is helping rather than hindering our efforts to counteract climate change. Perhaps "compounding" or similar would emphasise that this is a "bad" thing? [Matthew Menary, UK]	Accepted - text now modified
10146	6	8	32	8	32	E1a. Add "Regional and" to "local hazard…" [APECS Group Review, Germany]	Rejected - implied by local
10148	6	8	48	8	48	E1a. After "hydrology" ADD ", positive feedback on global change" [APECS Group Review, Germany]	Rejected - unsure about which phenomena this refers to

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16002	6	8	48	9	1	In Table 6.1, there are no items for "potentially abrupt", "irreversibility", "impacts", and "projected likelihood" in lines of "Sandy shore changes", "Hypoxic events and deoxygenation", "Higher trophic level production and ecosystem structure", and "Loss of endemic species and invasion of new species". For example, based on the contents in Section 5.2, ocean oxygen declines over the next centrury are predicted by all CMIP5 models, due to the combination of warming and increased stratification. I believe its impacts are global (global de-oxygenation) although upwelling shelf regions are more vulnerable to increasingly frequent and severe hypoxic events [Sunghyun Nam, Republic of Korea]	Rejected - these topics now deleted due to lack of literature
10152	6	9	0	10		Table 6.2 and Figure 6.2 are not introduced before they are presented in the text. [APECS Group Review, Germany]	Rejected - seems to be refering to the wrong table/figure
11170	6	9	0			Table 6.1. No information on Higher trophic level production and ecosystems structure [Mastura Mahmud, Malaysia]	Rejected - these topics now deleted due to lack of literature
11172	6	9	0			Table 6.1: No information on Loss of endemic species and invasion of new species [Mastura Mahmud, Malaysia]	Rejected - these topics now deleted due to lack of literature
16022	6	9	0			section 6.3 authors may like to consider inclusion of the literature on observed and projected trends in wind-driven waves in the Pacific islands: Australian Bureau of Meteorology and CSIRO (2014). Climate Variability, Extremes and Change in the Western Tropical Pacific: New Science and Updated Country Reports. Pacific-Australia Climate Change Science and Adaptation Planning Program Technical Report, Australian Bureau of Meteorology and Commonwealth Scientific and Industrial Research Organisation, Melbourne, Australia. [Olivia Warrick, New Zealand]	we did not use this literature as it did not provide new insights that were relevant to this chapter
5174	6	9	3	9	38	The title using "Tropical and Extra-Tropical Storms" may be confusing as in "tropical cyclone" and "extra-tropical cyclone" are adopted in 6.3.3. Technically, tropical storm is only one of the classifications of tropical cyclone. [Sai Ming Lee, China]	agree. Have changed extra-tropical storm to extra-tropical cyclone
11118	6	9	3	10	13	High ocean wave induced by typhoons are very important to East and southeastern Asia as the risk of climate change. We hope to include following reference in this chapter. (Moon et al., (2016) : Recent record-breaking high ocean waves induced by typhoons in the seas adjacent to Korea, Journal of coastal research, 1397-1401) [Inseong Han, Republic of Korea]	this paper is now cited

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4820	6	9	8	9	17	Replace with: "Intensity and damages of severe tropical and extra-tropical storms are characterized by their low pressure centres, high spiral winds, heavy rainfall, associated storm surges and high oceanic tides. The size of a storm determines its footprint on the underlying land or ocean where it falls. These storms pose a major threat to society, infrastructure and marine activities due to their destructive impacts, however, determining the frequency of occurrence of such storm events at a given location may improve the ability of the residing communities and the natural environment to prepare, recover and rebuild after every storm occurrence. Changes in large-scale circulation patterns as a result of climate change may also alter the regions where storms form or travel thereby exposing newer regions to new or more frequent hazards." [Qudsia Zafar, Pakistan]	Some parts of this suggestion have been incorporated
16016	6	9	8	17		Suggest to also include mention of translation speed as a key attribute of storms, important in the context of physical impacts (see Kossin, 2018). A slower moving storm can cause high rainfall rate in locations leading to localized flash flooding. This is a common occurance in Pacific island countries, where a slow-moving low pressure system or low category tropical cyclone can lead to significant flooding and resultant cascading impacts, for example, the Honiara flash flood in 2014 see https://www.researchgate.net/publication/308697828_Lessons_from_the_April_2014_flood_disaster_in_Honiara_Solomon_Islands [Olivia Warrick, New Zealand]	we have addressed translation speed and also acknowledge slow moving storms that lead to high rainfall
22286	6	9	8	9	17	A good introductory paragraph, but it might benefit from some general references [Andra Garner, USA]	some references have been added
24448	6	9	11	9	12	Is this statement orrect? Some of the most damaging cyclones in terms of ecosystem impacts, human lives and financial cost have not been the strongest cyclones [Hans-Otto Poertner and WGII TSU, Germany]	agree with the comment but it doesn't apply to the lines mentioned which are discussing the storm size and hence its potential for impact
11538	6	9	13	9	13	"ability for communities" should be changed to "ability of communities" [Taehyun Park, Republic of Korea]	done
10150	6	9	15	9	15	ENSO is only defined in the executive summary for the chapter - It should be spelled out here. [APECS Group Review, Germany]	done
17278	6	9	15	9	15	ENSO is very relevant for the sequencing of extreme weather and climate events, suggest to spell it out here [Iulian Florin Vladu, Germany]	done
23210	6	9	15	9	16	Connectng ENSO with extreme weather event might be not appropriate or not enough as an example. [Dongxiao Wang, China]	The sentence has been split to make clear about the role of modes of variability on influencing the frequency and locations of extreme events such as TCs
17306	6	9	17	9	17	a rerference is needed at the end of "changes in large scale.... Or more frequent hazards (ref) [Cecilia Conde, Mexico]	some references have been added
15658	6	9	21			A comma must be added after However [Hamid Nebdi, Morocco]	OK

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
17308	6	9	40	10	13	the section starts with attribution, without mentioning detection. In pag 15, it is stated that "TC attribution in most published studies are generally being inferred without support from a confident climate change detection. Authors should answer that first [Cecilia Conde, Mexico]	For extreme events, the method of event attribution is being used. In that it is noted that record-breaking weather and climate events can be expected to occur with or without climate change as the observed record lengthens. Event attribution begins with the premise that the climate is changing the goal is to determine statisticall,y by how much climate change has contributed to the severity of the event in question (Trenberth et al 2015; Shepherd, 2016). Additional text has been added to the beginning of this section to make this clear
14084	6	9	42	13	1	is it possible to add a paragraph that discusses the more frequent occurrence of rare tropical cyclone events in which cyclones grow and affect in unusual regions, such as the Cempaka and Dahlia cyclones in southern Java (november 2017), TC Sagar in northeastern Somalia (May 2018) and elsewhere? It is important for this very rare occurrence of attributes of cyclone occurrences to be part of and caused by climate change. [Siswanto Siswanto, Indonesia]	We have found literature that attributes greater cyclone frequency in the Arabian Sea to increasing sea surface temperatures and so have included this in Table 6.2.
23204	6	9	42	9	47	suggest including atmospheric blocking in the list of ocean influencing atmospheric extremes: possible references: Jensen, A.D., 2015: A Dynamic Analysis of a Record Breaking Winter Season Blocking Event. Advances in Meteorology, 2015, Article ID 634896, 9 pages. or S.-Y. Wang, L. Hipps, R. R. Gillies, and J.-H. Yoon, “Probable causes of the abnormal ridge accompanying the 2013-2014 California drought: ENSO precursor and anthropogenic warming footprint,” Geophysical Research Letters, vol. 41, no. 9, pp. 3220–3226, 2014. Or Lupo, A.R., S.J. Colucci, I.I. Mokhov, and Y. Wang, 2015: Large-scale dynamics, anomalous flows, and teleconnections: 2015 Edition. Advances in Meteorology, Special Issue: Large Scale Atmospheric Science, 2015 Volume 2015 (2015), [Anthony Lupo, USA]	We have included a short section on blocking with extra-tropical cyclones.
24450	6	9	43	9	43	If climate events, then isn’t the phrase coral bleaching conditions? [Hans-Otto Poertner and WGII TSU, Germany]	corrected
4994	6	9	46	9	47	suggest to add at the end of the line 47:", and severe cold climate Snow–Dust Storms in Iceland (Dagsson-Waldhauserova et al. 2015)". Suggested New Citation: Dagsson-Waldhauserova, P., Arnalds, O., Olafsson, H., Hladil, J., Skala, R., Navratil, T., Chadimova, L. & Meinander, O. Snow-Dust Storm: Unique case study from Iceland, March 6-7, 2013, Aeolian Research, doi: 10.1016/j.aeolia.2014.11.001, 2015. [Outi Meinander, Finland]	Due to space limitations, this was not included
1058	6	10	0			Table 6.2: Delete "?" in header of fifth column [Vineel Yettella, USA]	corrected
4822	6	10	0	10		Table 6.2, Row 1, SAM??? Please define. [Qudsia Zafar, Pakistan]	corrected
4824	6	10	0	10		Table 6.2, Row 2, please define AMO and ENSO. [Qudsia Zafar, Pakistan]	corrected
10154	6	10	0	10		Table 6.2 2008 Western Pacific Islands - last sectence in the impacts column needs editing specifically "across 8 province of PNG" [APECS Group Review, Germany]	corrected
10156	6	10	0	10		Table 6.2 2011 Western North Pacific - Impacts column data presentation is not consistent with the other rows and is confusing presented in this manner [APECS Group Review, Germany]	this has been fixed

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11116	6	10	0	13		In Table 6.2, it should be needed to explain the icons in year category. And, extreme events in table 6.2 and figure 6.2 were usually concentrated around the Northwestern Atlantic and Southwestern pacific. So, I think that more useful informations about extreme events due to TS around another regions are have to described in this table and figure. [Inseong Han, Republic of Korea]	heading has been changed to indicate the column is year and event type
11174	6	10	0			Table 6.2: Please provide consistency with the notations (M presumably as million, and billion). For example, 'USD 30M/ann', while on Page 12, the notation is stated as 'USD0.5 billion'. [Mastura Mahmud, Malaysia]	This has been done
15308	6	10	0		13	are these events logos or features certified? , and Is it possible to add a column representing the sources of climate change: natural or anthropogenic ? [Maitham Sultan, Iraq]	We will work with the TSU on the final style of the figure and the icons that are used. In the interests of space we include only one column but describe what the attribution is to.
17312	6	10	0	13		The attribution column has cases based on observed and other based on model results. Maybe point explicitly when it is the result of modeling [Cecilia Conde, Mexico]	We have added some words in the introductory section to 6.3.2 about event attribution as well as the table caption. We have also made it more explicit on the methods used in the table entries.
1052	6	10	8	10	9	The sentence "The findings of the studies....ocean and cryospheric events" is unclear. Suggest rewriting it the following way: "The findings of the studies indicate how the role of climate change in ocean and cryospheric extreme events is strengthening through time" [Vineel Yettella, USA]	this sentence has been rephrased as suggested
11540	6	10	8	10	9	The sentence beginning "The findings" is unclear and should be rephrased [Taehyun Park, Republic of Korea]	this sentence has been rephrased as suggested
1054	6	10	9			Suggest citing the three studies [Vineel Yettella, USA]	these studies have been cited
1056	6	10	9			Replace "the most recent edition" with "the most recent annual report" [Vineel Yettella, USA]	this has been done
23172	6	10	9	10	9	"most recent edition" ---of what? [Aimé Fournier, USA]	this has been altered
16020	6	10	13			Suggest that this section should acknowledge regions where attribution studies have been limited, either due to methodological constraints (data availability etc.) and/or lack of capacity/imperative by regional/national technical institutions. Pacific islands is one such region. [Olivia Warrick, New Zealand]	this has been done
11542	6	10	15	12	1	The Golden Bay NZ cells 15-5% should be 5-15% or may need correction. 2015 North America statement that it was the third largest hurricane season since 1949. What does this mean? longest season? greatest number of hurricanes? TheAtlantic 2015 season appears to have been the third consecutive below average season on record, although it was above average for the Pacific. The relationship with intense snowstorms needs to be clarified [Taehyun Park, Republic of Korea]	this has been corrected
4996	6	10	16	13	1	Cryospheric extreme and rare events are missing! e.g., extreme snow fall cases, and severe cold snow-dust storms in Iceland (Dagsson-Waldhauserva et al. 2015). [Outi Meinander, Finland]	some cryospheric and snowfall events have been included
5622	6	10	16	13	1	There is no legend explaining the symbols occuring in this table. We think a legend would be helpful, especially when mapping events to Figure 6.2. [Roderik Van De Wal, Netherlands]	A legend has been added
5624	6	10	16	13	1	La Niña is erronously spelled 'La Nina' a couple of times. [Roderik Van De Wal, Netherlands]	This has been corrected

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
12842	6	10	16	13	6	Table 6.2 and Figure 6.2 - are there really no examples around Africa / Europe? (makes it look as though impacts are not relevant in these geographies). The table includes some arguably non oceans / cryosphere examples (e.g. record heat in Asia, Thailand the description doesn't make it obvious why it is in the SROCC) [Stephen Cornelius, UK]	The cases selected focus on extreme events that have a more obvious link to oceans or cryosphere in either the event or its impact. However, we have included a new type of extreme that had impacts on northern Africa
20632	6	10	16	13	1	Table 6.2.: An analysis of 74 large-scale post-disaster assessments between 2006 and 2016 conducted by FAO (2018) found that the fisheries and aquaculture sector is highly vulnerable to disasters. Of these, storms (such as hurricanes), floods and tsunamis caused roughly 82 percent of the overall damage and loss to the fisheries subsector (http://www.fao.org/3/I8656EN/i8656en.pdf). Because of this, it is suggested that Table 6.2 mentions the impacts of record breaking extreme events on fisheries in the "impact" column. Nigel C Sainsbury et al (2018) has collected specific information on the ecological, scoial and economic impacts of storms on fisheries (Sainsbury, N.C, Genner., M.J, Saville G.R, Pinnegar, J.K, o'Neill C. K., Simpson, S.D. and Turner. R.A. 2018. Changing storminess and global capture fisheries. in: Nature Climate Change https://www.nature.com/articles/s41558-018-0206-x). Other examples of impacts can be found in table 1 "types of damage to fisheries and aquaculture showing damage to productive assets and primary and secondary impacts on ecosystems", Poulain & Lee. Chapter V, In: FAO. 2018. 2017 the impact of disasters and crisis on agriculture and food security (http://www.fao.org/3/I8656EN/i8656en.pdf) [Florence Poulain, Italy]	Have added this reference to selected cases in Table 6.2
22288	6	10	16	10	16	Table 6.2 could use some aesthetic updates in future drafts, including more prominent headings, and consistency for whether or not events of the same year all include a year label, or if only the first row in the table for that year gets the year label. [Andra Garner, USA]	The table and figure have been substantially revised to improve aesthetic appearance and consistency of information
22660	6	10	16	13	1	Excellent and extremely useful table, would be good to have more precise cost information (e.g. 2005 Hurricane Katrina and similar examples, where it only says "costliest … disaster" - there must be a number available for this, such as "upward of …USD billion"). [Eva Kruemmel, Canada]	thankyou, more precise information has been added
24452	6	10	16			Is this table comprehensive, or the best examples? Suggest selecting a set of the most robust examples that are relevant to SROCC. An extended table if desired, could be placed in SOM [Hans-Otto Poertner and WGII TSU, Germany]	we have selected examples that have a more obvious link to oceans or cryosphere in either the event or its impact with attention to regional coverage and so have removed some examples that were less relevant
15660	6	10	17			In Table 6.2 Year 2010 ref. 45 must be changed as given in the others (Name of the Author…) [Hamid Nebdi, Morocco]	the statement and reference have been corrected
10158	6	10	34	10	42	E1a. Spelling correction needed three times "La Niña" [APECS Group Review, Germany]	This has been corrected
10160	6	11	0	11		Table 6.2 2014 Western Tropical & NE Pacific Ocean, Attribution column - Please reword section beginning with "during the 2014…" [APECS Group Review, Germany]	This has been corrected
10162	6	11	0	11		Table 6.2 2014 Western Tropical & NE Pacific Ocean, Attribution column - is the word "likely" intended to invoke the IPCC confidence language? [APECS Group Review, Germany]	reworded to avoid using likely
12632	6	11	0	11		Golden Bay event - no date [Alexander Milner, UK]	date added

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
13934	6	11	0			Hawaiian hurricane: "Third largest hurricane season" does this mean there have been three extreme events since 1949 or that this is the third-largest since then? If the latter, when were the second-largest and largest? Same for North America. [Debra Roberts and Durban Team, South Africa]	this has been corrected
3202	6	11	1	11	1	For Sandy, there are also analyses of the role of tracks and SST. [Robert Kopp, USA]	these studies have been cited
22290	6	11	1	11	1	It seems that the "Meteorological record-breaking event" description for the first entry for 2015 (North America snowfall) is incorrect. Rather than a description of winter storms, the table has the same description as two rows above, for the 2014 Hawaiian hurricane season ("Third largest hurricane season since 1949"). [Andra Garner, USA]	this text has been removed
5626	6	11	2	11	2	Incorrect citation of the increased amount of total available moisture due to anthropogenic emissions. Dean et al., 2013 lists 1-5% instead of the reported 15-5%. [Roderik Van De Wal, Netherlands]	this has been corrected
24454	6	11	5			Maybe the approach of Chapter 18 AR5 WGII Figure 18-3, showing indication of major or minor role of climate change and level of confidence would improve the messaging in this figure?? [Hans-Otto Poertner and WGII TSU, Germany]	Considered to be too difficult due to liited literature in some cases
5628	6	11	6	11	6	About row 6 of table 6.2 at page 11: Column 3 mentions global SST, whereas column 2 refers to specific parts of the Atlancic and Pacific oceans. This seems inconsistent. [Roderik Van De Wal, Netherlands]	Blobal mean is made up of both positive and negative regional anomalies. We simply point out the large positive anomalies
5630	6	11	9	11	9	In row 9 of table 6.2 at page 11, the content of column 3 and symbol column 1) are incorrect. It mentions 'Third largest hurricane season since 1949' as the meteorological record-breaking event, whereas the row is about winter weather in North America, which is unrelated to the hurricane season. [Roderik Van De Wal, Netherlands]	this has been corrected
3232	6	11	10	11	10	To include Patricia Hurricane event on 2015. Patricia Hurricane was category 5 on the Pacific Ocean and broken several records (Rogers, R. et al. 2015). https://journals.ametsoc.org/doi/pdf/10.1175/BAMS-D-16-0039.1 [Mercedes Andrade-Velazquez, Mexico]	Hurricane Patricia has now been included
10164	6	12	0	12		Table 6.2 2016 Central Equatorial Pacific, Attribution Column - needs to be a complete sentence to be consistent with the rest of the Table. [APECS Group Review, Germany]	this has been corrected
11176	6	12	0			Table 6.2 for the Artic region, the symbol and its color is not that clearly demarcated in Figure 6.2 [Mastura Mahmud, Malaysia]	New icon has been created
11178	6	12	0			Table 6.2. SOUTH ASIA is probably better to represent India. Alternatively, another suggestion would be “Asia: India and Thailand”. [Mastura Mahmud, Malaysia]	due to length considerations and the need to focus more on extreme events with a strong oceanic or cryospheric link, this example has been removed
11180	6	12	0			Table 6.2: “USD0.5 billion total loss in the agricultural production of about half a billion U.S.” Repetition? Suggest delete “of about half a billion US” [Mastura Mahmud, Malaysia]	due to length considerations and the need to focus more on extreme events with a strong oceanic or cryospheric link, this example has been removed
16094	6	12	0	13		The last line of the table in page 12, the author also talked about California, United States, however, no referrences are about California here. In the last column, it reads "Both anthropogenic and the 2015–2016---, " , this should be "Both anthropogenic factors and the 2015-2016 strong EL NINO---". Besides, ONLY in Sun and Miao (2018), they increased the risk of the event tenfold, not for all the three areas. [Yixing Yin, China]	due to length considerations and the need to focus more on extreme events with a strong oceanic or cryospheric link, this example has been removed

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22296	6	12	0	12		in Table 6.2, for 2016 event over Asia, Thailand: If it is Asia region then more than two countries are expected to represent this region. Alternatively, it can be simply, "India, Thailand". [Ruksana Rimi, UK]	due to length considerations and the need to focus more on extreme events with a strong oceanic or cryospheric link, this example has been removed
22298	6	12	0	12		in Table 6.2, for 2016 extreme rainfall event over California: "Both anthropogenic and the 2015– 2016 increased the risk of extreme rains tenfold" Not clear what reason "2015-2016" is indicating to [Ruksana Rimi, UK]	due to length considerations and the need to focus more on extreme events with a strong oceanic or cryospheric link, this example has been removed
5632	6	12	1	12	1	In table 6.2, row 1 at page 12, 'the sixth largest flood in Virginia Key, Florida since 1994' does not sound particularly extreme. If this event is included because of the larger likelyhood, consider mentioning this explicitly. [Roderik Van De Wal, Netherlands]	it is an example of an attribution study to a particular type of hazard and hence is retained.
5634	6	12	4	12	4	In table 6.2, row 4 at page 12, the 2016 global warmth extreme could be specified more. Perhaps several regions where warming was extreme w.r.t. the climatology can be mentioned, or the global temperature anomaly can be specified. If this is the warmest year on record, this could also be explicitly mentioned. [Roderik Van De Wal, Netherlands]	this event did not have a specific link to oceans and cryosphere so is discussed in the text but removed from the table
5636	6	12	9	12	9	A few words are missing in column 5, row 9 of table 6.2 at page 12. It should presumably be: Both anthropogenic emissions*/forcing* and the 2015–2016 El Nino* increased the risk of extreme rains tenfold (Hope et al., 2018; [Roderik Van De Wal, Netherlands]	due to length considerations and the need to focus more on extreme events with a strong oceanic or cryospheric link, this example has been removed
10166	6	12	25	12	25	E1a. Spelling correction needed in "El Niño" [APECS Group Review, Germany]	this has been corrected
4826	6	13	0	13		In general all abbreviations used in Table 6.2 need to be defined earlier in the chapter context. [Qudsia Zafar, Pakistan]	This has been noted
10168	6	13	0	13		I think this section would be easier to comprehend if Figure 6.2 is presented before Table 6.2. [APECS Group Review, Germany]	The order has been reversed as suggested
11182	6	13	0			Table 6.2 “Great barrier reef” The color of symbol is not clear in the map on Figure 6.2 [Mastura Mahmud, Malaysia]	Symbols have been revised including a more brightly outlined bleached coral symbol
11184	6	13	0			Fig 6.2. Some of the symbols shown on the map are not clear, especially for corals and ice., Fig 6.2. Symbols are not clear due to uncomplimentary contrast of colors in the figure. [Mastura Mahmud, Malaysia]	Symbols have been revised
6408	6	13	1	13	1	I'm surprised to not see the springtime low record in Antarctic sea ice extent of November 2016 stand in the table (https://phys.org/news/2016-12-sea-ice-lows-november.html). The observed value was 6 standard deviations away from the climatological mean, this event can therefore be qualified as extreme. Whether this event was natural or not is of course another question. [François Massonnet, Belgium]	This event has been added
17310	6	13	1	13	1	Perhaps include the Cape Town case, using the "Accumulated daily rainfall at Cape Town Ariport". [Cecilia Conde, Mexico]	check this
10170	6	13	2	13	2	E1a. Add symbol labels to Figure 6.2 to clarify and unify the readers perception [APECS Group Review, Germany]	This has now been added
10172	6	13	2	13	2	E1a. Consider moving Figure 6.2 before Table 6.2 for better understanding [APECS Group Review, Germany]	The order has been reversed as suggested
15662	6	13	2	13	3	Somethings is wrong in the map of Figure 6.2 between Morocco and Mauritania [Hamid Nebdi, Morocco]	A different map background will be used for the final figure
13212	6	13	3	13	3	the figure and table are great but I think it would still be helpful to explain at least the symbols in the caption, i.e. extreme rains, heat etc. [Baerbel Hoenisch, USA]	A table to define the symbols has been added

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5638	6	13	5	13	6	The location of hurricane Ophelia, occurring in the eastern Atlantic in 2017 (last row of table 6.2), is not indicated in figure 6.2. [Roderik Van De Wal, Netherlands]	This has been corrected
22292	6	13	5	13	5	Is it possible to in some way color code the symbols to allow the specific events from Table 6.2 to be more directly mapped to the figure? Also, are all of the events from Table 6.2 on the map? For example, I don't see Ophelia on the map--should it be? If some of the events from the table are intentionally left off of the map, I suggest adding some clarification. [Andra Garner, USA]	This has been corrected
5640	6	13	12	13	14	The phrase 'all other factors equal' is confusing. Is it meant that factors like subsidence are not considered? Perhaps a rephrasing such as 'while other factors like subsidence are not considered' would make more clear what is meant with this phrase. [Roderik Van De Wal, Netherlands]	This sentence was removed to shorten the section
15664	6	13	12			Line must be corrected as Tropical Cyclones (TC) … [Hamid Nebdi, Morocco]	this has been done
1060	6	13	13	13	14	Consider replacing "how the tropical cyclone climate will change" with "how tropical cyclones will change as the climate warms" [Vineel Yettella, USA]	This sentence was removed to shorten the section
4828	6	13	13	13	14	"determine how the tropical cyclone climate will change." Not clear. Does this mean how climate change will affect the TCs ? ' [Qudsia Zafar, Pakistan]	This sentence was removed to shorten the section
11544	6	13	13	13	13	Change "all other factors equal" to "all other factors being equal" [Taehyun Park, Republic of Korea]	This sentence was removed to shorten the section
4830	6	13	15	13	16	" and we assess that there is low confidence in attributing global changes to any particular cause." Not clear. Which cause is this refered to? [Qudsia Zafar, Pakistan]	this was a direct quote from the last IPCC assessment (Hartmann et al, 2013). However, this paragraph has been shortened due to page constraints and so the sentence in question is no longer there
4832	6	13	16	13	19	"In the North Atlantic…..for this observed trend". Please include proper references in support. [Qudsia Zafar, Pakistan]	this was a direct quote from the last IPCC assessment (Hartmann et al, 2013)
10174	6	14	2			Possible IPCC confidence language un-italicized "likely" [APECS Group Review, Germany]	corrected
10176	6	14	3			Possible IPCC confidence language un-italicized "likely" [APECS Group Review, Germany]	corrected
10178	6	14	6			Possible IPCC confidence language un-italicized "low confidence" [APECS Group Review, Germany]	corrected
10180	6	14	7			Possible IPCC confidence language un-italicized "medium confidence" [APECS Group Review, Germany]	corrected
10182	6	14	11			Possible IPCC confidence language un-italicized "likely" [APECS Group Review, Germany]	corrected
4834	6	14	14	14	18	Context not clear. Needs to be rewritten in two or more sentences. Also in order to discuss aerosols, a brief account of their forcing should be mentioned in introduction as well to discuss it later in the chapter. [Qudsia Zafar, Pakistan]	sentence has been split in two. Discuss aerosol comment
13936	6	14	15	14	15	Insert 'in' after 'variability'. [Debra Roberts and Durban Team, South Africa]	corrected
5642	6	14	18	14	19	In the following part of a sentence, "There have been a number of tropical cyclone dynamical or statistical/dynamical downscaling studies and higher resolution global climate model experiments that support previous projections of future tropical cyclone activity", 'dynamical' is mentioned twice ("dynamical or statistical/dynamical"). We assume it should be either "dynamical or statistical" or "statistical/dynamical". [Roderik Van De Wal, Netherlands]	dynamical studies refer to the analysis of tropical cyclones in climate models where as dynamical/statistical refer to studies where cyclonic vortices are introduced into dynamical models to boost the statistical robustness of findings

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4836	6	14	20	14	20	"previous projections of future tropical cyclone activity". What kind of previous projections. ?? [Qudsia Zafar, Pakistan]	this sentence refers to the AR5 projections reported in the previous paragraph. Have made this clearer
4838	6	14	23	14	25	"One study…previous assessments". No need of this sentence. [Qudsia Zafar, Pakistan]	this sentence has been retained
22300	6	14	23	14	24	Instead of writing "one study", directly can mention "findings from Emanuel (2013) was notable for …." [Ruksana Rimi, UK]	this has been done
1062	6	14	27			The acronym TC has been used before indicating what it stands for. Rreplace TC with "Tropical Cyclone (TC)" [Vineel Yettella, USA]	it is now defined in the first paragraph of the section
5644	6	14	27	14	27	The abbreviation TC is used without being formally defined above. [Roderik Van De Wal, Netherlands]	it is now defined in the first paragraph of the section
10184	6	14	27			Define TC it has not been defined up to this point in the chapter. [APECS Group Review, Germany]	it is now defined in the first paragraph of the section
17280	6	14	27	14	27	TC definition would add value here [Iulian Florin Vladu, Germany]	it is now defined in the first paragraph of the section
22302	6	14	27	14	27	what is TC? Is it tropical cyclone? If yes, put tropical cyclone (TC) and continue to use TC for whole document [Ruksana Rimi, UK]	this has been done
3236	6	14	29	14	29	Farfan, L. Et al. 2014 [Mercedes Andrade-Velazquez, Mexico]	this paper, dealing with chlorophyll-a (Chl-a) concentrations before and after storm impacts was not relevant to the material discussed in this section so was not included
4840	6	14	34	14	40	"Subsequent follow-up…stratification change".In order to justify last sentence of this para, we need to give arguments in favour of the last sentence mostly in which the studies project increase in the TC intensity. [Qudsia Zafar, Pakistan]	this sentence has been reworded to clarify meaning
1064	6	14	42	14	43	I am not sure what purpose stating that several observed cyclone analyses have been published serves in the context of climate change. Therefore, I suggest removing the sentence "Several observed historical landfalling…. basin (Lee et al., 2012) domains" [Vineel Yettella, USA]	this sentence has been removed
4842	6	14	42	14	45	Replace with: "Extensive research has been conducted on TC cyclone activity using historical observations at global level (Weinkle et al., 2012) with several studies performed at northwest Pacific basin (Lee et al., 2012). Studies have also been performed regarding challenges in detecting TC intensity and associated climate change signal (Sobel et al., 2016)." Here also give an account what these studies have actually explored. [Qudsia Zafar, Pakistan]	the sentences in question were removed to shorten the section overall. Sobell et al 2016 - add more

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
5176	6	14	42	14	45	Since AR5, there was noticeable research progress on observed historical tropical cyclone (TC) analysis for the western North Pacific (WNP) basin, in particular on the improvement in the consensus between best track datasets and trends of intense TCs since late 1970s. In short, amid a general decrease in overall tropical cyclone frequency, an increase in the number and intensification rate for intense TCs, such as Cat. 4-5, in WNP since mid-1980s, was observed by a number of studies using various statistical methods to reduce the uncertainty in intensity assessment among datasets. Also, significant northwestward shift in TC tracks and poleward shift in the average latitude where TCs reach their peak intensity in the WNP have also been reported since 1980s. The prevailing track changes also resulted in an increase in the exposure of TC passage and landfalling in some regions, including eastern China, Japan, and Korean Peninsula in last few decades (e.g. Kang and Elsner, 2012; Zhao and Wu, 2014; Park et al., 2014; Mei and Xie, 2016; Kossin et al., 2016; Li et al., 2017; Song and Klotzbach, 2018). References: 1. Kang, N. Y. and J.B. Elsner, 2012 : Consensus on climate trends in western North Pacific tropical cyclones, Journal of Climate, 25, 7564-7573. 2. Kossin, J. P., K. A. Emanuel, and S. J. Camargo, 2016: Past and projected changes in western North Pacific tropical cyclone exposure. Journal of Climate, 29, 5725-5739. 3. Li, C.Y., W. Zhou, C.M. Shun and T.C. Lee, 2017 : Change in Destructiveness of Landfalling Tropical Cyclones over China in Recent Decades, Journal of Climate, 30, 3367-3379, http://dx.doi.org/10.1175/JCLI-D-16-0258.1 4. Mei, W. and S.P. Xie, 2016 : Intensification of landfalling typhoons over the northwest Pacific since the late 1970s, Nature Geoscience, 9, 753–757. 5. Park, D.S.R., C.H. Ho, and J.H. Kim, 2014 : Growing threat of intense tropical cyclones to East Asia over the period 1977-2010, Environmental Research Letter, 9, 014008. 6. Song, J.J. and P.J. Klotzbach, 2018 : What Has Controlled the Poleward Migration of Annual Averaged Location of Tropical Cyclone Lifetime Maximum Intensity Over the Western North Pacific Since 1961?, Geophysical Research Letters, 45 (2), 1148-1156. 7. Zhao, H.K. and Liguang Wu, 2014 : Inter-decadal shift of the prevailing tropical cyclone tracks over the western North Pacific and its mechanism study, Meteorol. Atmos. Phys. 125, 89-101. [Sai Ming Lee, China]	thank you. Have added some of the more recent references
854	6	14	47	14	49	replace by: the twentieth-century combined effect caused by the industrialization of cyclones with antropenic forcing will cough the climate system and preheat tropical cyclones either annually or seasonally. [Belkacem Balah, Algeria]	the sentences in question are commenting on event attribution and have not been changed
3204	6	14	47	14	53	I think it may be helpful to distinguish between attribution of an event (did climate change cause Harvey) and attribution of the enhancement of its characteristics (given Harvey, how did climate change increase its precipitation), per Trenberth et al (2015). [Robert Kopp, USA]	This has been elaborated upon in section 6.3.2 including citing Trenberth et al (2015)

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4844	6	14	47	14	54	Replace with: "A relatively recent development in detecting climate change signals for TCs is the event attribution approach where individual TCs or anomalous seasonal TCs influenced by anthropogenic forcing are explored (Lackmann, 2015; Murakami et al., 2015; Takayabu et al., 2015; Zhang et al., 2016; Emanuel, 2017). Apart from model-based attribution in change detection, van Oldenborgh et al. (2017) and Risser and Wehner (2017) studied observed historical observations (in case of hurricane Harvey) and found detectable human influence." [Qudsia Zafar, Pakistan]	In shortening this section, the relevant text has been revised
22304	6	14	51	14	54	This is a good example. While attribution of climate change for tropical cyclones are challenging, attributing such consequent impacts (i.e, cyclone-related precipitation) from tropical cyclones can give some light on this kind of event's attribution [Ruksana Rimi, UK]	thank you. No changes required
4846	6	14	56	14	56	"tropical cyclone" terms should be replaced with "TC" throughout the chapter [Qudsia Zafar, Pakistan]	this has been done
4848	6	15	3	15	3	delete "across these studies" [Qudsia Zafar, Pakistan]	this has been done
856	6	15	9	15	9	Please: 10% or loss (identify type and nature of losses) [Belkacem Balah, Algeria]	the phrase was "10% or less" (not loss) so no change required
4850	6	15	9	15	9	"and the size changes are variable even in sign". What does this mean? [Qudsia Zafar, Pakistan]	the projected changes in TC size were small (10% or less) and could indicate a small increase or small decrease. The sentence has been rephrased to clarify
4852	6	15	13	15	13	"Taking into account these developments and new findings," replace with: " taking the above into account" [Qudsia Zafar, Pakistan]	done
16004	6	15	13	15	36	Although Kossin et al. (2016) present evidence that the observed poleward migration of the latitude of maximum TC intensity in the western North Pacific is unusual compared to expected natural variability, the pronounced global poleward shift in the latitude at which the maximum TC intensities occur has been identified to be significantly influenced by changes in interbasin frequency (Moon et al., 2015; Environ. Res. Lett. 10; Moon et al., 2016; Environ. Res. Lett. 11). These frequency changes are a larger contributor to the poleward shift than the intrabasin migration component. The strong role of interbasin frequency changes in the poleward migration also suggest that the poleward trend could be changed to an opposite equatorward trend in the future due to multidecadal variability that significantly impacts Northern Hemisphere TC frequency. [Sunghyun Nam, Republic of Korea]	The section has been revised to include reference to Moon et al's study
4854	6	15	18	15	21	Replace with: "Kossin et al. (2016) showed that the observed pole ward migration of the latitude of intense TC activity in the western North Pacific is unusual compared to expected natural variability and therefore there is low-to-medium confidence that this change represents a detectable contribution from anthropogenic forcing." [Qudsia Zafar, Pakistan]	this has been done

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4856	6	15	21	15	36	Replace with: "They relate this to the poleward expansion of tropical circulation as a result of climate change (Bindoff et al., 2013). Following studies performed for finding anthropogenic signals in observed long-term trends in TC activity, present only low confidence: i) decreasing frequency of intense landfalling TCs in eastern Australia since the late 1800s (Callaghan and Power, 2011); ii) increasing frequency of moderately large US storm surge events since 1923 (Grinsted et al., 2012); iii) increasing frequency of intense cyclonic storms over the Arabian Sea in the post-monsoon season (Murakami et al., 2017); and iv) increase in annual global proportion of hurricanes reaching Category 4 or 5 in recent decades (Holland and Bruyère, 2014). Contd..... [Qudsia Zafar, Pakistan]	this has been done noting the accommodation of some other suggested changes
4858	6	15	21	15	36	While an anthropogenic influence on extreme precipitation in general has been detected over global land regions (Bindoff et al., 2013), and recently in some specific regions affected by hurricanes (Risser and Wehner, 2017; van Oldenborgh et al., 2017) an anthropogenic climate change influence has not yet been detected specifically for hurricane precipitation rates. Therefore the lack of climate change detection for most TC metrics continues to limit confidence in both future projections and in the attribution of past changes and events." [Qudsia Zafar, Pakistan]	this has been done noting the accommodation of some other suggested changes
3234	6	15	36	15	36	...a confident climate change detection. Also, it is expected the precipitation decreased on the tropics, the TC contribution on the land precipitation is not clear yet (Farfan, L. Et al. 2014). Estuaries and Coasts (2014) 37:1388–1402DOI 10.1007/s12237-014-9797-2 [Mercedes Andrade-Velazquez, Mexico]	not clear on what is being requested here. due to the requirement to provide a synthesis, it is not possible to cite every regional study.
4860	6	15	38	15	49	All "tropical cyclone" terms should be replaced with "TC" [Qudsia Zafar, Pakistan]	this has been done
13938	6	15	38	15	40	So this means there will probably be the same number or fewer cyclones, but that those that happen will be stronger winds and higher rains? Is there any indication that tropical cyclones will occur in higher latitudes as the tropical ocean belt expands? [Debra Roberts and Durban Team, South Africa]	Yes could add a low confidence statement here (limited evidence) because of Kossin and Sharmila and Walsh
17884	6	15	38	15	49	This paragraph provides a summary of projections, but it is not clear if this is summarizing model results or summarizing what the authors judge will be the future -- suggest making this clear. The basis for the paragraph is not so clear since these concluding statements are separated from the cited literature -- suggest saying why these conclusions were arrived at. And there is no indication if these conclusions differ from the AR5 -- suggest stating if this paragraph modifies the findings of the AR5. [Haroon Kheshgi, USA]	the summary statement is based on expert review of the authors based on the evidence in the literature.
858	6	15	39	15	39	average confidence statistically replace by confidence threshold or probability at average non-exceedance [Belkacem Balah, Algeria]	It was not clear what this comment was specifically recommending. No changes made.
10188	6	15	39	15	40	E1a. Reorder sentence for better understandig "1)... it is easier to read starting with individual basin level and then global frquency... [APECS Group Review, Germany]	preference is to start at the large scale then drill down to the more specific scale. No changes made
860	6	15	40	15	40	trust is weak replaced by: confidence level is low [Belkacem Balah, Algeria]	the comment is unclear. No changes made
10186	6	15	47		49	Throughout this paragraph IPCC confidence language is used. Point 5 should be re-worded to include the confidence language, if possible, for consistency. [APECS Group Review, Germany]	thank you. (very high confidence) has been added

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22294	6	15	47	15	48	Suggest adding some references, potentially including Lin et al. (2016) and/or Garner et al. (2017). [Andra Garner, USA]	these references are cited in the body of the discussion. The sentence here refers to the summary of the evidence provided in the body of the discussion so no references are cited. Hence no change.
23206	6	15	51	16	18	Atmospheric blocking is responsible for high impact weather regimes in the mid-latitides (e.g. Woollings et al. 2018). Models underestimate blocking frequency and duration, and climate models have low confidence in the future occurrence of blocking. There is relatively good agreement among most model scenarios that blocking may decline in the future, but still remain a factor in extreme regional weather. It is known that warm ocean conditions can lead to longer lived and more intense blocking (e.g. Tilly et al. 2008). However, blocking also impacts underlying surface consditions and typically results in warmer surface conditions (e.g. Woolings et al. 2018). Woollings, T. , Barriopedro Cepero, D., Methven, J, Son, S-W., Martius, O., Harvey, B., Sillmann, J., Lupo, A.R., Seneviratne, S., 2018: Blocking and its response to climate change. Current Climate Change Reports, in press. Tilly, D.E., A.R. Lupo, and C.J. Melick, P.S. Market 2008: Calculated height tendencies in a Southern Hemisphere blocking and cyclone event: The contribution of diabatic heating to block intensification. Monthly Weather Review, 136, 3568–3578. [Anthony Lupo, USA]	A paragraph addressing atmospheric blocking has been added.
4862	6	15	53	15	53	"Extratropical cyclones (ETCs) form in defined storm track regions". What defined region?? Are these in the extratropics?? [Qudsia Zafar, Pakistan]	these regions have been defined
4864	6	15	54	15	54	"Jet streams influence their direction and speed of movement." Here we have this understanding that jet streams do not influence TC? [Qudsia Zafar, Pakistan]	Jet streams influences ETCs, not TCs
1066	6	15	55			replace "mid-latitudes" with "midlatitudes" [Vineel Yettella, USA]	this has been corrected
11546	6	15	55	16	2	Long and confused sentence could benefit from rephrasing [Taehyun Park, Republic of Korea]	this sentence has been reworded to clarify its meaning
1068	6	16	5			remove "in a CMIP5 multimodel ensemble" [Vineel Yettella, USA]	done
4866	6	16	7	16	12	Para is about models which is a misfit in the current context (as model results are not being discussed here). Are winter cyclones a category of TC or ETC??? is there any other type of TC or ETC?? if yes then these should be discussed in above paras to make a background for this para. line 9 "A global.....al.,2014c)" is grammatically incorrect [Qudsia Zafar, Pakistan]	model results related to ETCs are being discussed here. Have reworded last sentence of paragraph
22306	6	16	9	16	9	unit is wrong, it should be W/m2 [Ruksana Rimi, UK]	this has been corrected
2372	6	16	14	16	18	Cvijanovic et al 2017 showed a connection of the declining Arctic sea ice to the lack of precipitation in California. (Cvijanovic I., et al. (2017) Future loss of Arctic sea-ice cover could drive a substantial decrease in California's rainfall, NATURE COMMUNICATIONS 8(1947):1–10.) [Kristin Campbell, USA]	This paper is now cited

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
2498	6	16	14	16	18	Cvijanovic et al 2017 showed a connection of the declining Arctic sea ice to the lack of precipitation in California. (Cvijanovic I., et al. (2017) Future loss of Arctic sea-ice cover could drive a substantial decrease in California's rainfall, NATURE COMMUNICATIONS 8(1947):1–10.) [Durwood Zaelke, USA]	This paper is now cited
4868	6	16	14	16	18	In this para, Arctice sea ice should be discussed with the sea ice melting context in the above paras and this section (6.3.3.2) should end with the discussion of TC and ETC. More explanation should be added on ETCs. Effects of aerosols should be discussed in the context of both TCs and ETCs. [Qudsia Zafar, Pakistan]	This paper is now cited
12996	6	16	14	16	18	Cvijanovic et al 2017 showed a connection of the declining Arctic sea ice to the lack of precipitation in California. (Cvijanovic I., et al. (2017) Future loss of Arctic sea-ice cover could drive a substantial decrease in California's rainfall, NATURE COMMUNICATIONS 8(1947):1–10.) [Gabrielle Dreyfus, USA]	This paper is now cited
23232	6	16	16	9	17	"Alter the region' needs to change into a more specific words or maybe change the changes in large scale circulations may have influences on the environment variables related TC genesis and track. [Dongxiao Wang, China]	This applies to page 9 (section 6.3.1). changes have been incorporated
4870	6	16	20	16	20	Section 6.3.3.3, Please define 'wave energy flux' in the first para. [Qudsia Zafar, Pakistan]	It is the rate of transfer of wave energy. This has been added
4668	6	16	23	16	23	Missing "a", e.g. "project up to [a] 30% increase…" [Matthew Menary, UK]	corrected
4872	6	16	25	16	25	"NH" replace with "Northern Hemisphere (NH)" [Qudsia Zafar, Pakistan]	corrected
4874	6	16	26	16	26	"by the relationship" replace with "by their relationship" [Qudsia Zafar, Pakistan]	corrected
4876	6	16	26	16	26	define abbreviations "(AO, ENSO and NAO)." [Qudsia Zafar, Pakistan]	done
17282	6	16	26	16	26	the climate indices AO, ENSO, and NAO could be clearly defined here as they explain long term trends in extreme wave energy flux that affect sea-level [Iulian Florin Vladu, Germany]	done
4878	6	16	27	16	27	"20-member ensemble". 20-member ensemble of what?? how are the ensembles made??? [Qudsia Zafar, Pakistan]	it is an ensemble of wave climate simulations (as stated)
11186	6	16	28			Capitalize North Pacific [Mastura Mahmud, Malaysia]	this comment may relate to page 28
4880	6	16	31	16	31	please define SST. [Qudsia Zafar, Pakistan]	done
4882	6	16	36	16	37	please define SLR and MHW. [Qudsia Zafar, Pakistan]	done
10190	6	16	36			Define SLR. It has not been defined up to this point in the chapter. [APECS Group Review, Germany]	done
10196	6	16	44			Define GCM. It has not been defined up to this point in the chapter [APECS Group Review, Germany]	done
10192	6	16	46			Possible IPCC confidence language un-italicized "low confidence" [APECS Group Review, Germany]	likely changed to probably
10194	6	16	46			Global climate model is spelled out throughout the chapter but it is also used as the abbreviation GCM. Please be consistent. [APECS Group Review, Germany]	changed to GCM
628	6	17	0			Consider replacing measures such as "~500 y" with the more standard "~500y" [William Clarke, Australia]	done
630	6	17	0			Replace "heavy rainfal1" with "heavy rainfall" if the last letter is indeed a numeral as it somewhat appears, though may not be. It could also be that the font has changed. [William Clarke, Australia]	rainfall was correctly spelt
13940	6	17	0			The many acronyms make this text in places almost impossible to read. [Debra Roberts and Durban Team, South Africa]	the acronyms have been defined

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
1070	6	17	4			Insert comma after "show that under sea level rise" [Vineel Yettella, USA]	done
10198	6	17	4			Comma after German Bight [APECS Group Review, Germany]	done
4884	6	17	8	17	8	please define MSL [Qudsia Zafar, Pakistan]	done
3206	6	17	12	17	19	This is not about extratropical cyclones, despite its poistion in the ETC section. This discussion should also be tied to the discussion of ESL frequency amplification in ch 4. [Robert Kopp, USA]	This comment is presumably relating to content on page 16 (not 17) which is in the ETC section. Agree. Although we now include a paragraph on blocking in this section, we have based the assessment on a more recent review of the topic rather than this specific study
4886	6	17	12	17	19	replace "tropical cyclones" with "TC" [Qudsia Zafar, Pakistan]	done
4896	6	17	23	17	32	the seasonal occurrence of TCs and ETC should be discussed [Qudsia Zafar, Pakistan]	due to length constraints, this was not possible
4888	6	17	24	17	26	"In the context…(Yang et al., 2016a) replace with " In this context, western boundary current (WBC) regions are notable for their vulnerability to the regional climatic changes" [Qudsia Zafar, Pakistan]	this change has been made
3404	6	17	26	17	30	Revise the use of (), please. [Castor Muñoz Sobrino, Spain]	Sentence has been rewritten to eliminate brackets
4890	6	17	28	17	29	"Hirata et al. (2016) for the Kuroshio and Pepler et al. (2016a) for the East Australian Current)," replace with " for the Kuroshio (Hirata et al. 2016) and for the East Australian Current (Pepler et al. 2016a)" [Qudsia Zafar, Pakistan]	this change has been made
4892	6	17	29	17	29	replace 'influence' with 'inflict' [Qudsia Zafar, Pakistan]	changed 'influence' to 'intensify'
4894	6	17	31	17	31	please define AMOC. [Qudsia Zafar, Pakistan]	done
4898	6	17	37	17	38	replace with: " that takes in to account the local projected SLR along with TC frequency and intensity changes." [Qudsia Zafar, Pakistan]	done
4900	6	17	38	17	38	"multi-model ensemble". Multi-model ensemble of which models??? [Qudsia Zafar, Pakistan]	this has been clarified
5646	6	17	38	17	40	It is stated that " In a multi-model ensemble they find that relative to 1986–2005 changes in the FI by 2080–2099 are 4–75 times higher for RCP2.6 (10–90th percentile range) and 35–350 times higher for RCP8.5.". This sentence states that changes in the FI are x-y times higher by 2081-2100 relative to 1986-2005, whereas it is presumably meant that the values of the FI are x-y times higher. [Roderik Van De Wal, Netherlands]	this has been corrected
4902	6	17	39	17	39	Put comma after "(1986-2005)" [Qudsia Zafar, Pakistan]	done
4904	6	17	40	17	40	EAC region???? [Qudsia Zafar, Pakistan]	this has been rephrased
4906	6	17	45	17	45	Replace "required to simulate" with "for simulating" [Qudsia Zafar, Pakistan]	done
1072	6	17	46			Replace "to compound hazards is several new studies" with "to compound hazards are several new studies" [Vineel Yettella, USA]	done
4908	6	17	47	17	47	"western boundary currents". Use WBC onwards as this has been defined previously. [Qudsia Zafar, Pakistan]	done
20634	6	17	51	18	21	In 6.3.4., "Impact from cyclones", mention loss of lives at sea (not only on land) due to cyclones. Cyclone Ockhi which hit Inda in November 2017 is an example of this. Almost all the victims of this disaster were either short- or long-haul fishers on board vessels. [Florence Poulain, Italy]	we removed any specification to land or sea in terms of loss of life.
3208	6	17	53	18	21	See also Hsiang, S. M., & Jina, A. S. (2014). The causal effect of environmental catastrophe on long-run economic growth: Evidence from 6,700 cyclones (No. w20352). National Bureau of Economic Research. [Robert Kopp, USA]	Hsiang et al. 2017 is cited instead in section 6.8 to denote consequences on long-term economic growth/sectors.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4910	6	17	53	18	3	Replace with: "Impacts from weather extremes such as TCs are principally assessed by hazard, exposure and vulnerability of a specific location or region. As shown in previous assessments, increased exposure to hazards such as TCs and ETCs associated with heavy rainfall, storm surges and flooding, is a major driver of increased risk in terms of damages (Handmer et al., 2012; Arent et al., 2014). Changes in impacts are therefore determined by changes in hazard along with sensitivity or tipping points (flooding for instance triggered by sea level rise) and local exposure characteristics." [Qudsia Zafar, Pakistan]	rephrased. Aslo reflected in Fig 6.1
24456	6	17	53			aren't the extreme climate events the hazard? [Hans-Otto Poertner and WGII TSU, Germany]	hazard has the potential (risk) to harm/damage. Event is seen more neutrally as a phenomenon
16024	6	17	56	57		"signals from anthropogenic climtae change have not been shown" this statement is confusing for the reader given the earlier overview in section 6.3.3.1 of medium confidence in increases in TC-related precipitation extremes, and TC intensity [Olivia Warrick, New Zealand]	This was an error. Sentence now corrected.
20636	6	18	5	18	11	In 6.3.4: Cyclones also affect marine life and habitats that support productive fisheries as well as fishing itself. There is some evidence that fish may evacuate storm areas or be redistributed by storm waves and current but this requires further exploration (Sainsbury, N.C, Genner., M.J, Saville G.R, Pinnegar, J.K, o'Neill C. K., Simpson, S.D. and Turner. R.A. 2018. Changing storminess and global capture fisheries. in: Nature Climate Change https://www.nature.com/articles/s41558-018-0206-x). Other examples of damage to fisheries from cyclones and storm surges can be found in Poulain & Lee, table 1, Chapter V, of: FAO. 2018. 2017 the impact of disasters and crisis on agriculture and food security (http://www.fao.org/3/I8656EN/i8656en.pdf) [Florence Poulain, Italy]	done
24458	6	18	5	18	8	can you provide specifics eg examples, numbers? [Hans-Otto Poertner and WGII TSU, Germany]	done
4912	6	18	6	18	8	Replace with: "The relation between changes in TCs, ETCs and property losses is however complex, and there are indications that wind shear changes (in intense TCs and ETCs) may have larger impacts than changes in global temperatures (resulting in increased frequencies of TCs and ETCs) (Wang and Toumi, 2016)". [Qudsia Zafar, Pakistan]	done
5648	6	18	6	18	8	About the sentence, "The relation between changes in tropical cyclones and property losses is however complex, and there are indications that wind shear changes may have larger impacts than changes in global temperatures (Wang and Toumi, 2016)": This states that changes in wind shear influence the relation between tropical cyclones and property loss, whereas it in fact only influences tropical cyclones, and not the relation between tropical cyclones and property losses. [Roderik Van De Wal, Netherlands]	done
10200	6	18	17			GCM is used above (pg 16 line 44) and should be defined there. [APECS Group Review, Germany]	Changed to 'models'
23218	6	18	18	18	18	"an RCP8.5 scenario" is "a RCP8.5 scenario" [Dongxiao Wang, China]	Changed to "the RCP8.5..."
20638	6	18	24	18	24	change 6.3.5 title to: Risk management and adaptation [Florence Poulain, Italy]	done

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4914	6	18	26	18	40	replace with: "Generally, there is a lack of understanding in predicting storm surge associated with a TC or ETC. Storm surge, for example, is a rare occurrence often accompanied by hurricanes, cyclones, and typhoons that change track, therefore are difficult to predict because they tend to be new or rare to the locality (Lagmay et al., 2015). Morrow et al., 2015 highlights problems in issuance of early warning of storm surge and accurate surge maps. So far scant literature is present related to storms that change track. Relatively well studied are Super storm 'Sandy' that landed in New York in 2012 and Typhoon Haiyan that hit Philippines in 2013.Contd to row100. [Qudsia Zafar, Pakistan]	rephrased taking into consideration the comment
4916	6	18	26	18	40	In both cases, the severity and intensity of both storms was unexpected. The impacts were larger than any previous storm which could have been avoided by considering the advance early warnings and evacuation directives. In case of Typhoon Haiyan, the dissemination of warnings via scripted text messages ineffectively explained the difference of Haiyan accompanying storm surge with the usual or 'normal' storms which people were accustomed to (Lejano et al., 2016). Additionally, poorly managed evacuations, traffic jams and far flung evacuation sites also contributed to less than half of the population being evacuated in New Jersey (Kulkarni et al., 2017), resulting in higher number of casualties during Sandy (Dalisay and De Guzman, 2016)." [Qudsia Zafar, Pakistan]	rephrased taking into consideration the comment
14012	6	18	26	19	5	Good discussion here. Just wonder though why only examples for the US are used in this sub-section. [Debra Roberts and Durban Team, South Africa]	we have Haiyan as well. We selected these cases because of their changed tracks plus most well-documented in peer-reviewed literature
16026	6	18	26			"storm surge ... is a rare occurance in areas prone to hurricanes" - ??? Perhaps it should read 'is NOT a rare occurance' ? [Olivia Warrick, New Zealand]	removed the phrase
5650	6	18	27	18	29	In the current phrasing, it seems that storm surges are a particular feature to storms that change track, though storms that change track are not occampanied by storm surges more often than storms that do not change track. Consider changing it to 'Storms, also those that changed track, are often accompanied by storm surge. [Roderik Van De Wal, Netherlands]	removed the phrase
20640	6	18	29	18	30	In 6.3.5: An FAO Workshop (1999) on lessons learned from the 1999 Odisha cyclone, India, highlighted the following issue: capability of fisherfolk on land and at sea to receive cyclone warnings; perception of accuracy of cyclone warnings by fisherfolk; ability to evacuate fisherfolk from the area; desire of fisherfolk to be evacuated from the area; availability of sufficient and adequate shelters from the storm surge; capability of the vessels and crew to either run for shelter or ride out the storm; existence and capacity of rescue and relief organizations to ensure survival in the aftermath. Yadava, Y.S.; Turner, J.M.M; Calvert, P. Report of the Government of India/Government of Andhra Pradesh/FAO Workshop on Measures to Reduce Loss of Life during Cyclones. Vishakapatnam, Andhra Pradesh, India, 4 - 6 March 1999. FAO Fisheries Report. No. 622. Rome, FAO. 2000. 70p. [Florence Poulain, Italy]	we included problems of evacation and warning in 6.3 as well a 6.9 though did not cite specifically 1999 as it was not as pertinent to our treatment of not so 'typical' storms and we also adhered to more recent occurrences
22312	6	18	29	18	29	"A U.S. study on storm surge ....." suggesting to reword phrase [Ruksana Rimi, UK]	done

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
20642	6	18	38	18	40	In 6.3.5: However dissemination of early warning information and evacuation can be very effective. Cyclone Phailin, which hit the State of Odisha, India, in October 2013 and killed 47 people, is an example of this. Fourteen years earlier, in October 1999, another cyclone had struck the same area with the same intensity but killing 9 848 people. [Florence Poulain, Italy]	discussed in 6.9
4918	6	18	42	18	52	Replace with:"Conflicts between local and state governments over land management responsibilities; lack of coordinated state-wide coastal adaptation plans; and clashes among individuals and communities needs have led to buyouts becoming unpopular (Boet-Whitaker, 2017). Buyout programs gained traction after Sandy. Despite resilient designs and sustainable urban plans integrating climate change concerns that are inclusive of vegetation barriers as coastal defenses, more hard-defense structures less sustainable and short-term, were built after Sandy. New retreat and rebuild options were explored for recovery of communities from storm impacts in the past (Binder, 2014). Contd to row 102.. [Qudsia Zafar, Pakistan]	rephrased taking into consideration the comment
4920	6	18	42	18	52	The reason was to resolve conflicts between local and state governments over sharing of land management responsibilities; lack of coordinated state-wide coastal adaptation plans; and clashes among individuals and communities which have led to buyouts becoming unpopular (Boet-Whitaker, 2017). Also relocation is more controversial incurring largest political risk (Gibbs et al., 2016), rarely implemented with much success. " [Qudsia Zafar, Pakistan]	rephrased taking into consideration the comment
20644	6	18	42	18	42	In 6.3.5: Mention building back better (retreat or rebuild or building back better options exist). Storms provide an opportunity for building back better, thus addressing the causes of current vulnerabilities (Wilkinson, E. et al. 2018. Building back better a resilient Caribbean after the 2017 hurricanes. ODI policy brief). Building back better forms one of the four pillars of the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR) [Florence Poulain, Italy]	sustainable plans and resilient designs embed the notion of building back better that we discuss in the last paragraph of 6.3.5
1074	6	18	44	18	46	Replace all semi-colons between these lines with commas [Vineel Yettella, USA]	done
22662	6	18	46	18	47	Note that this is a contradicting statement when compared to Cross-Chapter Box 5, p 9, lines 4 - 6: "Relocation of communities and economic activities in response to the effects of climate change is increasingly being considered as an adaptation option" - as in my previous comments on this statement, the effects on health and well-being also need to be considered. [Eva Kruemmel, Canada]	noted

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4922	6	18	54	19	5	Replace this para with:"In disaster response, coordination between stakeholders is the main cause of concern (Abramson and Redlener, 2013) among government bodies such as in the United States (Olshansky and Johnson, 2014); among government and non-governmental bodies, offering suspended services (Santiago et al. 2016); and among the government and self-organized volunteers that use participatory mapping and social media tools (Wridt et al., 2016). Social media use proliferation during these storms with varied findings related to transmitting second hand information, generating scientific misinformation, understanding sentiments, and providing damage assessment (Guan and Chen, 2014; Knox et al., 2016; Takahashi and Tandoc, 2016)." [Qudsia Zafar, Pakistan]	revised
20646	6	18	54	19	5	Other risk management and adaptation measures include: Contingency Plan of Action, Improved Safety at Sea, Information and communications technology (ICTs) for information about weather forecast and search and rescue operations. In addition Sainsbury et al. (2018) highlight: "technological advances, improvements in the accuracy and communication of weather forecasts, and innovative financial solutions. In Kerala, India, a weather forecast service called Radio Monsoon (https://twitter.com/radiomonsoon) provides daily information over loudspeaker in harbours and through social media. Insurance schemes triggered by environmental indices are growing in popularity in terrestrial agriculture and could increase the resilience of fisheries to increased storminess." (https://www.nature.com/articles/s41558-018-0206-x) [Florence Poulain, Italy]	these options are discussed throughout the chapter specific to the event assessed
15316	6	19	0			possibility of referring to the Implications of Marine Heat Waves on environment and areas of the coasts, marine water quality , in addition to the oil extraction projects in the marine [Maitham Sultan, Iraq]	Rejected - there is a lack of literature on impact on oil industry.
11188	6	19	2		5	The text highlights the different strategies to solve problems, but coordination may not be properly managed. This can be as a lesson to other countries in terms of disaster management, alternatively set an SOP guidelines. [Mastura Mahmud, Malaysia]	Seems like a wider point discussed in section 6.9
23516	6	19	8	24		marine heat waves should be put in the context of the well known , well established, long known SST positive trend. Calling them "heat waves" without recognizing that this is a trivial effect of using a cooler baseline for comparison is confusing and opens the report up to criticism. The key is whether there are any clear impacts of the changing baseline. It is not evident that the 99% extremes on top of this changing baseline are having important impacts beyond perhaps coral reefs. I suggest a more nuanced presentation that highlights the fact that, perhaps excepting corals, we do not know very well how marine heat waves will impact ecosystems going forward. Will they adjust to a new warmer baseline for example? [Galen Galen Mckinley, USA]	Accepted - we include a short summary of AR5 about recent trends in global ocean heat content and refer to chapter 5 for more details. We also state that heatwaves occur on top of the well-known increase in SST. We also state more clearly that our understanding about the impact of marine heatwaves on marine ecosystems is limited. In addition, we clarified that the current models suggest tjat the most of the increase in marine heatwave occurence can be explained by a shift in the mean global warming (medium confidence).

SROCC First Order Draft Expert Review Comments - Chapter 6							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11120	6	19	10	20	19	East Asia including Korea had experienced the record break heat wave in summer 2016 and 2017. High water temperature by this heat wave was caused to marine mass mortality in aquaculture in Korea. We hope to include the case of marine heat wave around the East Asia like this reference. (Yeh et al. (2018) : The record-breaking heat wave in 2016 over South Korea and Its physical mechanism.) [Inseong Han, Republic of Korea]	Accepted - We now include the Korean marine heatwave and its impact on marine organisms. We also included it in Figure 6.3a.
20648	6	19	12	19	20	In 6.4.1.: it is suggested to mention the proposed new classification system to separate marine heatwaves into categories of intensity and help communicate with the public (Hobday, A.J., E.C.J. Oliver, A. Sen Gupta, J.A. Benthuysen, M.T. Burrows, M.G. Donat, N.J. Holbrook, P.J. Moore, M.S. Thomsen, T. Wernberg, and D.A. Smale. 2018. Categorizing and naming marine heatwaves. Oceanography 31(2), https://doi.org/10.5670/oceanog.2018.205) [Florence Poulain, Italy]	Accepted - We now include the Hobday classification scheme in the text.
11190	6	19	15			. The acronym SROCC was not introduced in this chapter but maybe in previous chapters. [Mastura Mahmud, Malaysia]	Editorial - copyedit to be completed prior to publication
11548	6	19	53	19	53	the term above climatology is not clear. Needs rephrasing. Does it mean above average?? [Taehyun Park, Republic of Korea]	Editorial - Changed to '.. above the 1982-2005 average.'
16510	6	19	56	20	2	The official Peruvian report on this "coastal El Niño" event is ENFEN, 2017: El Niño Costero 2017, Informe Técnico Extraordinario N°001-2017/ENFEN. A brief peer-reviewed report in press is: K. Takahashi, V. Aliaga-Nestares, G. Avalos, M. Bouchon, A. Castro, L. Cruzado, B. Dewitte, D. Gutiérrez, W. Lavado-Casimiro, J. Marengo, A. G. Martínez, K. Mosquera-Vásquez, And N. Quispe, 2018: The 2017 Coastal El Niño [in State of the Climate 2017], Bulletin of the American Meteorological Society, in press. As described in these, the warming was shallow compared with the ENSO related warming. The development of this "coastal El Niño" was also reported in: WMO, 2017: El Niño/La Niña update. 15 February, 2017 (http://www.wmo.int/pages/prog/wcp/wcasp/documents/WMO_ENSO_Feb17_Eng.pdf) Thus, I would propose the following replacement text: "A "coastal El Niño" event (Takahashi and Martínez, 2017; ENFEN 2017) developed in early 2017, with fast and strong shallow ocean warming of up to 10°C off the northern coast of Peru (ENFEN, 2017; WMO, 2017; Ramírez and Briones, 2017; Takahashi et al 2018) was caused by local air-sea interactions involving northerly winds and the strengthening of the Intertropical Convergence Zone in the Southern Hemisphere (Takahashi and Martínez, 2017; ENFEN 2017; Garreaud; Takahashi et al 2018). [Ken Takahashi, Peru]	Accepted - text revised
1076	6	20	0			Replace "atribution" with "attribution" in the legend for Figure 6.3 (a) [Vineel Yettella, USA]	Editorial - text revised.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
1078	6	20	0			Figure 6.3: In caption, replace "degree heating week" with "Degree Heating Week (DHW)" [Vineel Yettella, USA]	Editorial - text revised.
11198	6	20	0			The legends are not legible since the fonts are small and colored lightly (physical system over land, marine ecosystems). [Mastura Mahmud, Malaysia]	Accepted - the figure is now vertically stacked and the colors and fonts enlarged.
10202	6	20	2			Missing section of reference starting with "Garreaud" [APECS Group Review, Germany]	Editorial - text revised.
10210	6	20	2	20	2	E1a. Delete "Garreaud" or do you mean Garreaud 2018? (Garreaud, R. D. (2018). A plausible atmospheric trigger for the 2017 coastal El Niño. International Journal of Climatology, 38, e1296-e1302). https://doi.org/10.1002/joc.5426 [APECS Group Review, Germany]	Editorial - text revised.
11192	6	20	2			Reference for Garreaud should have the year it was published for consistency [Mastura Mahmud, Malaysia]	Editorial - text revised.
11550	6	20	2	20	2	Use of "repeatedly" implies that in each of the period noted there were several such events. Would be better to delete [Taehyun Park, Republic of Korea]	Accepted - text revised
13214	6	20	3	20	12	what does degree heating week mean? Please define [Baerbel Hoenisch, USA]	Accepted - now defined.
5652	6	20	5	20	6	No likelyhood is specified for this causal relationship. [Roderik Van De Wal, Netherlands]	Accepted - text revised
15666	6	20	11		12	Figures 6.3 in (a) and (b) must be in column for more clarity [Hamid Nebdi, Morocco]	Agreed - the figure is now vertically stacked
17042	6	20	11	20	12	Maps to recent marine heat waves and their documented impacts should be enlarged. Icons are not readible. Both maps should be enlarged to page width. [Diana Reckien, Germany]	Agreed - the figure is now vertically stacked
11122	6	20	14	20	27	Economic loss by mass mortality in aquaculture by MHWs in summer 2016 and 2017 was reported about 17M$ and 7.5M$ in respectively(Ministry of Ocean and Fisheries, Rep.Korea). So we think to include the impact of MHWs around the East Asia in Figure 6.3(a). [Inseong Han, Republic of Korea]	Rejected - we could not find the numbers mentioned by the reviewer in the report.
13942	6	20	14			Fig 6.3 pity it is not possible to see the *extreme* event of +10oC off Peru mentioned in text on the map? Is that because it happened in 2017? [Debra Roberts and Durban Team, South Africa]	Accepted - The Peruvian MHW was already included in the map, but the spatial extent of the MHW is small and therefore the MHW was not very well visible. We resolved this by enlarging the size of Figure panel a and b by arranging them into columns.
11200	6	20	18			Caption for Figure 6.3. (MHW) should be placed after 'marine heat wave'. [Mastura Mahmud, Malaysia]	Editorial - text revised.
10204	6	20	22		23	Add the abbreviation DHW after degree heating week to define the scale in Figure 6.3b. [APECS Group Review, Germany]	Editorial - text revised.
11194	6	20	23			. Caption for Figure 6.3. Acronym for DHW should be stated in caption, (DHW) should be placed after 'degree heating week'. [Mastura Mahmud, Malaysia]	Editorial - text revised.
10206	6	20	32			ENSO is used earlier (pg 9 line 15) and should be defined there. Please use only the abbreviation here [APECS Group Review, Germany]	Editorial - text revised.
862	6	20	34	20	34	and position of ocean ? Comment [Belkacem Balah, Algeria]	Editorial - text revised to 'direction and location'
10208	6	20	36			Please verify the use of the word termination in this sentence. [APECS Group Review, Germany]	Accepted - text changed to 'The build-up and decay of extreme ..'
5654	6	21	2	21	4	It would be interesting to see from which value to which value the number of marine heat wave days exceeding the 99th percentile has doubled. If these numbers are large, including the value would make it even more explicit that this is not due to internal variability. [Roderik Van De Wal, Netherlands]	Accepted - text revised. We now explictly say that the number of marine heatwave days per year has increased from about 2.5 to 5 over the 1982 to 2016 period.
10212	6	21	3	21	3	E1a. Considr rephrasing to separate numbers "1982-2016 99th..." [APECS Group Review, Germany]	Editorial - text revised.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16512	6	21	9	21	11	An frequency increase due to increased mean temperature implies that the heatwaves are defined based on a fixed temperature threshold. Thus, to make this clear this sentence could be phrased as: "The trend towards more frequent and intense marine heat waves, defined in terms of absolute temperature, can largely be explained by the increase in mean..." [Ken Takahashi, Peru]	Accepted - Text revised
11552	6	21	16	21	19	Sentence beginning "most of" would benefit from rephrasing to make clearer [Taehyun Park, Republic of Korea]	Editorial - text revised.
3406	6	21	20	21	20	Delete . [Castor Muñoz Sobrino, Spain]	Editorial - text revised.
11202	6	21	20			Delete fullstop after 'waves'. [Mastura Mahmud, Malaysia]	Editorial - text revised.
5656	6	21	24	21	31	What features do record-breaking SSTs have in order to be fully attributable to anthropogenic climate change? Is it that these extreme events could not have taken place in pre-industrial conditions? How is this 'clear'? [Roderik Van De Wal, Netherlands]	Accepted - text revised. We clarified that such events are very rarely found or event absent in preindustrial climate model simulations.
11554	6	21	29	21	29	Sentence beginnimng "Also, there was..." needs correcting, does not make sense as written [Taehyun Park, Republic of Korea]	Accepted - Text revised.
1080	6	21	30			Replace "temperature along in the California" with "tempermature along the California" [Vineel Yettella, USA]	Editorial - text revised.
1082	6	21	30			When did the extreme ocean temperature occur? Please mention year. [Vineel Yettella, USA]	Editorial - text revised. Now included: 'between 2014 and 2016'.
10214	6	21	30	21	30	E1a. Consider deleting "large" [APECS Group Review, Germany]	Rejected - The California Current Large Marine Ecosystem is one of more than sixty predefined so-called Large Marine Ecosystems. We now use capital letters for Large Marine Ecosystem
16514	6	21	41	21	41	The reference to Ramírez and Briones, 2017 does not belong there. [Ken Takahashi, Peru]	Accepted - text revised.
1084	6	22	0			Figure 6.4: Somewhere in caption, note that the plots were derived from CMIP5 models [Vineel Yettella, USA]	Accepted - text revised. Now included: 'from 12 Earth system models participated in phase 5 of the Coupled Model Intercomparison Proejct'.
1086	6	22	0			Figure 6.4: In caption, replace "scenario" with "scenarios" [Vineel Yettella, USA]	Editorial - text revised.
13944	6	22	0			Fig 6.4 Is "historical" modelled values? Need to be specific. One can think "historical" means observed in the past. Note that historical modelled values are quite a bit higher than the black 'observed' values. Please explain? This will make a big compounded difference in the later modelled values, right? The models should hit the observed values, for the future modelled values to be believable? [Debra Roberts and Durban Team, South Africa]	Partly accepted - text revised. 1) Now include 'CMIP5' in the figure legend to indiate the modelled values. 2) The observed changes are within the uncertainy of the modelled changes. No changes are made in repsonse to this comment.
16516	6	22	4	22	5	This frequency increase depends on having the heatwaves defined using a fixed threshold. This makes sense as impacts on biology depend on absolute temperature. But if in the future scenario they were redefined using the updated 99-percentiles (which would be more relevant for precipitation), they wouldn't change by construction. I propose the following change: "Most of the changes in the probability of marine heat waves, when defined relative to a fixed temperature value, are driven by the global-scale shift in the mean ocean SST stemming from ocean warming." [Ken Takahashi, Peru]	Accepted - Text revised.
10216	6	22	6		8	The second half of this sentence, beginning with "it becomes," could benefit from confidence language. [APECS Group Review, Germany]	Accepted - Text revised. Now included ' likely'
5658	6	22	10	22	19	Remove the negative region in the y-axis in figue 6.4a. [Roderik Van De Wal, Netherlands]	Editorial – copyedit to be completed prior to publication
10220	6	22	10	22	10	in Figure 6.4 is hard to distinguish the thicker lines [APECS Group Review, Germany]	Accepted - We increased the thickness of the thick lines.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
5660	6	22	28	22	28	Very likely' is not spelled in italics. Is this the IPCC likelyhood or not? [Roderik Van De Wal, Netherlands]	Accepted - Text revised. We now spell likely in italics.
10218	6	22	28			Possible IPCC confidence language un-italicized "very likely" [APECS Group Review, Germany]	Accepted - Text revised. We now spell likely in italics.
11204	6	22	36			(LINK TO CHAPTER 5) should be corrected to the proper chapter numbering [Mastura Mahmud, Malaysia]	Accepted - Text revised.
632	6	23	0			Negative emissions to save coral need not be atmospheric ones, but could result from upcurrent, ultra-slow-release, buoyant flake ocean fertilisation helping to turn local marine CO2 into biomass and oxygen, at the same time as the additional phytoplankton concentration increases sea surface albedo and nucleates cooling marine clouds from the DMS released by the phytoplankton. Ocean brightening employing long-lived nanobubbles generated locally using fluidic oscillator technology on moored, solar-powered fiztops should also reduce SSTs. [William Clarke, Australia]	Rejected - out of the scope of this chapter.
864	6	23	13	23	13	you are talking about the effect of climate change on the ocean's profonde layers especially on the reef (which are located on hundreds of meters of depths), the increase of the temperature of which the order of 1.5 to 3 degree (° C) on its surface. please, what is the position of the thermal gradient term is that really the effects of this change will really affect the deep-sea goose of the ocean)? [Belkacem Balah, Algeria]	Rejected - sea surface temperature anomalies has been used as a proxy for thermal stress of corals in many studies.
1088	6	23	15			Replace "Not only do corals bleach less when they are subject to" with "Not only did corals bleach less when they were subject to" [Vineel Yettella, USA]	Editorial - Text revised.
868	6	23	16	23	19	I think that we can not taint the blaching of corals on very deep layers of the ocean (or the sea) with the change of climate (increase of the temperature of the air whose order of about 1.5 The degree of degradation of seawater quality caused by industrial discharges or by a potentially unreal submarine potential volcanic activity (eg vapors) is not right.). [Belkacem Balah, Algeria]	Rejected - not supported by the peer-reviewed published literature
866	6	23	17	23	17	help coral ? [Belkacem Balah, Algeria]	Accepted - Text revised.
1090	6	23	17			Replace "stress may help" with "stress may have helped" [Vineel Yettella, USA]	Editorial - text revised.
870	6	23	29	23	29	why just the health of corals? the best is: miliex aquatic or marine [Belkacem Balah, Algeria]	Rejected - Outside the scope of the chapter.
872	6	23	29	23	29	why just the health of corals? the best is: the health of the inhabitants of the marine aquatic environment [Belkacem Balah, Algeria]	Rejected - Outside the scope of the chapter.
11556	6	23	29	23	31	Sentence beginning "Reducing emissiions…." It needs to be clarified what is meant by long term in this case. The way the sentence is written implies that immediate workable options for negative emissions exist, whereas this is highly questionable. The text should either reflect this or be rewritten to reflect that only significat reductions of atmospheric CO2 would assure long term reef health [Taehyun Park, Republic of Korea]	Accepted - Text revised.
11206	6	23	51		53	What about the impact to the poor marginal countries and in the equatorial waters? Probably the research work done in these areas are worth mentioning though not forthcoming. [Mastura Mahmud, Malaysia]	Rejected - out of the scope of the chapte

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11558	6	23	51	23	53	The sentence beginning "In addition" should be rewritten to name the diatom which was reponsible for the production of the toxin domoic acid and which led to the closure of fisheries as a result of it being accumulated by commercially important species and also led to the poisoning of marine mamals. It was not an outbreak of domoic acid but a large scale bloom of the diatom which produces domoic acid [Taehyun Park, Republic of Korea]	Accepted - Text revised
16518	6	24	8	24	8	Suggest adding: The 2017 "coastal El Niño" off Peru affected the marine resources, particularly the anchovies, which presented decreased fat content and early spawning as a reproductive strategy (IMARPE 2017), as is common during El Niño (Ñiquen and Bouchon 2004). References: IMARPE (Instituto del Mar del Perú), 2017: Informe integrado de la Operación EUREKA LXIX (21-23 de Febrero 2017) [Integrated Report of the EUREKA LXIX Operation]. 23 pp. [Available online at http://http://www.imarpe.pe/imarpe/archivos/informes/Informe_Operacion_EUREKA_LXIX%20_21_23feb_2017.pdf.] Ñiquen, M., and M. Bouchon, 2004: Impact of El Niño events on pelagic fisheries in Peruvian waters. Deep-Sea Res. II, 51, 563-574, http://dx.doi.org/10.1016/j.dsr2.2004.03.001. [Ken Takahashi, Peru]	Accepted - Text revised and reference taken into account.
11208	6	24	19			Reference for Garreaud should have the year it was published for consistency [Mastura Mahmud, Malaysia]	Editorial - text revised.
11292	6	24	19	24	19	Garreaud citation missing year (2018?) [Croot Peter, Ireland]	Editorial - text revised.
16520	6	24	19	24	19	Add the following references with respect to the impacts of the coastal El Niño in Peru: - ENFEN, 2017: El Niño Costero 2017, Informe Técnico Extraordinario N°001-2017/ENFEN. - K. Takahashi, V. Aliaga-Nestares, G. Avalos, M. Bouchon, A. Castro, L. Cruzado, B. Dewitte, D. Gutiérrez, W. Lavado-Casimiro, J. Marengo, A. G. Martínez, K. Mosquera-Vásquez, And N. Quispe, 2018: The 2017 Coastal El Niño [in State of the Climate 2017], Bulletin of the American Meteorological Society, in press. So the citation can be "(ENFEN, 2017; Garreaud; Takahashi et al 2018)". [Ken Takahashi, Peru]	Accepted - References added.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16522	6	24	20	24	20	Even though this paragraph discusses past and present-day events, the reader might end with the impression that the precipitation-related impacts and teleconnections of marine heat waves, which depend on temperature gradients, would increase as much as the biological impacts, which depend on total temperature. The former is much more uncertain. I suggest adding the following paragraph "It should be noted that the effects of future changes in marine heat waves on precipitation-related impacts and teleconnections will depend not only on the total temperature but on the temperature gradients within the climate system, as those associated with extreme ENSO events (see Section 6.5) or the mean climate (Jauregui and Takahashi 2017), so these changes are more uncertain." Jauregui, Y. R., and Takahashi, K., 2017: Simple physical-empirical model of the precipitation distribution based on a tropical sea surface temperature threshold and the effects of climate change. Climate Dynamic, 5–6, 2217–2237, doi:10.1007/s00382-017-3745-3 [Ken Takahashi, Peru]	Accepted - Text revised.
13946	6	24	24	24	37	Suggest that the value of the economic loss should be quantified. Also, the impact on human systems has not been sufficiently discussed. There is no mention of the implication of marine heat waves on health and wellbeing for instance. [Debra Roberts and Durban Team, South Africa]	Accepted - We now include a few sentences about impacts of MHWs on human health and wellbeing through harmful algal blooms. We also tried to quantify the economic loss, but only few literature was available.
3408	6	24	25	24	25	SST changes may affect ecosystem distribution on land. E.g. Muñoz Sobrino et al. (2005) Boreas 34(3): 381-400; Muñoz Sobrino et al. (2009) Plant Ecology 203, 317–340; Reimer et al. (2015) PLos One 10(4): e0125177. [Castor Muñoz Sobrino, Spain]	Accepted- We now clarified this in section 6.4.2.2: "Such physical changes may then also affect ecosystems on land (Reimer et al. 2015)."
15318	6	25	0	38		The Impacts on Human and Natural Systems of the selective events in this report are very clearly [Maitham Sultan, Iraq]	Editorial - Thank you.
20650	6	25	17	25	21	In 6.4.3: in addition to improved knowledge, a 2013 study looking at extreme climatic influences on fisheries and mariculture suggested that a good response should also include: establishing an early warning system by connecting fisheries agencies and marine research institutions to assist decision makers in performing time-adaptive measures; temporarily suspending fishing activities after the occurrence of a natural disaster to help recover fishery resources and ecosystems; and continually filing surveys to understand the recovery status of marine ecosystems (Chang et al, 2013 - https://www.sciencedirect.com/science/article/pii/S0308597X12001698?via%3Dihub) [Florence Poulain, Italy]	Accepted - Text revised. Thank you for pointing us to this study.
11210	6	25	20		21	What about other areas besides the Pacific basin? Are they also affected throughout the world or only at these locations such as Peru-Pacific region? [Mastura Mahmud, Malaysia]	Rejected – no scientific evidence/publication provided to support changes suggested by the reviewer
874	6	25	23	25	23	edit stress this words [Belkacem Balah, Algeria]	Rejected - not clear what is meant here.
17314	6	25	38			Described teleconections related to ENSO here, as used for the AMOC and SPG sections (page 38) [Cecilia Conde, Mexico]	Teleconnections are discussed in 6.5.2

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10222	6	25	49			Possible IPCC confidence language un-italicized "low" with the earlier mention of confidence in the sentence. [APECS Group Review, Germany]	Accepted - text revised
11560	6	25	50	25	50	"Substantial" does the use of this adjective mean that the body of literature is very limited or that whatsuch literature as exists has no substance to it? This should be clarified [Taehyun Park, Republic of Korea]	Accepted - text revised
12212	6	25	54	25	57	There is a debate in the ENSO experts community about the "increase of ENSO variance at the end of the 20C" statement made here. This statistical result comes from a few well observed extreme events during the satellite era. Data reconstructions (which are not observations) before the satellite era in the tropical Pacific use different techniques to account for missing data (see HadISST or ERSST papers). These techniques were not designed to reconstruct extreme El Niño events so this supposed trend in ENSO variance could be an artefact of the SST reconstructions (see also Giese and Ray 2011). In addition we know from several studies that a minimum of 200/300 years are needed to detect an ENSO variance change (Stevenson et al. 2010, Wittenberg et al. 2009). I could not find in Roxy et al. (2014) any discussion of the quality of the data in HadISST that can substantiate the claim made here (the study is focused on the Indian ocean and vaguely refers to other papers for quality of data coverage). And Lee and McPhaden (2010) only compare periods when satellite data is available (post 1980). This part should be written in a much more careful language and not reused later on given the degree of uncertainty. Giese, B. S., and S. Ray (2011), El Niño variability in simple ocean data assimilation (SODA), 1871–2008, J. Geophys. Res., 116, C02024, doi:10.1029/2010JC006695. Stevenson, S., Fox-Kemper, B., Jochum, M., Rajagopalan, B., & Yeager, S. G. (2010). ENSO Model Validation Using Wavelet Probability Analysis. Journal of Climate, 23(20), 5540–5547. http://doi.org/10.1175/2010JCLI3609.1 Wittenberg, A. T. (2009). Are historical records sufficient to constrain ENSO simulations? Geophysical Research Letters, 36, –. http://doi.org/10.1029/2009GL038710 [Eric Guilyardi, France]	Accepted – text revised
876	6	25	56	25	57	I think we can not compare the event of EL NINO from the period 1901-1950 with that of 1951-2000 and that the birth of the words was in the early 60s. [Belkacem Balah, Algeria]	Rejected – Comparison here is made using available data, not based on literature accounts of the term "El Niño".
11020	6	26	2	26	10	This 2015-16 El Nino caused a malaria outbreak in Peru: Outbreaks caused by Aedes aegyptis due to El Nino in a coastal area of Peru By:Ruiz, EF (Ruiz, Eloy F.)[1,2] ; Vasquez-Galindo, CM (Vasquez-Galindo, Claudia M.)[2,3] ; Aquije-Pariona, XM (Aquije-Pariona, Ximena M.)[2,4] ; Torres-Roman, JS (Smith Torres-Roman, J.)[2,5] TRAVEL MEDICINE AND INFECTIOUS DISEASE Volume: 21 Pages: 78-79 DOI: 10.1016/j.tmaid.2017.11.003 Published: JAN-FEB 2018 [Ben Orlove, USA]	Accepted – The reference cited by the reviewer discuss about the 2017 coastal El Niño conditions (not an Extreme El Niño). Instead, we have included another study which discuss the mosquito born outbreaks during 2015/16 El Niño (Caminadae et al., PNAS 2017). This is now included in 6.5.2., where the impacts are discussed.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11022	6	26	2	26	10	The 2015-16 event destroyed over 40.000 homes and damaged over 200,000 homes, rendering some areas uninhabitable http://pure.iiasa.ac.at/id/eprint/14849/1/French_Mechler_2017_El%20Ni%C3%B1o_Risk_Peru_Report.pdf [Ben Orlove, USA]	Added - thanks Ben
4924	6	26	4	26	10	Sentence too long. [Qudsia Zafar, Pakistan]	Accepted - The sentence is now shortened
11212	6	26	4		10	This sentence is too long. [Mastura Mahmud, Malaysia]	Accepted - The sentence is now shortened
10224	6	26	15	26	16	Please mention if (or not) the rainfall threshold of 5 mm per day satisfies the extreme event definition put forward in the introduction section (6.1), page 7, line 10 to 12 [APECS Group Review, Germany]	Accepted - Yes the rainfall threshold of 5 mm/day is above the 90th percentile and satisfies the extreme event definition.
16524	6	26	20	26	22	Huang et al., 2016 did a careful analysis of the SST data and concluded that the three strongest El Niño events cannot be ranked with statistical confidence. Thus, the first sentence should be replaced with: "The background long-term warming puts the 2015/2016 El Niño among the three warmest in the instrumental records (Huang et al, 2016; Santoso et al., 2017). And the second sentence "However, once the warming trend is removed, the 2015/2016 El Niño is comparable with the 1997/98 El Niño." should be removed. Reference: Huang, B., L'Heureux, M., Hu, Z. Z., & Zhang, H. M. (2016). Ranking the strongest ENSO events while incorporating SST uncertainty. Geophysical Research Letters, 43(17), 9165-9172, doi: 10.1002/2016GL070888. [Ken Takahashi, Peru]	Accepted
10226	6	26	22	26	24	It will be nice to have a clear definition of an extreme El-Nino event, e.g. should it meet the criteria of both (1) pronounced eastward extension of the west Pacific warm pool and (2) a rainfall increase of greater than 5 mm per day during December-February? (Cai et al 2014a). Or an evet would be extreme if one of the above two conditions are met. Or any other definition that the authors want to adopt. The 2015/16 event doesn't meet both of the criteria mentioned in lines 13 to 16, page 26. [APECS Group Review, Germany]	Definition now given
16526	6	26	24	26	24	Recommend adding the following at the end of the paragraph: "... warm pool (Santoso et al., 2017), as the warming in the eastern Pacific was low relative to the 1982/1983 and 1997/1998 events (L'Heureux et al, 2017)". Reference: L'Heureux, M. L., Takahashi, K., Watkins, A. B., Barnston, A. G., Becker, E. J., Di Liberto, T. E., ... & Mosquera-Vásquez, K. (2017). Observing and predicting the 2015/16 El Niño. Bulletin of the American Meteorological Society, 98(7), 1363-1382, doi: 10.1175/BAMS-D-16-0009.1 [Ken Takahashi, Peru]	Accepted - Reference accepted, text already implies the same. Hence kept as is for brevity.

SROCC First Order Draft Expert Review Comments - Chapter 6							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11662	6	26	30	26	30	Keller et al., GRL, 2015 find the modeled variance in ENSO amplitude is significantly higher during the Maunder Minimum cold than during the 21st century warm period in a ESM simualation from 850 to 2100 AD and altered ENSO impacts on air-sea carbon flux and marine productiviy (as relevant for Fig. 6.6). This study puts anthropogenic change in the context of the last millennium [Fortunat Joos, Switzerland]	Accepted
12214	6	26	30	26	34	A quantification of the change discussed would strenghen this part (doubling of occurrence). [Eric Guilyardi, France]	Accepted
16528	6	26	30	26	30	Even though it has been stated previously, given the relevance of this, it should be noted that the "extreme El Niño" in these studies refer to precipitation, not SST, variability, which has different implications for ocean impacts than more traditional SST-based definitions. So, I suggest stating this as: "In terms of eastern Pacific precipitation, extreme El Niño frequency increases with ..." [Ken Takahashi, Peru]	Accepted
13948	6	27	0			Fig 6.5 the dots are separated into two groups. What is the meaning of this? What is the meaning of the shape of the plot? The lower the SST gradient the higher the rainfall? A lower 'gradient' means SST some distance from the equator are very much similar to SST on the equator, representing warm conditions, while a higher gradient means SST are cooler as you move away from the equator? This could be spelled out in plain English to help non-specialists. A small map showing where these windows are would be useful. [Debra Roberts and Durban Team, South Africa]	Figure now modified and caption enhanced, hopefully clarifying these points. We do not include a map indicating regions as these are relatively easy for a non-specialist to draw themselves
20612	6	27	0	27		Figure 6.7 is not clear. Specially the values near to dot poits are not readable. Please replace it with better quality diagram. [Pushp Raj Tiwari, UK]	Figure now modified and caption enhanced, hopefully clarifying these points
22308	6	27	0	27		what is the unit of the histogram of relative frequency given in Figure 6.5? [Ruksana Rimi, UK]	Figure now modified and caption enhanced, hopefully clarifying these points
13216	6	27	1	27	1	the years of the extreme events are diffcult to read. I would suggest to move the numbers outside of the data cliud and connect them with their respective dots with a line or arrow [Baerbel Hoenisch, USA]	Accepted
10228	6	27	4	27	4	Please describe NINO3 abbreviation? I could not find it at least in chapter 6. [APECS Group Review, Germany]	Now defined
20652	6	27	36	28	37	In 6.5.2: Impacts are also felt on fisheries and aquaculture (e.g. Peruvian anchovy) (FAO. 2018. (forthcoming). El Niño Southern Oscillation (ENSO) effects on fisheries and aquaculture) [Florence Poulain, Italy]	Added
23216	6	28	6	28	67	This is a important and interting issue that need further studies.We shall also pay attention to how climate change may have modulated the multiscale interactions from diurnal variation to the intraseasonal and interannual variations. [Dongxiao Wang, China]	Yes interesting, but outside the scope of this report
12216	6	28	12	28	12	again "increasing extreme El Niño events" can be an artefact of data reconstructions - see comment above [Eric Guilyardi, France]	Accepted
16008	6	28	20	28	20	heatwaves' ==> 'heat waves' otherwise change all the others into 'heatwaves' [Sunghyun Nam, Republic of Korea]	Accepted - heatwaves
4926	6	28	28	28	29	please check parenthesis. [Qudsia Zafar, Pakistan]	Citation deleted (grey literature)
878	6	28	37	28	37	this reduction of the CO2 concentration is on a point or surface scale (please mention the surface or the probable limy of this decrease). [Belkacem Balah, Algeria]	In the atmosphere. We think this is clear

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
1092	6	28	38	28	39	The phrase "due an increase to the response from the terrestrial component of the carbon cycle" is unclear. Suggest replacing with "due to the response of the terrestrial component of the carbon cycle to El Niño" [Vineel Yettella, USA]	Accepted
11294	6	28	39	28	39	…due to an increase… [Croot Peter, Ireland]	Accepted
11296	6	28	41	28	41	…frequency of extreme events would modulate… [Croot Peter, Ireland]	Accepted
1040	6	29	0			Figure 6.6: I found this figure confusing. What's the purpose of showing background SST anomalies when the intent is to list the aspects of the climate system that studies have considered the joint impacts of climate change and modes of variability on? I think simply mentioning those aspects in the text or in a table would suffice. [Vineel Yettella, USA]	Figure and text now modified
11214	6	29	0			Figure 6.6. There is no legend in the figure. The graduated color bar should include unit for temperature (C). Hurricane activities are symbolized, as well as rainfall and clouds. [Mastura Mahmud, Malaysia]	Figure now modified
11216	6	29	0			Figure 6.6. Are other areas such as in South America or the Caribbean/Gulf of Mexico also affected? [Mastura Mahmud, Malaysia]	Figure now modified
13950	6	29	0			Fig 6.6 Not clear what this figure shows. Do the four icons (2xvortex, rain, trees) represent four studies? Figure could probably be omitted. [Debra Roberts and Durban Team, South Africa]	Figure now modified, based on a new study published since the FOD
5662	6	29	1	29	7	Figure 6.6 does not include unit. [Roderik Van De Wal, Netherlands]	Caption modified accordingly
5664	6	29	1	29	7	The icons in this figure are unnecessary, as the impacts are discussed in the paragraphs above, while in the figure some impacts, such as flooding, are not shown, which makes the inclusion of icons arbitrary. [Roderik Van De Wal, Netherlands]	Figure now modified
13218	6	29	1	29	5	the symbols need to be explained. Th=e hurricane symbols are actually quite intuitive but what does the forest and "carbon cycle" do outside of the map? Please explain in the caption and/or improve presentation in the figure. Also, "the background pattern … is" not "are" (line 4) [Baerbel Hoenisch, USA]	Figure now modified
24460	6	29	1	29	5	Is this figure missing the schematics? [Hans-Otto Poertner and WGII TSU, Germany]	Figure now modified
4928	6	29	3	29	5	Figure 6.6: It looks like the figure is incomplete. what are the units of SST? where are the modes of variability ???? [Qudsia Zafar, Pakistan]	Figure now modified
10232	6	29	3			Please provide a lengend to the scale in Figure 6.6. [APECS Group Review, Germany]	Figure now modified
10236	6	29	3	29	3	Please mention the unit of temperature (K ?) [APECS Group Review, Germany]	Caption modified accordingly
12218	6	29	3	29	5	I find this figure not very informative, even when legends are added [Eric Guilyardi, France]	Figure now modified
880	6	29	10	29	10	Normal ENSO caused flood risk …. so there is the extreme ENSO caused from what. I think it's normal term suprimer. [Belkacem Balah, Algeria]	Accepted, text revised
16390	6	29	10	29	16	It isn't clear to me what 'normal' enso events are and what I assume extreme are. I'm not in agreement that risk management has focussed on better prediction and early warning systems and better mechanisms for reducing risks. There is a lot of work on disaster risk reduction international with the Sendai Framework. Perhaps a rewording or better critical review of the literature. [Margot Hurlbert, Canada]	Extreme ENSO event's lack of definition discussed in section 6.5.1.1. Comment taken into account, combined with comment 560, text has been revised
20654	6	29	10	29	11	add fishery and aquaculture In: "and better mechanims for reducing risks to agriculture etc." [Florence Poulain, Italy]	Accepted, text revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
20656	6	29	10	30	2	In 6.5.3: It is also important to empower local population, including fishers, to assess the changes to local conditions through simple environmental indicators and to share this information with local, national & regional networks to analyse the information, assess risk level and agree on early warning triggers for early action and emergency response In: Poulain and Wabbes. 2018. Impacts of climate-driven extreme events and disasters In Barange, M., Bahri, T., Beveridge, M., Cochrane, K., Funge-Smith, S., Poulain, F. (Eds.) 2018. Impacts of Climate Change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options. FAO Fisheries Technical Paper 627 (in press). [Florence Poulain, Italy]	taken into account, combined with comment 558, text has been revised but the reference was not added.
12220	6	29	11	29	12	The following reference can be used to substantiate this claim: Puy M., J. Vialard, M. Lengaigne, E. Guilyardi, P. N. Di Nezio, A. Voldoire, M. Balmaseda, G. Madec, C. Menkes and M. J. McPhaden (2017). Influence of Westerly Wind Events stochasticity on El Niño amplitude: the case of 2014 vs. 2015. Clim. Dyn., doi:10.1007/s00382-017-3938-9 [Eric Guilyardi, France]	taken into account, reference added
10230	6	29	12	29	12	Term "very rare" could be made less vague (i.e. "there have been n extreme events in X years of observations) [APECS Group Review, Germany]	taken into account, text has been revised
10234	6	29	12			Possible IPCC confidence language un-italicized "very rare" [APECS Group Review, Germany]	Now changed to rare
11218	6	29	14			" (see e.g., also Chapter 4, for coastal risks)" Specify the sub-section of this referral [Mastura Mahmud, Malaysia]	taken into account, text has been revised
16030	6	29	15	16		gaps in the literature regarding ENSO event teleconnections, impacts, lead time to impacts in specific locations, impacts related to different El Nino types, impacts related to strength of ENSO events etc. is crucial. I suggest that this point is fleshed out and brought forward to the beginning of the section. The section assumes that specific risk management systems are required for 'extreme ENSO events' but this is not based on evidence that extreme ENSO events reliablyand universally lead to severe impacts on human and natural systems. [Olivia Warrick, New Zealand]	taken into account, text has been revised
12222	6	29	23	29	24	A better reference here would be the review: Lengaigne, M. , Boulanger, J. , Menkes, C. , Delecluse, P. and Slingo, J. (2013). Westerly Wind Events in the Tropical Pacific and their Influence on the Coupled Ocean-Atmosphere System: A Review. In Earth's Climate (eds C. Wang, S. Xie and J. Carton). doi:10.1029/147GM03 [Eric Guilyardi, France]	Accepted, reference added
12224	6	29	24	29	26	There is a debate as to the role of EWEs vs. lack of WWEs (see Puy et al. cited above). I would balance the text to reflect this debate. I personnaly think the case for the lack of WWEs is more compelling (so does A. Fedorov - personal communication). [Eric Guilyardi, France]	taken into account, text has been revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
5666	6	29	26	29	29	"Advection of mean temperature by anomalous eastward zonal current also plays an important role in producing extreme El Niño events. Another parameter is the advection of mean temperature by anomalous eastward zonal current that plays an important role in producing extreme El Niño events, but not La Niña events, especially when it occurs during the early part of the developing period (Kim and Cai, 2014).". The content of the first sentence is contained in the second one, so we propose to remove the first one. [Roderik Van De Wal, Netherlands]	Accepted, text revised
12226	6	29	26	29	30	Air-sea fluxes (heat and stress) can also be a source of non-linearity tha tgive rise to extreme El Niño (e.g. Bellenger H., E. Guilyardi, J. Leloup, M. Lengaigne, J. Vialard (2013). ENSO representation in climate models: from CMIP3 to CMIP5. Clim. Dyn., 42, 1999-2018) [Eric Guilyardi, France]	Accepted, text revised and reference added
16530	6	29	26	29	26	Include: "Fedorov, 2016). Triggering of atmospheric deep convection leads to an enhancement of the feedbacks that helps extreme El Niño development (Takahashi and Dewitte, 2016)." Reference Takahashi, K., Dewitte, B., 2016: Strong and moderate nonlinear El Niño regimes, Climate Dynamics, 46, 1627–1645, doi:10.1007/s00382-015-2665-3 [Ken Takahashi, Peru]	Accepted, text revised and reference added
11562	6	29	28	29	28	The sentence needs a definite or indefinite article preceding "anomalous" [Taehyun Park, Republic of Korea]	Accepted, text revised
882	6	29	32	29	32	Please quote the individual event characteristics' ENSO [Belkacem Balah, Algeria]	taken into account, text has been revised
884	6	29	33	29	33	contradiction between the line of paragraph 32-33 and line 12 of the same page (ie new method with difficulty of prediction and rarity) [Belkacem Balah, Algeria]	taken into account, text has been revised
1094	6	29	36			Replace "ENSO associate" with "ENSO associated" [Vineel Yettella, USA]	Accepted, text revised
11564	6	30	1	30	1	The factors outlined can only be used for risk analysis if they can actually be identified and dimensioned [Taehyun Park, Republic of Korea]	Accepted, text revised
5668	6	30	7	30	14	The content of the opening paragraph of 6.6 seems rather specific and may not properly explain what will be discussed about Inter-Ocean Exchanges and Global change. [Roderik Van De Wal, Netherlands]	Paragraph now revised
4930	6	30	11	30	11	replace "we may label this as" with:" this might be labelled as" [Qudsia Zafar, Pakistan]	Text now modified
1096	6	30	13			Consider replacing "Whether natural or having an anthorpogenic component" with "Whether natural or anthorpogenic in origin" [Vineel Yettella, USA]	Sentence now deleted
1098	6	30	29			Delete "although," [Vineel Yettella, USA]	Accepted
5670	6	30	29	30	32	Due to the placement of commas, althoughs and becauses, it is difficult to discern the causal relations. Consider 'Although the strengthened Pacific trades are couped to cooler Pacific SSTs, because of its unprecedented nature and importance in driving global-scale temperature variability, we describe the Pacific trends and associated pattern of SST anomalies (…) an exterme decadal variability event.' [Roderik Van De Wal, Netherlands]	Text now modified
11220	6	30	29		32	The sentence can be improved, as there are 2 ‘because’. [Mastura Mahmud, Malaysia]	Text now modified
1100	6	30	30			Replace "because of its unprecedented" with "and because of its unprecededted" [Vineel Yettella, USA]	Text now modified

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
1102	6	30	32			Replace "While it is potentially" with "While the extreme event is potentially" [Vineel Yettella, USA]	Accepted
13952	6	31	0			Is there a map anywhere in the report on the various ocean currents? This would help the reader understand the text. [Debra Roberts and Durban Team, South Africa]	Reader can refer to a textbook
15668	6	31	5			A strange word is given in this line: r1i1p1 ??? [Hamid Nebdi, Morocco]	Deleted
23220	6	31	13	31	31	Some literatures reported that the South China Sea Through Flow (SCSTF) is a part of the Pacific to Indian Ocean exchange. The transport of SCSTF is negatively related to the transport of ITF which indicates the modulation of SCSTF on the Indo-Pacific clmate varibility should be considered. [Dongxiao Wang, China]	Acepted, text has ben revised and references have been added.
15670	6	31	18		19	Sv in the SI units is used for radiation dose quantitiesis given in Sieverts [Hamid Nebdi, Morocco]	Acepted, text has ben revised.
22310	6	31	18	31	18	106 m3 s–1 "/" is missing in between them [Ruksana Rimi, UK]	Acepted, text has ben revised.
15672	6	31	33		37	Sv in the SI units is used for radiation dose quantitiesis given in Sieverts [Hamid Nebdi, Morocco]	Acepted, text has ben revised.
15674	6	31	38			Sv in the SI units is used for radiation dose quantitiesis given in Sieverts [Hamid Nebdi, Morocco]	Acepted, text has ben revised.
1104	6	31	42			Replace "co-vary" with "covary" [Vineel Yettella, USA]	Acepted, text has ben revised.
1106	6	32	15			Replace "There already are evidence of cases of regional abrupt" with "There is already evidence of regional abrupt" [Vineel Yettella, USA]	Acepted, text has ben revised.
11566	6	32	15	32	17	the sentence needs rewriting to make it clear [Taehyun Park, Republic of Korea]	Acepted, text has ben revised.
5248	6	32	19	32	20	The sentence."It is deemed that monitoring for tipping points are vital in order to be able to predict when .....", is an oxymoron, as monitoring can only show past changes. This should be refomulated. [Jacobus Hofstede, Germany]	This whole section now deleted as there is a lack of relevant literatures
5672	6	32	19	32	41	These two paragraphs are generally vague. Terms as 'states', 'tipping points' and 'systems' are used, but perhaps one example could be mentioned of a possible tipping point of a system from one state to another and how this can be monitored, to make this paragraph less abstract. [Roderik Van De Wal, Netherlands]	This whole section now deleted as there is a lack of relevant literatures
1108	6	32	20			Replace "shift to new state" with "shift to a new state" [Vineel Yettella, USA]	This whole section now deleted as there is a lack of relevant literatures
5674	6	32	21	32	29	This is an extremely long (112 words, without references) and therefore complex sentence, that should be split into multiple sentences. [Roderik Van De Wal, Netherlands]	This whole section now deleted as there is a lack of relevant literatures
11222	6	32	21		29	The sentence is too long, suggest simplifying it. [Mastura Mahmud, Malaysia]	This whole section now deleted as there is a lack of relevant literatures
11568	6	32	21	32	29	This sentence needs breaking up and rewriting. Also the notion that it is possible to facilitate transitions to a preferred state is highly questionable for natural systems though may be possible for governance systems. This should be made clear [Taehyun Park, Republic of Korea]	This whole section now deleted as there is a lack of relevant literatures
1110	6	32	31			Replace "when it is using explicitly science" with "when it is explicitly using science" [Vineel Yettella, USA]	This whole section now deleted as there is a lack of relevant literatures

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
5250	6	32	31	32	32	The sentence: "There is agreement in the studies that management is most effective when it is using explicitly science to avoid thresholds or to reverse ecosystem change after a threshold has been crossed" seems self-evident and feels strongly like advertisement (self-promotion) for scientists. It is urged to delete this sentence. [Jacobus Hofstede, Germany]	This whole section now deleted as there is a lack of relevant literatures
5676	6	32	31	32	32	using explicitly science' is a vague phrasing. Does this mean that management should be based on scientific evidence? [Roderik Van De Wal, Netherlands]	This whole section now deleted as there is a lack of relevant literatures
5246	6	32	32	32	36	in this paragraph, the word "threshold" is repeatedly used; in the paragraph before "tipping-point", obviously as synonym. For a better understanding, it is recommended to use only one of these two. [Jacobus Hofstede, Germany]	This whole section now deleted as there is a lack of relevant literatures
4932	6	32	39	32	41	where are results from these fisheries???? [Qudsia Zafar, Pakistan]	This whole section now deleted as there is a lack of relevant literatures
11224	6	32	39		41	The paragraph is written on a topic that has no continuity with the previous paragraph (which discussed general management strategies). This paragraph focusses only on the regulations on regional fisheries management but not others. [Mastura Mahmud, Malaysia]	This whole section now deleted as there is a lack of relevant literatures
11664	6	32	46			I miss a discussion of the risk of a slowdown in Southern Ocean ventilation and deep Indo-Pacific ventilation, as for example relevant for long-term C uptake and deoxygenation [Fortunat Joos, Switzerland]	Rejected - After careful consideration of this requirement, we have decided in agreement with chapter 3 that the risk of abrupt changes in ventilation in the Southern Ocean is not supported by enough evidence, notably given the large biases in climate models for representing convection in the Southern Ocean. We have therefore assessed that scientific evidence is not sufficient to include this in the table dealing with well-identified potential abrupt changes.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10728	6	32	48	34	22	There is no discussion of inter=annual extremes in the AMOC. McCarthy et al., (2012) reported a 30% reduction in the AMOC in 2009-2010, this was followed by a weaker minima a year latter. Analysis of forced ocean models suggests (Blaker et al., 2014) such events may occur once every two or three decades. The impact of the extreme low AMOC was seen in ocean heat content (Cunningham et al., 2013, and has been implicated in cold European weather events (Bychan et al. 2014). McCarthy, G., Frajka-Williams, E., Johns, W. E., Baringer, M. O., Meinen, C. S., Bryden, H. L., et al. (2012). Observed interannual variability of the Atlantic meridional overturning circulation at 26.5°N. Geophysical Research Letters, 39(19), L19609. http://doi.org/10.1029/2012GL052933 Blaker, A. T., Hirschi, J. J. M., McCarthy, G., Sinha, B., Taws, S., Marsh, R., et al. (2014). Historical analogues of the recent extreme minima observed in the Atlantic meridional overturning circulation at 26°N. Climate Dynamics, 1–17. http://doi.org/10.1007/s00382-014-2274-6 Cunningham, S. A., Roberts, C. D., Frajka-Williams, E., Johns, W. E., Palmer, M. D., Rayner, D., et al. (2013). Atlantic Meridional Overturning Circulation slowdown cooled the subtropical ocean. Geophysical Research Letters, 40, 6202–6207. http://doi.org/10.1002/2013GL058464 Buchan, J., Hirschi, J. J. M., Blaker, A. T., & Sinha, B. (2014). North Atlantic SST Anomalies and the Cold North European Weather Events of Winter 2009/10 and December 2010. Monthly Weather Review, 142(2), 922–932. http://doi.org/10.1175/MWR-D-13-00104.1 [David Smeed, UK]	Taken into account - text revised both in section 7.6.1 ans 7.6.2 to highlight these findiings.
1112	6	32	50			Replace "paleo-reconstructions" with "paleo reconstructions" [Vineel Yettella, USA]	Accepted – text revised
1114	6	32	54			Delete "even" [Vineel Yettella, USA]	Accepted – text revised
4934	6	33	1	33	9	kindly define abbreviations in this para. [Qudsia Zafar, Pakistan]	Accepted – text revised
5300	6	33	1	33	4	the wording is not really correct - RAPID and OSNAP are not sections but arrays measuring the basin-wide structure of the AMOC, whereas OVIDE is a traditional hydrographic section - these should be distinguished [Meric Srokosz, UK]	Accepted – text revised
16010	6	33	1	33	9	One of important efforts dedicated to improve the AMOC observation system is missing here. Through monitoring array MOVE (Meridional Overturning Circulation Variability, origianlly initiated by German CLIVAR program and now operated by U.S. NOAA Climate observation program) in the subtropical west Atlantic, the transport fluctuations across 16N has been monitored. [Sunghyun Nam, Republic of Korea]	Accepted – text revised. Nevertheless, due to substantial space restrictions, we had to summariez this section and e do not refer to acronyms of the different system any more.
22538	6	33	2	33	13	Since the program name is "Argo" that is not an acronym, "ARGO" should be replaced with "Argo". [Toshio Suga, Japan]	Accepted – text revised
10624	6	33	3	33	3	The use of "large-scale oceanic section" is wrong. RAPID 26°N, OSNAP make continuous measurements and so "dedicated large-scale observing arrays" would be better. This brief paragraph does nto fully represent the significant effort that has gone into dedicated observations of the AMOC. [David Smeed, UK]	Accepted – text revised. Nevertheless, space limitation does not allow to go into too much details.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
10626	6	33	3	33	3	There should be citations for each of RAPID 26°N and OSNAP. E.g. McCarthy, et al. (2015). Measuring the Atlantic Meridional Overturning Circulation at 26° N. Progress in Oceanography, 130, 91–111. http://doi.org/10.1016/j.pocean.2014.10.006 and Lozier, S. M., et al. (2017). Overturning in the Subpolar North Atlantic Program: A New International Ocean Observing System. Bulletin of the American Meteorological Society, 98(4), 737–752. http://doi.org/10.1175/BAMS-D-16-0057.1 [David Smeed, UK]	Accepted - text revised
10628	6	33	5	33	5	I think SAMOC should be changed to SAMBA and add citation to Meinen, C. S., Speich, S., Perez, R. C., Dong, S., Piola, A. R., Garzoli, S. L., et al. (2013). Temporal variability of the meridional overturning cir- culation at 34.5°S: Results from two pilot boundary arrays in the South Atlantic. Journal of Geophysical Research: Oceans, 118, 6461–6478. https://doi.org/10.1002/2013JC009228 [David Smeed, UK]	Accepted - text revised. Nevertheless, due to space limitations we do not refer to the acronyms and just provide references.
1162	6	33	6	33	8	Sentence doesn't make sense - I think there is supposed to be a comma after 'variability', though it would be better to split the two latitudes into two sentences. Also missing reference for 26N observations [Laura Jackson, UK]	Accepted - text revised
5302	6	33	6	33	9	the latest published result from 26N for 2004-2017 are in Smeed, D. et al. The North Atlantic Ocean Is in a State of Reduced Overturning. Geophysical Research Letters 45, 1527-1533, doi:10.1002/2017GL076350 (2018) and this reference should be used here and results quoted appropriately e.g. 17Sv ± 1.9Sv [Meric Srokosz, UK]	Accepted – text revised
15676	6	33	7		17	Sv in the SI units is used for radiation dose quantitiesis given in Sieverts [Hamid Nebdi, Morocco]	Accepted – text revised
10630	6	33	8	33	8	After " and interannual variability"start new sentence. "The observation show that since 2008 the AMOC has been 2.7 Sv weaker than in the first 4 years of measurement (Smeed et al., 2018). However, the record is not yet long enough to determine if there is a long-term decline of the AMOC" Smeed, D. A., Josey, S. A., Beaulieu, C., Johns, W. E., Moat, B. I., Frajka-Williams, E., et al. (2018). The North Atlantic Ocean Is in a State of Reduced Overturning. Geophysical Research Letters, 370(1962), 1228–1533. http://doi.org/10.1002/2017GL076350 [David Smeed, UK]	Accepted – text revised
10632	6	33	8	33	8	The last phrase is better as a new sentence. "At 34.5°S the AMOC was estimated to have a mean of 15.2 Sv over the period 2009-2014 (Meinen et al 2017) [David Smeed, UK]	Accepted – text revised except that we keep the former stated estimate of 14.7 Sv over the period 2009-2007, which is clearly stated in Meinen et al (2017) contrary to the mean of 15.2 Sv stated here.
1164	6	33	11	33	13	Suggested inclusion: Reanalyses do have some success in more recent periods (possibly because of greater observational coverage). See Jackson et al, 2016. Recent slowing of Atlantic overturning circulation as a recovery from earlier strengthening Nature Geosci, Vol. 9 (23 May 2016), pp. 518-522, doi:10.1038/ngeo2715 [Laura Jackson, UK]	Accepted – text revised

SROCC First Order Draft Expert Review Comments - Chapter 6							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4670	6	33	11	33	12	Additional work has also investigated ocean reanalyses in the not-well-sampled northern subpolar gyre, a crucial region for the AMOC. Here, the reanalyses suggest different (essentially opposite) dynamical regimes, which have significant impacts on the ensuing predictions. I suggest an additional sentence following "… starting around 2004 are available", e.g. "In particular, it has been shown that a lack of salinity observations in the Labrador Sea can lead to somehwhat different, but equally plausible, AMOC behaviour in ocean reanalyses. (Menary & Hermanson, 2018)" The reference is: Menary & Hermanson (2018) Nat. Comm. "Limits on determining the skill of North Atlantic Ocean decadal predictions" [Matthew Menary, UK]	Accepted – text revised
1166	6	33	13	33	15	Various papers have shown the weakening trend is statistically significant for different periods/methodologies (Smeed, et al, 2014: Observed decline of the Atlantic meridional overturning circulation 2004–2012, Ocean Sci., 10, 29-38, https://doi.org/10.5194/os-10-29-2014; Roberts et al (2014), Is the 2004–2012 reduction of the Atlantic meridional overturning circulation significant?, Geophys. Res. Lett., 41, 3204–3210, doi: 10.1002/2014GL059473; Jackson et al, 2016, Recent slowing of Atlantic overturning circulation as a recovery from earlier strengthening, Nature Geoscience volume 9, pages 518–522 (2016) doi:10.1038/ngeo2715; Smeed et al, (2018). The North Atlantic Ocean is in a state of reduced overturning. Geophysical Research Letters, 45, 1527–1533. https://doi.org/10.1002/2017GL076350). What is the source of the comment that the weakening is not statistically significant? [Laura Jackson, UK]	Accepted – we have modified this sentence to better highlight this published work, even though the main conclusion remains that the time lenght of the observations is far too short to make any robust statement concerning any long-term trend.
5304	6	33	13	33	14	The statement that there is no significant trend is not strictly correct and needs to be revised in light of Smeed et al. (2018) - see previous comment [Meric Srokosz, UK]	Accepted – text revised. See response to comment 604
5306	6	33	15	33	19	It should be noted that the paleo proxies have NOT been verified against actual measurement of the AMOC so considerable uncertainty exists about these results [Meric Srokosz, UK]	Accepted – text revised
3210	6	33	19	33	20	"low confidence" should modify "this weakening over the historical era", not "needs to be confirmed" [Robert Kopp, USA]	Accepted – text revised
5308	6	33	22	33	24	Note that the CMIP5 model generally do not take account of Greenland Ice Sheet melting and this should be explicitly stated here with a cross-reference to section 6.7.1.2 where it is discussed explicitly (line 41) [Meric Srokosz, UK]	Accepted – text revised
11570	6	33	22	33	24	it is the AMOC which has been deemed "very unlikely to collapse" rather than the changes in the AMOC. Rephrasing required [Taehyun Park, Republic of Korea]	Accepted – we were referring to the AMOC, not its change - text revised.
18600	6	33	22	33	33	Paragraph says AMOC very unlikely to collapse in 21st century, but I think this certaintly is unwarranted. Note Bakker, P., Schmittner, A., Lenaerts, J. T. M., Abe-Ouchi, A., Bi, D., Broeke, M. R., … & Mernild, S. H. (2016). Fate of the Atlantic Meridional Overturning Circulation: Strong decline under continued warming and Greenland melting. Geophysical Research Letters, 43(23). wihch pointed out previous assessment failed to include Greenland. THis paper made a probabilistic cacluation of AMOC reduction that is worth citing here. [Alan Mix, USA]	Rejected - This paper is already cited later on, and Figure 6.9 is based on its results. This sentence has still been revised following comment no 607.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22504	6	33	24	33	24	9 out of 40 (line 26) is not a lot of. [Juliette Mignot, France]	Accepted - "a lot" was referring to abrupt changes in sea-ice cover and SST at the global scale. Following Table 1 from Drijfhout et al. (2015), 19 models were showing rapid variations in these two variables. To avoid any subjective quantification, we now provide this number (19 out of 40 models) in the text.
11226	6	33	28			The 'subpolar gyre (SPG)' should be placed here on line 28 instead of on line 35 (Page 33). [Mastura Mahmud, Malaysia]	Accepted – text revised
4672	6	33	33	33	33	Although there is a lots of diversity in the model's deep convection sites, it has been shown that in all climate models, a weakening of the AMOC will lead to a "warming hole" in the North Atlantic, despite somewhat large differences in model mean ocean states. Nonetheless, the precise location of the warming hole within the North Atlantic remains model dependent, and may result in different associated consequences. This is shown in Menary & Wood (2017). Clim. Dyn. "An anatomy of the projected North Atlantic warming hole in CMIP5 models" which is very relevant here. I suggest a follow on sentence at line 33: "Nonetheless, the CMIP5 models agree that a weakening of the AMOC into the 21st century will lead to localised cooling (relative to the global mean) in the northern North Atlantic, although the precise location is uncertain. (Menary & Wood, 2017)" [Matthew Menary, UK]	Accepted – text revised
1116	6	33	38			Replace "onset of little ice age" with "onset of the little ice age" [Vineel Yettella, USA]	Accepted – text revised
22506	6	33	39	33	41	I am not sure this assessement corresponds to the description of a "tipping point" give p.7 line 19 as the text here seems to suggest it. [Juliette Mignot, France]	Rejected - this comment is not clear enough to make a proper correction. We do feel that the quoted line 41-42 do correctly refer to a tipping points as defined in the beginning of the document. If the reviewer is willing to clarifying his point, we will be able to make some corrections when necessary.
5310	6	33	41	33	42	Why is the tipping point mentioned for the SPG but not the AMOC more generally - as originally envisaged by Stommel (1961)? In addition, there does not seem to be any discussion of the bi-stability of the AMOC (numerous papers on this) - there is mention of hysteris on page 35 though [Meric Srokosz, UK]	Taken into account - it should be mentionned that the AMOC is bi-stable. Nevertheless, since it has been discussed in former IPCC assesment, we will not produce an extended discussion in this report.
11228	6	34	0			Figure 6.8. Where are the notations (a), (b), (c) and (d) on the 4 panels? The colors and fonts in the legend are not clearly discerned. [Mastura Mahmud, Malaysia]	Accepted - figure revised
11230	6	34	0			Figure 6.8 is not referred to in the previous paragraph/text. [Mastura Mahmud, Malaysia]	Accepted – text revised
5678	6	34	2	34	7	The label for the y axis of the lower left subplot is incorrect. It states "Percent of decrease", whereas the figure shows the relative AMOC strength compared to 2005-2015. [Roderik Van De Wal, Netherlands]	Accepted - figure revised
15678	6	34	4		14	Sv in the SI units is used for radiation dose quantitiesis given in Sieverts [Hamid Nebdi, Morocco]	Accepted – text revised
1118	6	34	10			Replace "Figure 6.1" with "Figure 6.8" [Vineel Yettella, USA]	Accepted – text revised
4936	6	34	10	34	10	"Evaluation…(Figure 6.1)". Figure 6.1 is about the framework. Kindly check figure no. [Qudsia Zafar, Pakistan]	Accepted – text revised
5680	6	34	10	34	10	The link with Figure 6.1 is not apparent. Is Figure 6.8 meant to be referenced here? [Roderik Van De Wal, Netherlands]	Accepted – text revised
15584	6	34	10	34	10	Should be Figure 6.8 not 6.1 [Jasmin John, USA]	Accepted – text revised
4674	6	34	11	34	11	"twice as many models as in…" [Matthew Menary, UK]	Accepted – text revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4938	6	34	11	34	13	kindly check as figure 6.8 shows that starting from 1850, the percent of decrease is almost 100% and then going upto 2100 it goes back to 80%. is this what the figure is intended for??? [Qudsia Zafar, Pakistan]	Taken into account - we have modified the figure caption to clarify the panel c and d).
11572	6	34	11	34	11	change "twice more" to "twice as many" and make assessment plural [Taehyun Park, Republic of Korea]	Accepted – text revised
1168	6	34	13	34	13	Fig 6.8 not 6.1 [Laura Jackson, UK]	Accepted – text revised
1170	6	34	13	34	13	It would be useful to note somewhere which model it is that shows the >80% decrease since the colors are difficult to identify [Laura Jackson, UK]	Accepted - the colors in the figure have been improved to identify better the models showing large changes
15586	6	34	13	34	13	Should be Figure 6.8 not 6.1 [Jasmin John, USA]	Accepted – text revised
1172	6	34	17	34	17	in opposition' doesn't make sense. I think you mean 'as opposed' [Laura Jackson, UK]	Accepted – text revised
1174	6	34	19	34	19	few new mechanisms'. Only one is mentioned. Either add more or change to 'a new mechanism' [Laura Jackson, UK]	Accepter - we use singular since we only mention one here.
17646	6	34	26	35	12	I was expecting AMOC variability to appear in another chapter and I ran out of time on going through this in detail so my comments here are not very detailed.... [Jonathan Bamber, UK]	Thank you for providing them.
17648	6	34	26	35	12	Using a box model approach Proshutinsky et al, 2015, Phil Trans Roy Soc propose a mechanism for how GrIS melt could have influenced the dominant ocean circulation regime in the Arctic since 1997 and Gillard, L. et al 2016, GRL looks at the fate of FWF from the GrIS in an eddy-permitting model, while Zhuravleva, A. et al 2017, QSR links LIG hydrographic changes to East greenland melt.....There are others.... [Jonathan Bamber, UK]	Accepted - We have cited the study from Gillard, later on in the text, to highlight the limits of present-day model. The two other studies seemed to be a bit far from the topic discussed in this section.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
21556	6	34	26	34	39	Considerable space is devoted to the Yang et al. 2016b study and, as a result, to the role land-ice melt (especially from Greenland) may have played in the slow-down of convection in the Labrador Sea. Here are some counterarguments: 1) Convection resumed in the Labrador and Irminger Sea in 2015 and following, such that the volume of Labrador Sea water is slowly building back up (e.g Yashayaev and Loder, 2016, GRL; de Jong and de Steur, GRL, 2016) - largely this variability is attributed to changes in the atmospheric forcing with potential contributions to changes in ocean circulation (Josey et al. 2017; Ann Rev Mar Sci). 2) Freshwater from Greenland experiments have varied greatly in terms of freshwater forcing magnitude and its distribution (e.g. Straneo and Heimbach, Nature, 2013). Boning et al. 2016 cited here is the most realistic in terms of magnitude yet the freshwater is all injected at the surface contrary to observations and models showing that meltwater from Greenland's glaciers is largely released at depth and strongly diluted at the glaciers' margins (see Straneo and Cenedese, Ann Rev of Mar Science, 2015; Beaird et al. GRL 2018; Beaird et al. Annals of Glaciology, 2017). Hence it is fair to say that at present we do not see any conclusive evidence that increased freshwater discharge from land-ice melt has resulted in circulation or dense water formation changes in the North Atlantic AND that we do not have the right model runs to address this problem because of uncertainties in specifying the appropriate forcing from Greenland and other Arctic ice caps. (All other cited model experiments also release freshwater at the surface and, as stated, the magnitudes vary greatly). Bamber et al. 2018, JGR provides the most accurate estimate for arctic land-ice discharge in terms of magnitude and spatial distribution. [Fiamma Straneo, USA]	Accepted - we have modifed the text to correctly to correctly account for the uncertainty that are highlighted here. Nevertheless, due to space Imitation, we were not able to enter into the many potentially crucial processes highlighted in this comment.
4940	6	34	27	34	27	Replace "(Atlantic Meridional Overturning Circulation)" with AMOC [Qudsia Zafar, Pakistan]	Accepted – text revised
10238	6	34	31	34	39	Needs to incorporate new findings from Thornally et al. (2018) who demonstrate post-Little Ice Age weakening of AMOC. Thornalley, D.J., Oppo, D.W., Ortega, P., Robson, J.I., Brierley, C.M., Davis, R., Hall, I.R., Moffa-Sanchez, P., Rose, N.L., Spooner, P.T. and Yashayaev, I., 2018. Anomalously weak Labrador Sea convection and Atlantic overturning during the past 150 years. Nature, 556(7700), p.227. [APECS Group Review, Germany]	Rejected - this reference has been already cited and discussed earlier in the section (line 19 page 33) and the results should be taken cautiously given the large uncertainty in the proxy used.
886	6	34	32	34	32	about 50% (please confirm this amount since it is large) [Belkacem Balah, Algeria]	Accepted - we confirmed this amount coming from (Yang et al. 2016b)
11232	6	34	33		38	Unfinished sentence. Alternatively, …Rahmstof et al (2015) and Yang et al. (2016b). [Mastura Mahmud, Malaysia]	Accepted – text revised
11574	6	34	37	34	37	incomplete sentence [Taehyun Park, Republic of Korea]	Accepted – text revised
4676	6	34	39	34	39	Add a sentence at the end: "In addition, model sensitivities to freshwater forcing are not well constrained, even in ocean reanalyses (Menary & Hermanson, 2018)" The reference is: Menary & Hermanson (2018) Nat. Comm. "Limits on determining the skill of North Atlantic Ocean decadal predictions" [Matthew Menary, UK]	Accepted – text revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4942	6	35	0	35		Figure 6.9: The probabilities (99-100%, 90-100%,66-100% and Median) should be explained in the figure ccaption. [Qudsia Zafar, Pakistan]	Accepted – text revised
11234	6	35	0			Figure 6.9 is not referred to in the previous text. [Mastura Mahmud, Malaysia]	Accepted – text revised
11576	6	35	1	35	1	change "led" to "carried out" [Taehyun Park, Republic of Korea]	Accepted – text revised
1176	6	35	8	35	8	Fig 6.9 not 6.2 [Laura Jackson, UK]	Accepted – text revised
15588	6	35	8	35	8	change to "of collapse only starts to be of consequence above ..." [Jasmin John, USA]	Accepted – text revised
15590	6	35	8	35	8	Should be Figure 6.9, not 6.2 [Jasmin John, USA]	Accepted – text revised
15680	6	35	8			Figure 6.9 and not Figure 6.2, I think [Hamid Nebdi, Morocco]	Accepted – text revised
17650	6	35	12	35	12	Ritz et al is for Antarctica. For GrIS you should use e.g. Fettweis et al 2013, The Cryosphere. [Jonathan Bamber, UK]	Accepted – text revised
4944	6	35	18	35	19	"results from 10,000 RCP4.5 and 10,000 RCP8.5 experiments over the period 2006–2300,". Which scenario does the figure depict? RCP45 or RCP85? [Qudsia Zafar, Pakistan]	Accepted - The figure is showing simulations following both RCP45 and RCP85. The legend has been corrected.
22508	6	35	20	35	20	add "in particular" at the beginningof the sentence starting with "A potential" [Juliette Mignot, France]	Accepted - We assume that the reviewer was referring to page 34 rather than 35 where there is no mention of "A potential" in the quoted line. We have modified the former sentence following comments from another reviewer to be clearer.
1178	6	35	26	35	28	This sentence is confused. What is the 20% and what the 70%? If only quoting values to 2200 then why mention 2300? [Laura Jackson, UK]	Accepted - we have reformulated this sentence.
10240	6	35	26	35	26	This sentence needs to be clarified - at first reading unsure whether this is saying that the impact of GrIS melting is 20% larger or whether GrIS itself is "melted" by 20%. Again, I would recommend to move away from using the term "melting", as mass loss is much more representative, and encompasses both surface runoff and iceberg calving fluxes. [APECS Group Review, Germany]	Accepted - we have reformulated this sentence. We prefer to keep the mention "melting" since it is the input of freshwater from GrIS that affects the AMOC, not the mass balance, which is also ifluenced by increase in precipitations that are not exactly relevant here.
1182	6	35	32	35	32	I think the reference you want here is Jackson, L.C., Schaller, N., Smith, R.S. et al. Clim Dyn (2014) 42: 3323. https://doi.org/10.1007/s00382-013-1842-5 rather than the one given? [Laura Jackson, UK]	Accepted – text revised
1180	6	35	33	35	36	I don't understand these sentences. I think it is suggesting that Fov is relevant for multi-centennial timescales but not for shorter time periods where other processes are important (N Atlantic transient response is very vague). It's an interesting suggestion but would need to be expanded on and include more lines of evidence (ie references) for both longer and shorter term responses - this paper would support that theory (de Vries, P., and S. L. Weber (2005), The Atlantic freshwater budget as a diagnostic for the existence of a stable shut down of the meridional overturning circulation, Geophys. Res. Lett., 32, L09606, doi: 10.1029/2004GL021450.) An alternative theory is that the idea of Fov is less relevant (other feedbacks are more important) in coupled GCMs. If the authors are discussing this they need to go into more detail and discuss different suggestions [Laura Jackson, UK]	Accepted - given that the chapter is too long, we decide to remove this discussion rather than to enlarge it as it would have been necessary as nicely highlighted byt the reviewer.
4678	6	35	34	35	34	"depends more on" [Matthew Menary, UK]	Accepted – but this text has been removed in response to former comment
15592	6	35	34	35	34	change to "was more dependent on North Atlantic ..." [Jasmin John, USA]	Accepted – but this text has been removed in response to former comment

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
1184	6	36	2	36	2	but more on the centennial timescale' doesn't really make sense [Laura Jackson, UK]	Accepted – this text has been removed in response to former comment
1186	6	36	4	36	7	There are a few models that are higher resolution than 1 degree in CMIP5, possibly eddy-permitting but certainly not eddy-resolving [Laura Jackson, UK]	Accepted - text revised
4680	6	36	4	36	7	There has been work systematically analysing the relationships between bias and resolution in the North Atlantic across all the models in CMIP5. This is particularly relevant and should be mentioned here after the sentence ending "... which is around 1degree", e.g. "Across CMIP5 models, there was a systematic link between resolution and near surface mean state temperature and salinity biases, with higher resolution models generally being warmer and saltier (Menary et al., 2015)". The reference for this is Menary et al. (2015) GRL. "Exploring the impact of CMIP5 model biases on the simulation of North Atlantic decadal variability" [Matthew Menary, UK]	Accepted – text revised
17488	6	36	4	36	16	The model representation of ocean overflows has been shown to impact the model simulation of AMOC and its variability, see for example Yeager and Danabasoglu, 2012: Sensitivity of Atlantic Meridional circulation variability to parameterized Nordic sea overflows in CCSM4. Journal of Climate, doi: 10.1175/JCLI-D-11-00149.1 [Sonya Legg, USA]	Rejected - this report is mainly focusing on novelty since AR5 report i.e. 2013. This reference was published earlier, and is not diectly relevant to the topic discussed, while there is a need to remain synthetic to respect page limit.
1188	6	36	10	36	12	Suggested inclusion: Mecking et al 2016 suggested that the stronger transports at higher resolution might have assisted hysteresis in her study. However this is still to be proved. [Laura Jackson, UK]	Rejected - as mentionned by the reviewer, the demonstration is not entirely clearand since we need to remain below a page limit, we assessed that this suggestion may be not directly relevant.
4682	6	36	10	36	12	As per my comment above - a link between ocean model resolution and the mean state biases has been noted above. Furthermore, and more relevant here, this paper also shows a link between ocean resolution and the locations of feedbacks in the northern North Atlantic, which one might expect to be quite important for the AMOC (cf. colours in Figure 3 of Menary et al., 2015). The reference for this is Menary et al. (2015) GRL. "Exploring the impact of CMIP5 model biases on the simulation of North Atlantic decadal variability" [Matthew Menary, UK]	Accepted - this reference has already been quoted earlier in response to a former comment from the same reviewer.
11578	6	36	12	36	12	change "led" to "carried out" and "make" to "allow" [Taehyun Park, Republic of Korea]	Accepted - text revised
4946	6	36	18	36	23	Kindly add more information on decadal predictability of AMOC and if possible explain with figure. If AMOC is being affected on decadal basis then effect should be discussed decade wise in more detail. this can be a very important part of this chapter. [Qudsia Zafar, Pakistan]	Rejected - due to space limitation we are unable to extent this paragraph too much.
22510	6	36	18	36	23	This paragrah is not at the right place in my view. No direct link to Greenland Ice Sheet melting. [Juliette Mignot, France]	Accepted - we have added a a few words to highlight that these systems do not account for GrIS melting in order to remain relevant with the subsection topic.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4684	6	36	23	36	23	Recent work has shown that the AMOC in decadal hindcasts is fundamentally linked to whether the bisaes in the underlying (unforced) climate model are similar to the validating ocean reanalysis - and not the specifics of the initialisation. Given also that the ocean reanalyses show different (but equally plausible) AMOC states in the nothern North Atlantic (cf Karspeck et al.), we are still at a stage where we don't know what the "truth" is to which we should compare. The reference is: Menary & Hermanson (2018) Nat. Comm. "Limits on determining the skill of North Atlantic Ocean decadal predictions" As such, I suggest adding a sentence at Line 21 to the effect of "However, there remain difficulties in determining the skill (quality) of decadal prediction systems related to the lack of ocean observations, particularly of salinity in the northern North Atlantic. (Menary & Hermanson, 2018)" [Matthew Menary, UK]	Accepted - this reference has already been added
17316	6	36	25			Perhaps include references related to the polar vortex: Baek-Min Kim , Seok-Woo Son, Seung-Ki Min, Jee-Hoon Jeong, Seong-Joong Kim , Xiangdong Zhang, Taehyoun Shim & Jin-Ho Yoon. (2014). “Weakening of the stratospheric polar vortex by Arctic sea-ice loss”, Nature Communications 5, 4646 (2014). Kretschmer, M., Coumou, D., Agel, L., Barlow, M., Tziperman, E., Cohen, J. (2017). More frequent weak stratospheric polar vortex states linked to cold extremes. Bulletin of the American Meteorological Society. [DOI: 10.1175/BAMS-D-16-0259.1]. [Cecilia Conde, Mexico]	Rejected - this section is dealing with impacts of the AMOC, not of th melting of sea ice.
22516	6	36	25			given that abrupt changes of the AMOC are unlikely, this paragraph describes impacts of an AMOC weakening rather than abrupt change and may be more relevant to chapter 5. More generally, regarding AMOC issues I find chapters 5 and 6 sometimes overlapping. [Juliette Mignot, France]	Rejected - this has been the matter of a lot of debate within SROCC and we agreed with chapter 5 that this should remain in chapter 6, since chapter 5 is harldy dealing with AMOC and mainly refer to chapter 6 when it is the cause. Also, the text is also discussing impact of collapse in specific simulations. Even if low probability, this an be a huge impact event.
11580	6	36	27	36	27	change "can" to may" [Taehyun Park, Republic of Korea]	Accepted - text revised
4948	6	36	29	36	31	Where is this shown? Any figure? [Qudsia Zafar, Pakistan]	Rejected - this is not shown in a dedicated figure, but the specific impacts are discussed throughout the text.
5682	6	36	29	36	29	Here it is stated that the SPG subsystem potentially shifts over decadal time scales, but it is not stated in which direction the shift takes place. We propose to add information about the direction of this shift. [Roderik Van De Wal, Netherlands]	Accepted - text revised
1190	6	36	33	38	5	There is no mention of general impacts - cooling of the N Atlantic (and potentially warming of S Atlantic), less evaporation and therefore precip over the N Atlantic, shift of the ITCZ [Laura Jackson, UK]	Accepted - text revised
1192	6	36	33	38	5	It's unclear in various places what are the impacts from AMOC weakening/collapse and what is from the SPG [Laura Jackson, UK]	Accepted - we have clarified when this was unclear.
4950	6	36	33	36	34	In which figure? Kindly include figure no. [Qudsia Zafar, Pakistan]	Rejected - There is no figure at this stage, this is just a general reminder of results from AR5.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
5684	6	36	35	36	35	The word 'still' is used. Does this mean that this will change? Consider rephrasing: …are supported by a large amount f paleo evidence as well. [Roderik Van De Wal, Netherlands]	Accepted - text revised
11582	6	36	36	36	36	change "by" to "with" [Taehyun Park, Republic of Korea]	Accepted - text revised
15594	6	36	39	36	39	change to "They confirmed the main climatic impacts related to AMOC weakening …" [Jasmin John, USA]	Accepted - text revised
4952	6	36	41	36	43	"Nevertheless…Zhang, 2017). We can say this in case of lack of observed data. But can we say this on the basis of models as well.?? Do we have some conclusive results from AR5 based on CMIP5 models?? [Qudsia Zafar, Pakistan]	Rejected - We highlight here the issue of not long-enough observations to have robust knowledge. Models are not sufficient to be confident of the results.
22512	6	36	41	36	43	this sentence seems to suggest that the two cited articles question the link between SST and circulation and gives biased view of this debate. [Juliette Mignot, France]	Accepted - we have removed the reference to Zhang et al. (2017)
11584	6	36	42	36	42	change "long-enough" to "long term" [Taehyun Park, Republic of Korea]	Accepted - text revised
4954	6	36	45	36	46	Figure 6.3 is about marine heat waves. Is this figure intended to be referenced here in the context of changes in AMOC ??? [Qudsia Zafar, Pakistan]	Accepted - text revised
5178	6	36	45	36	46	Figure 6.3 is not relevant to AMOC. [Sai Ming Lee, China]	Accepted - text revised
5686	6	36	45	36	46	Figure 6.3 may be too general when compared to the information given in this section. That there will be impact to marine ecosystems and political and economic systems seems obvious, so referring to the figure seems superfluous. Perhaps figure 6.10 is meant instead. [Roderik Van De Wal, Netherlands]	Accepted - text revised
1194	6	36	46	36	49	These sentences are rather unclear. The Jackson et al paper cited shows impacts on the storm track when the AMOC collapses but there's nothing to support that the impacts are 'largest' for AMOC collapse than a weakening (it also is going to depend on how large the weakening is) [Laura Jackson, UK]	Accepted - text revised
10726	6	36	46	36	46	I think this should be Figure 6.10, not Figure 6.3 [David Smeed, UK]	Accepted - text revised
15596	6	36	46	36	46	Change to Figure 6.10 [Jasmin John, USA]	Accepted - text revised
23518	6	36	46			should be figure 6.10 [Galen Galen Mckinley, USA]	Accepted - text revised
3734	6	36	48	36	48	Sentence mentions “winter storms hitting Europe” and cites Haarsma et al. (2015). However, this seems wrong as Haarsma et al. (2015) analyse summer, not winter, responses. [Petteri Uotila, Finland]	Accepted - ths reference has been removed and replaced by Woollings et al. (2012) and Jackson et al. (2015).
4956	6	36	48	36	49	"The impacts … Jackson et al., 2015)". kindly discuss in more detail the context in which AMOC collapses discussed by Jackson et al.,2015. The scenarios on AMOC collapse should be added along with discussion of AMOC weakening and figure 6.8 discussion. [Qudsia Zafar, Pakistan]	Accepted - this sentence was not precise enough and has been removed to answer another comment.
11586	6	36	48	36	49	rewrite: "The analysis shows the impacts on storm tracks to be greatest when……" [Taehyun Park, Republic of Korea]	Accepted - this sentence was not precise enough and has been removed to answer another comment.
1196	6	36	51	36	52	What does this sentence mean? What impacts in particular? How/what is 'damped'? [Laura Jackson, UK]	Accepted - we have extended this description to clairfy what we meant here.
4958	6	36	51	37	2	"The climatic impacts…..resolution models". The climatic impacts should be discussed in a sseparate para. [Qudsia Zafar, Pakistan]	Rejected - we did not understand well the request.
11588	6	36	51	35	51	change "can" to "could" [Taehyun Park, Republic of Korea]	Accepted - text revised
4960	6	36	54	36	54	replace "has been" to "have been" [Qudsia Zafar, Pakistan]	Accepted - text revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4962	6	36	54	36	54	heat waves or marine heat waves? [Qudsia Zafar, Pakistan]	Accepted - we were talking of heat waves over Europe. This has been added.
11590	6	36	55	36	55	change "short period" to "lack of historical observations" or similar text [Taehyun Park, Republic of Korea]	Accepted - text revised
10242	6	37	2	37	2	Reference needed for this assertion [APECS Group Review, Germany]	Accepted - text revised
4964	6	37	4	37	9	Explanation of scenarios of AMOC collapse from Jackson et al., 2015 can be added with this. this whole context can be added with discussion of figure 6.8. [Qudsia Zafar, Pakistan]	Accepted - the description of results from Jackson et al. (2015) is now more details in this subsection.
5312	6	37	4	37	9	In the context of sea level changes due to AMOC the recent work of McCarthy, G. D., Haigh, I. D., Hirschi, J. J.-M., Grist, J. P. & Smeed, D. A. Ocean impact on decadal Atlantic climate variability revealed by sea-level observations. Nature 521, 508-510 (2015) should be referenced [Meric Srokosz, UK]	Accepted - text revised
11592	6	37	5	37	5	change "can" to "could" [Taehyun Park, Republic of Korea]	Accepted - text revised
11594	6	37	5	37	5	does "few tenths of centimetres" mean a few millimetres or should it be a few tens of centimetres? clarification needed [Taehyun Park, Republic of Korea]	Accepted - we were meaning a few tens of centimeters
11596	6	37	7	37	7	change "is suspected to" to "may" [Taehyun Park, Republic of Korea]	Accepted - text revised
1198	6	37	11	37	52	A couple of other suggestions for impacts on the carbon cycle. Parsons et al (2014), Influence of the Atlantic Meridional Overturning Circulation on the monsoon rainfall and carbon balance of the American tropics, Geophys. Res. Lett., 41, 146–151, doi: 10.1002/2013GL058454. shows increase in Amazon vegetation due to changes in seasonal rainfall though Bozbiyik et al 2011 predicted dieback. Also Jackson et al 2015 show reduction in European net primary productivity with an impact on crops [Laura Jackson, UK]	Accepted - text revised
11666	6	37	41			See also Bock et al. PNAS, 2017 for methane and information from dual isotopes on emission sources and Zürcher et al., Biogeosciences 2013 regarding the 8.2 event [Fortunat Joos, Switzerland]	Accepted - we have added a reference to Zurcher et al. (2013), but not to Bock et al. (2017) as the link with this paragraph was not clear in our opinion.
5314	6	37	45	37	47	With regard to Bozbyik et al. (2011) the contrasting results of Parsons, L. A., Yin, J., Overpeck, J. T., Stouffer, R. J. & Malyshev, S. Influence of the Atlantic Meridional Overturning Circulation on the monsoon rainfall and carbon balance of the American tropics. Geophys Res Lett 41, 146-151, doi:10.1002/2013GL058454 (2014) should be referenced too [Meric Srokosz, UK]	Accepted - text revised
15600	6	37	47	37	52	See John et al., A more productive, but different, ocean after mitigation, GRL, https://doi.org/10.1002/2015GL066160, 2015 for a study on ocean and marine ecosystem responses to a ramp-up/ramp-down RCP8.5 simulation. [Jasmin John, USA]	Accepted - text revised
10244	6	37	56	37	56	Would recommend not using the term "melting" as it implies entirely meltwater runoff, while mass loss from Greenland is a combination of both runoff (50-70%) and iceberg calving (30-50%) (Enderlin et al., 2014). Enderlin, E.M., Howat, I.M., Jeong, S., Noh, M.J., Angelen, J.H. and Broeke, M.R., 2014. An improved mass budget for the Greenland ice sheet. Geophysical Research Letters, 41(3), pp.866-872. [APECS Group Review, Germany]	Rejected - we think that mass balance is also accounting for mass increase from additionnal precipitation on top of the ice sheet. What we are interested in here is the freshwater input from the ice sheet, due to ice melting, coming either from runoof or icebergs. To increase clarity we specify this in the first occurence of the word melting and also add basal melting as a potential source.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11236	6	38	0			Figure 6.10. Accordingly, Figure 6.10 should be placed after Section 6.7.3 (page 38, line 19). Here, the figure precedes the text. [Mastura Mahmud, Malaysia]	Accepted - text revised
11598	6	38	5	38	5	change "urging" to "indicating the need" [Taehyun Park, Republic of Korea]	Accepted - text revised
22664	6	38	5	38	9	Figure 6.10: Not clear why there is no arrow for the symbol of "Livelihoods, economics and migration pressure" on the African continent. Based on the other impacts indicated on the continent, one would assume increased pressure on livelihoods, economics and migration? [Eva Kruemmel, Canada]	Accepted - figure revised
1200	6	38	7	38	7	Infographic: Storms in the N Atlantic affect Europe. Maybe move symbol east? At the moment looks like it is an impact over the ocean. Also impacts have been been shown on vegetation (which doesn't seem to be a symbol) in the Amazon, and on crops over Europe (though possibly less severe than in other regions). [Laura Jackson, UK]	Accepted - figure revised
888	6	38	9	38	9	I think that Figure 6.10 should be deleted, because all the impact results mentioned by AMOC and SPG are inspired by: 1) global flooding, 2) ice melt 3) sea level rise and oceans; 4) Poverty and roughly a trend toward the end of the world on the maturity of both models. Other points, I vote that, in certain cases, it is necessary to judge the bases of the basic statistical laws, which are introduced in the two models of forecast before use. if not, the results should be combined with the probability of not exceeding (or exceeding) and / or threshold of confidence for its results to be satisfactory. [Belkacem Balah, Algeria]	Rejected - this comment is not clear enough to make a proper correction.
4966	6	38	9	38	9	Is figure 6.10 about AMOC weakening or is it about AMOC collapse? [Qudsia Zafar, Pakistan]	Figure 6.10 is for a substantial weakening or collapse, in order to have the different effect significant. We have completed the caption to highlight this.
15602	6	38	14	38	16	It's important to note that mitigation may lead to potentially surprise responses and unintended consequences - there may be winners and losers. See e.g. John et al., A more productive, but different, ocean after mitigation, GRL, https://doi.org/10.1002/2015GL066160, 2015 [Jasmin John, USA]	Accepted - text revised
15598	6	38	19	38	19	Refers to Figure 6.10 which is an infographic. Looks like there is a missing figure - Figure 6.11 [Jasmin John, USA]	Accepted - We were referring to Figure 6.9. This has been corrected
11238	6	38	22		23	[PLACHOLDER FOR SECOND ORDER DRAFT: inclusion of material from the SR1.5]23. Please rectify this unfinished reminder. [Mastura Mahmud, Malaysia]	Accepted - text revised
1202	6	38	25	38	28	Literature … is scarce'. Don't agree with this - lots is cited! Also it's not clear why there's then a summary of impacts over Europe only. It would be better to cut this and just refer back to previous section. Also not clear why 6.5.2 is referenced - should this be 6.7.2? [Laura Jackson, UK]	Accepted - text revised
5316	6	38	25	38	25	On impacts see recent review of Good P. et al. 2018 Recent progress in understanding climate thresholds: ice sheets, the Atlantic meridional overturning circulation, tropical forests and responses to ocean acidification, Prog. Physical Geog. 42, 24-60, doi:10.1177/0309133317751843 [Meric Srokosz, UK]	Accepted - we have mentionned this reference at the beginning of section 6.7.2
1120	6	39	1			Delete "to come" [Vineel Yettella, USA]	Accepted - text revised
1122	6	39	1			Replace "Furthermore, a few studies have shown that already" with "For example, a few studies have already shown that" [Vineel Yettella, USA]	Accepted - text revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4968	6	39	6	39	6	Section 6.8. Multi-risk and casscading impacts have been discussed in much detail on page 7 in definitions. i suggest that more details should be added here and only definition should be added at page 7. [Qudsia Zafar, Pakistan]	We have revised the chapter incl. The introduction substantially
3212	6	39	10	39	30	In the English language, "multi-risk" has the form of an adjective, not a noun, and grates excessively on the native ear when used as a noun. In addition, it is not defined here, but described in an imprecise way that is very hard to follow, and also seems to be used (even more awkwardly then as a noun) as a noun that is identical in its singular and plural forms. I urge you to please stick to using 'multi-risk' as an adjective (e.g., as in "multi-risk assessments" or "multi-risk events," which is fine). [Robert Kopp, USA]	Accepted: the term has been replaced by compound events
5688	6	39	29	39	30	It is unclear what is meant with 'defining the application'. What is meant by application? [Roderik Van De Wal, Netherlands]	Accepted: the sentence has been removed
5254	6	39	32	39	48	In Ch. 6.8.2, only the topic of reefs is addressed, although the headline says "impacts and effects on ecosystems". The contents seems incomplete or rather arbitrarily. Further, the statements do not seem to be substantiated (see above). It is recommended to delete this subchapter. [Jacobus Hofstede, Germany]	Rejected: this section is on "cascading" impacts or cumulative effects on ecosystems, not a generic section on impacts on ecosystems . The only purpose is to illustrate a cascading impact since ecosystem impacts are covered in other chapters.
4970	6	39	34	39	48	Kindly add more references in this para. [Qudsia Zafar, Pakistan]	Accepted: reference added
11600	6	39	34	39	35	regime shifts may result in an equally resilient system as illustrated by the shift following overfishing of Canadian cod stocks to a more invertebrate dominated resource base [Taehyun Park, Republic of Korea]	Accepted: rephrased "regime shifts in ecosystems may lead to"
1124	6	39	38			Replace "due the loss of" with "due to the loss of" [Vineel Yettella, USA]	Accepted
5252	6	39	41	39	48	The statements (e.g., with the loss of reefs, annual damage would more than double), contained in these sentences seem highly debatable. No literature is quoted to support them, uncertainties or confidence ranges are not included. If the extremely alarming figures are only supported by one modelling excersize, it us urged to delete them. Alternatively, comprehensive scientific documentation (publications, investigations) should be given. [Jacobus Hofstede, Germany]	Taken into account: the missing reference: Beck, M. W, Losada. I.J., Menendez, P., Reguero, B.G, Diaz-Simal, P., Fernandez, F. (2018). The global flood protection savings provided by coral reefs. Nature Communications 9, article 2186. was added
5690	6	39	43	39	44	The sentence "With the loss of reefs, annual damages would more than double (118%) and the flooding of the currently protected land would increase by 69% affecting 81% more people annually." seems to fit better in paragraph 6.8.3 about Social Systems. [Roderik Van De Wal, Netherlands]	Rejected; although the final outcome is given in terms of socioeconomic consequences, this examples tries to convey the cascading effects produced by impacts on ecosystems
3214	6	39	50	40	12	See also the discussion of repeated/compound extremes leading to critical transitions in social systems in R. E. Kopp, R. Shwom, G. Wagner, and J. Yuan (2016). Tipping elements and climate-economic shocks: Pathways toward integrated assessment. Earth's Future 4, 346-372. doi:10.1002/2016EF000362. [Robert Kopp, USA]	Accepted: point taken and included in the text.
5256	6	39	50	40	12	in Ch. 6.8.3, no scientific information, supported by references to publications, is contained. It is a highly general description, reflecting common knowledge. It is recommended to delete this subchapter. [Jacobus Hofstede, Germany]	Taken into account: references have been added and text has been enhanced but we perceive this section as important and it should not deleted
5258	6	40	9	40	9	If not deleted, it is stated that vulnerabilty, by definition, includes adaptive capacity. The words "adaptive capacity" should be deleted. [Jacobus Hofstede, Germany]	accepted: text revised

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
1382	6	40	14	40	39	Question is if you can make a link to the current localism/policycentric discourse - is that better to solve the challenge of natural hazards or not, see Ostrom (2010): Polycentric systems for cping with collective action and global environmental change. Global Environmental Change 20 (4):550-557 [Thomas Thaler, Austria]	This comment goes beyond the scope of our chapter.
1126	6	40	17			Replace "cascading impact" with "cascading impacts" [Vineel Yettella, USA]	Accepted: text has been changed
5260	6	40	23	40	23	what are "damage costs"? It is proposed to delete the word "costs". [Jacobus Hofstede, Germany]	Accepted: text was changed into costs of damage
5262	6	40	23	40	27	That indirect damages should be included in a holistic risk analysis is common knowledge since decades. More information is not contained in this paragraph. It is recommended to delete this paragraph. [Jacobus Hofstede, Germany]	taken into account; the text has been revised and expanded to include more information but we consider this paragraph important and decided to keep it.
16392	6	40	29	40	35	On lines 33-35 the sentence that assessments are expanding to risks to include impacts should be referenced and c hecked. This statement doesn't seem to coincide with how risks have been framed in relation to climate impacts in this chapter. [Margot Hurlbert, Canada]	Accepted: sentence deleted
23234	6	40	49	49	40	Cai et al (2016) consider' should be 'Cai et al. (2016) considered' [Dongxiao Wang, China]	Accepted; the text was corrected
22666	6	40	52	41	6	There is a repetition of the sentence "This subsequently can have an impact on local economies, potentially leading to social disruption and migration" [Eva Kruemmel, Canada]	rejected. The following second sentence provides more precise examples of the consequences of the cascading impacts and cumultive risks
22668	6	40	52	41	6	Missing here is the crucial impact on food security. [Eva Kruemmel, Canada]	Accepted: a sentence and a reference have been added
11240	6	41	5			[START BOX 6.1 HERE], Please rectify this unfinished reminder as other reports had placed the box prior to the FOD review. [Mastura Mahmud, Malaysia]	Noted
12116	6	42	15	42	20	Isn't the Coral Triangle region also under threat from ocean acidification? The threat is at present poorly quantified, but it is expected to be a gradual pressure acting on ecosystems there as well. [Sarah Cooley, USA]	Taken into account, the text has been revised to include the threat from ocean acidification, see inclusion of new text page 10 lines 29-32.
1128	6	42	25			Replace "highest richness" with "the richest biodiversity" [Vineel Yettella, USA]	Accepted, text revised
11196	6	42	53			The acronym DHW should be placed after ‘degree heating week’. [Mastura Mahmud, Malaysia]	Accepted, text revised
3216	6	43	19	44	5	Please note the recent literature estimating the number of deaths in Puerto Rico caused by Hurricane Maria. [Robert Kopp, USA]	accepted - text revised and amended with more literature
20658	6	43	19	44	6	In case study 3 Carribbean Hurricanes of 2017. Mention impacts on fishery (e.g. Government of Dominica. 2018. Post disaster needs assessment Hurricane Maria September 18, 2017. A report by the Government of Commonwealth of Dominica, also available at https://reliefweb.int/sites/reliefweb.int/files/resources/dominica-pdna-maria.pdf) [Florence Poulain, Italy]	Reference is included in the text - this study is much broader than only fisheries and supplies data on GDP and on gender issues

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16804	6	43	34	43	39	It is stated that two studies have examined the role of climate change on the rainfall intensity of Harvey, namely: van Oldenborgh et al. (2017) and Emanuel (2017). To this list, two recent studies seem to be lacking, namely "Risser & Wehner (2017). Geophysical Research Letters" and "Wang et al. (2018). Environmental Research Letters". Adding those studies are useful to highlight that attribution studies, though based on different approaches and data (only observations, reanalysis data, numerical simulations), can lead to consistent conclusions. In particular, extreme rainfall probability in Texas ranging from 15% (van Oldenborgh et al 2017) to 30% (Risser and Wehner 2017) that was linked to anthropogenic warming in the atmosphere. As far as I understand, this section of chapter 6 only insists on attribution of intensity increase (line 36), on the change of probability over time (line 38), but little is stated about the attribution of probabilty change may also be useful (as outlined in van Oldenborgh et al 2017 andRisser and Wehner 2017). Finally, the case of Harvey is also an opportunity to highlight some open questions in the domain of Detection / Attribution though recent attribution methodologies (risk-based or ingredient-based) appear to more and more efficient. For instance, in the Harvey case, the role of other natural modes of variability (such as the AMO in addition to ENSO) seems not fully understood (see conclusion of Wang et al., 2018). [Jeremy Rohmer, France]	These papers are now assesed in case study 3. Unfortuately, space limitations mean we cannot get into a long discussion about th strengths and limitations of detetction and attribution approaches
5692	6	43	50	43	51	The structure of this sentence seems incorrect: "These hurricanes by combining storm surge with riverine flooding in the U.S. heightened the cascading impact of compound events." Consider adding commas after 'hurricanes' and 'U.S.'. [Roderik Van De Wal, Netherlands]	accepted - text revised
10246	6	43	52	43	52	Units would be more useful in metric rather than imperial. The value also needs a reference. [APECS Group Review, Germany]	as the value changed to about 8 million pound in the latest news report by the Environmental Defense Fund without a formal analysis paper, we decided to remove this sentence.
11242	6	43	56			Should there be a full stop before Maria? [Mastura Mahmud, Malaysia]	corrected
11244	6	44	6		7	[END BOX6.1 HERE]. Please rectify this unfinished reminder as other reports had placed the box prior to the FOD review. [Mastura Mahmud, Malaysia]	unclear comment

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
20660	6	44	15	44	25	In 6.9.1, you may want to stress that we are experiencing conditions that have never been seen before (e.g. marine heatwaves) and that this is a real challenge: we need to learn quickly from on going extreme events and adapt, as we cannot rely on the past for understanding what we will see in the future. This point was made by several speakers at the 4th International Symposium of the effects of climate change on the world's ocean (Washington DC, June 4 - 82018). https://meetings.pices.int/meetings/international/2018/climate-change/background. In addition it is worth emphasizing that risk management and adaptation should be seen and implemented as an on-going and iterative process, with possibilities for mid course corrections in the light of new information (IPCC, 2007: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA., XXX pp). and Last the paper should emphasize the regional dimension of adaptation measures (with impacts across political boundaries) & therefore the need for regional collaboration [Florence Poulain, Italy]	accepted - text revised
20664	6	44	15	44	57	The FAO department of fisheries and aquaculture has analysed existing and recommended adaptations and grouped the latter into three main categories (with sub categories): institutional adaptation (e.g public policies, legal frameworks, institutional frameworks, planning and manement); livelihoods adaptation; risk reduction and management for resilience (e.g. risk pooling and risk transfer; early warning; risk reduction; preparedness and response). This categorisation aims to provide a portofolio of available adaptation measures to address climate change and extreme events. In chapter 25 In: Barange, M., Bahri, T., Beveridge, M., Cochrane, K., Funge-Smith, S., Poulain, F. (Eds.) 2018. Impacts of Climate Change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options. FAO Fisheries Technical Paper 627 (in press). [Florence Poulain, Italy]	accepted and revised - the recommendations are included in the new text
21516	6	44	16			Consider using "only" instead of "simply." [Tseng Rose, USA]	corrected
21514	6	44	17			Define "actor"--is this a government, a person, an agency? Specificity of who or what "actor" is will prevent presumptions to help determine applicability of Chapter 6.9 [Tseng Rose, USA]	text has been revised completely
16798	6	44	24	44	24	Sect. 6.9.1 deals with decision making and refers to adaptation measures. These are extensively dealt with in Chapter 4 and a reference to it would be here useful. [Jeremy Rohmer, France]	accepted, text revised, a reference to chapter 4, section 4.4 has been added
21518	6	44	25			Consider using "holistic approach" to describe that all encompassing ideas described in this paragraph. I believe the author is trying to convey that the ideas are wide-reaching. [Tseng Rose, USA]	the text has been revided completely
20662	6	44	27	44	37	Watkiss et al (2014) have also worked on costs benefits analysis (E.g. Watkiss, P. (2014). Early Value-for-Money Adaptation: Delivering VfM Adaptation using Iterative Frameworks and Low-Regret Options, DFID, London. Available at www.vfmadaptation.com) [Florence Poulain, Italy]	reference inclosed in the text

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16796	6	44	28	44	28	The term "deep uncertainty" is used here. This notion is not straighforward (and has triggered discussion in the litterature). A reference to the Cross Chapter Box 4 in Chapter 1, page 47 would be useful here. [Jeremy Rohmer, France]	accepted - text revised
1130	6	44	32			Replace "recognizes" with "recognize" [Vineel Yettella, USA]	corrected
1384	6	44	34	44	35	here the central question is: how we can solve/overcome the current path depency which will cause a technical lock-in in our current system. I would add one sentence on this issue. [Thomas Thaler, Austria]	accepted and included in the text
1386	6	44	39	44	45	Please add some references within this paragraph [Thomas Thaler, Austria]	accepted and references added
17318	6	44	45	44	45	a reference is needed after "credible, salient and legitimate" [Cecilia Conde, Mexico]	references included
1388	6	44	47	44	57	how you define trust? And please add further challenges within this section, e.g. legitimacy, accountability and social justices [Thomas Thaler, Austria]	amended and explained
17320	6	45	0			The IPCC TAR (and the UNFCCC), defines adaptation as changes in practices, processes and structures. That definition could be useful in this section. Smit et al, 2001. TAR. WGII.Ch. 18. Adaptation to Climate Change in the Context of Sustainable Development and Equity. [Cecilia Conde, Mexico]	noted and included in the text
1390	6	45	13	45	13	how you define transformation? Can you link this aspect with social justices (see Patterson et al. 2018): Political feasibility of 1.5°C societal transformations: the role of social justice. Current Opinion of Environmental Sustainability [Thomas Thaler, Austria]	It is explained already within the sentence. We added the reference in the first sentence of the paragraph.
1392	6	45	41	45	46	In particular, with small islands a central issue will be: how we can use planned retreat in the current risk management system; also in the line with current policy restrictions in various countries on climate refugees [Thomas Thaler, Austria]	accepted and revised - the recommendations are included in the new text
5694	6	45	48	45	54	The Sendai Framework is introduced, but it is not clear whether the European Wadden Sea coastal area example highlights the features of the Sendai Framework. If it does, this could be stated more clearly by saying 'highlights features of the Sendai Frameworksuch as...'. Alternatively, the Sendai Framework can be explained before or perhaps be omitted. [Roderik Van De Wal, Netherlands]	accepted and revised in the text
20666	6	46	1	46	3	Disaster risk reduction and disaster response are essential tools for climate driven extreme events. There is growing evidence at local levels that disaster risk management save lives and livelihoods. Cuba is a living example that early warning system and preparedness measures allow to evacuate people and their assets on time in the event of hurricanes. [Florence Poulain, Italy]	text has been revised and the referenced example of India has been included
13954	6	46	10			This ends rather abruptly? What did Pal et al find in their analysis? [Debra Roberts and Durban Team, South Africa]	text has been revised
1132	6	47	0			Answers to FAQs are missing [Vineel Yettella, USA]	Now provided
11246	6	47	1			Page 47 line 1 [START FAQ6.1 HERE] " [Mastura Mahmud, Malaysia]	Noted
12870	6	47	1	47	5	The main subject areas are: ice sheets and glaciers; planetary ice bodies; permafrost, river and lake ice; seasonal snow cover; sea ice; remote sensing, numerical modeling, in-situ and laboratory studies of the above and including studies of the interaction of the cryosphere with the rest of the climate system. [Md Enamul Haque, Italy]	These are covered by other FAQs
10248	6	47	3	47	18	Basis for the cryosphere aspects related to these FAQs are not currently covered in the main body of the chapter. This should be rectified as there are substantial impacts of cryospheric change that are outside of the scope of Chapters 3 and 4 that would fall within Chapter 6. [APECS Group Review, Germany]	Now covered by other FAQs in other chapters

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11248	6	47	5			Page 47 line 5 [END FAQ6.1 HERE] " [Mastura Mahmud, Malaysia]	Noted
12872	6	47	7	47	13	With delicately balanced ecosystems, weather patterns and a lot of ice, the planet's frozen areas (collectively known as the 'cryosphere') are some of the most sensitive to climate change. As the cryosphere warms, we can expect to see a range of knock-on effects. This briefing runs through what we know about how the cryosphere is reacting to climate change, and what the likely consequences of continued warming are. [Md Enamul Haque, Italy]	Now covered by other FAQs in other chapters
11250	6	47	8			Page 47 line 8 [START FAQ6.2 HERE] " [Mastura Mahmud, Malaysia]	Noted
11252	6	47	13			Page 47 line 13 [END FAQ6.2 HERE] " [Mastura Mahmud, Malaysia]	Noted
11254	6	47	16			Page 47 line 16 [START FAQ6.3 HERE] " [Mastura Mahmud, Malaysia]	Noted
12874	6	47	16	47	20	A definition of cascading disasters and cascading effects: Going beyond the "toppling dominos" metaphor.Multi-hazard is used throughout the Sendai Framework for Disaster Risk only includes a definition for 'multi-hazard early warning system', which is a very specific research gap are more representative of the natural and build environment. [Md Enamul Haque, Italy]	We now drop the term multi-hazard - see reviosed defintions in section 6.1
11256	6	47	20			Page 47 line 20 [END FAQ6.3 HERE] " [Mastura Mahmud, Malaysia]	Noted
4972	6	48	0	67		The references which have omitted from the text should also be omitted from here. [Qudsia Zafar, Pakistan]	Accepted - text revised
15320	6	48	0	67		the references are very importand and useful [Maitham Sultan, Iraq]	Noted
15682	6	48	9		10	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15684	6	48	12		14	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15686	6	48	16		18	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15688	6	48	24		26	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15690	6	48	30		32	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15692	6	48	35		37	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15694	6	48	45		57	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15696	6	48	61			References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
15698	6	49	12		29	References must be given for all the authors like ine line 1. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
11258	6	49	14		15	The title of article should be in Sentence case. [Mastura Mahmud, Malaysia]	Accepted - text revised
15700	6	49	31		37	References must be given for all the authors like ine line 1. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
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11266	6	51	5		6	The title of article should be in Sentence case. [Mastura Mahmud, Malaysia]	Accepted - text revised
11264	6	51	7		8	The title of article should be in Sentence case. [Mastura Mahmud, Malaysia]	Accepted - text revised
15728	6	51	11		13	References must be given for all the authors like ine line 1. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
11268	6	51	16			The title of article should be in Sentence case. [Mastura Mahmud, Malaysia]	Accepted - text revised
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11284	6	53	26			Capitalize makassar strait as Makassar Strait [Mastura Mahmud, Malaysia]	Accepted - text revised
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15792	6	56	1		11	References must be given for all the authors like ine line 3. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
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15840	6	59	34		39	References must be given for all the authors like ine line 1. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
11290	6	59	38			The reference is not complete, should have a date of publication and information on [Available at] [Mastura Mahmud, Malaysia]	Website address now added
15842	6	59	43		62	References must be given for all the authors like ine line 1. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
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15882	6	62	25		32	References must be given for all the authors like ine line 1. [Hamid Nebdi, Morocco]	Rejected - reference is in correct format (for more than 5 authors)
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