#	Ch	From Page	From Line	To Page	To Line	Comment
1	18	0	0	0	0	This is a clear and well-written chapter with arguments and assessments easy to follow and well illustrated. (Lough, Janice, Australian Institute of Marine Science)
2	18	0	0	0	0	There are many statements in the chapter along the lines of "confidence in attribution to climate change is very low". I think this wording is misleading as it starts with a statement "confidence in attribution to climate change" which sounds like a strong or clear result. I think it would be better to say something along the lines of "there is very low confidence in being able to attribute these trends to climate change". (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
3	18	0	0	0	0	Excellent draft chapter. Very good synthesis of the available litteraure. It is easy to read. Unfortounately should be reduced and eliminate a lot of information due to adjust to the permitted number of pages. (Suarez, Avelino, Institute of Ecology and Systematic, Cuban Environmental Agency)
4	18	0	0	0	0	The chapter has 742 references, out of which 128 (17%) are from the chapter authors. (INDIA)
5	18	0	0	0	0	Out of these 742 references, only 54 (7%) are on developing countries. It is suggested that a more balanced approach could be adopted. (INDIA)
6	18	0	0	0	0	A quick check on the total universe of articles in peer-reviewed journals since AR4 (2007) indicates that there are almost 2000 in journals of Science Direct, 30 in Francis and Taylor, approximately 5000 in Wiley and 279 in JSTOR totaling to around 7500 articles in all on topic covered in this chapter. The chapter has captured almost 11% of existing literature. (INDIA)
7	18	0	0	0	0	Out of total 7500 articles mentioned as above, almost 2000 are on developing countries (around 26%) and issues related to them. It indicates that there is a large enough pool of articles to be picked up on developing countries to be cited in this chapter. The authors may like to take a look at it. (INDIA)
8	18	0	0	0	0	The Executive Summary and some contents are well done, but some concepts or definitions seem that need to explore or explain clearly, e.g., the definitions of the climate system and natural system are different from the IPCC previous reports. AR4_SYR shows that "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (Figure 1.1)., topic 1, P30" Obviously, the climate system in AR4 report includes so called natural system in the chpater 18, p7. Secondly, the definition of Oceans in subtitle 18.3.4 seems not so clear? It might be reasonable to change "Oceans" to "Ocean systems", just like Coastal systems under the subsection 18.3. Then, the subsection 18.3.4 could remain only the content of "Impacts on Oceans Systems ....." and move the original subsection 18.3.4.2 to the subsection 18.5 as one of the regions in the world. Thereafter, it would also be helpful for the IPCC reports to keep consistency or balance among chapters and the reports.In addition, some concepts may be a little confusing. Table 18-8 which has been cited by SYR and SPM shows that the observed impacts of CC on marine ecosystem and coastal process across eight major world regions such Africa, Europe etc. However, how could we understand that some marine ecosystems appear across the continent regions? E.g., as for Europe in table 18-8, it sounds a little strange that NE Atlantic seems to be located in the Europe continent region? And some similar examples could easily be found in the table 18-8. This might be due to the concept problems. AR5-WG2 outline shows that there is an Ocean region, too, although it is somewhat different from the previous IPCC reports. WG2 SODs also show there are several ocean subregions defined by ch30, 5, 28 etc. The marine ecosystem and coastal processes might be better to be included in the Ocean and polar regions, not in the continent regions. Perhaps, the chapter 18 could give a table for observed impacts of CC on marine ecosystem across the ocean, polar regions and coastal areas to replace table 18-8, not across the continents such as Eurpope, Asia etc? Actually, Executive Summary also indicates the impacts of CC on all contients and in most oceans (P3) or covering all continents and the oceans (P5), respectively. (CAI, RONGSHUO, Third Institute of Oceanography)

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9	18	0	0	0	0	I was expecting to see some update of the meta-analysis undertaken in the AR4, but it appears that this has not been undertaken? There is no supplementary material this time, so I am assuming that this job was regarded as simply to ambitious to attempt. However, I think some attempt has been made at an update by Rosenzweig and Neofotis (2013) - see next general comment. (Carter, Timothy, Finnish Environment Institute)
10	18	0	0	0	0	I'm sure the authors are aware of this, but it is important that the recent review by Rosenzweig and Neofotis (WIREs Clim Change 2013, 4:121–150. doi: 10.1002/wcc.209) be detected, assimilated and attributed in this chapter! (Carter, Timothy, Finnish Environment Institute)
11	18	0	0	0	0	Unlike Chapter 1 of the AR4, this chapter places a lot of reliance on the core thematic and regional chapters to undertake relevant literature analysis on D/A of impacts (statements on P11 and P35). That is understandable, given the large amount of new literature, but it also has some dangers. First, it isn't clear where the reader/reviewer is supposed to look for key literature on this topic - is it here or is it scattered among the other chapters? Second, is the author team satisfied that the other chapters include authors on their team with sufficient knowledge and expertise to do full justice to the D/A issue, which is quite a specific and demanding research area? For example, just looking at the Europe chapter (23), I would expect to find the most comprehensive account of detection and attribution of observed impacts of any region in the world (based on the AR4 analysis, at least). Instead, what I discover is a short, two paragraph section addressing "Effects of observed climate change in Europe", reference to a Table (23-6) and mention of some other sections of the chapter that treat impacts (both observed and projected) without a specific "observed impacts" focus. Table 23-6 proceeds to offer some confidence statements regarding a number of observed impacts and their attribution to changes in climate factors , citing a very limited set of references and presumably applying expert judgement from the chapter team. This is a good effort, but one wonders how comprehensively they have been able to cover the main observed impacts occurring in Europe among the many other issues they are supposed to be assessing. How valid are their judgements, and how well has the literature been reviewed and assessed? Or is chapter 18 able to pick up the slack and complement missing information from this (and other) core chapters? For sure, some of the chapters do an excellent job of covering this issue. However, I'm not sure that all of them are properly equipped for this, which means the coverage is patchy. Without an ability to assemble evidence in a more systematic manner, a synthetic overview cannot be obtained. So using the approach described up front, can the chapter 18 author team be reasonably confident that no major literature has been missed, especially considering the regional and sectoral gaps in information that were emphasised in AR4 Chapter 1? (Carter, Timothy, Finnish Environment Institute)
12	18	0	0	0	0	We have a serious concern about particular methodology for presenting results of detection and attribution in chapter 18. (RUSSIAN FEDERATION)
13	18	0	0	0	0	As it is stated in the Executive Summary, serious problems still remain both on methodology of detection and attribution (especially with regard to anthropogenic effects) and on the coverage of various systems in publications. This relates, for example, to climate impacts on livestock (page 5, 1st paragraph), a spatial scale of detected climate-driven changes (page 5, lines 39-40), possibility to attribute observed changes in processes and systems to anthropogenic climate change (page 5, lines 44-46). (RUSSIAN FEDERATION)
14	18	0	0	0	0	In spite of remaining methodological problems and lack of reliable publications, the ch. 18 author team resolutely presented numerous diagrams with results of detection and attribution and even characterizations of confidence. (RUSSIAN FEDERATION)

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15	18	0	0	0	0	However, the diagrams do not give enough information on the spatial scale and subject range of the impacts (to what part of the globe the statement is applicable and which of the earth's systems typically are affected by climate change). Are climate change induced trends typical for certain physical and biological systems and processes, for certain regions / continents? This information can not be derived from the diagrams presented. It also remained unclear, who assigned particular grades for confidence at the diagrams, whether those were authors of respective publications, or an author of the other chapters of AR5, or the authors of ch. 18. (RUSSIAN FEDERATION)
16	18	0	0	0	0	Methodology for detection and attribution is given in a very general manner in the chapter. A transparent example of the end-to-end application of the proposed methodology would be extremely helpful. Description of mathematical basis (with respective references) of the methodologies employed for assigning confidence levels would be especially important. (RUSSIAN FEDERATION)
17	18	0	0	0	0	Serious additional efforts on ch. 18 are required. (RUSSIAN FEDERATION)
18	18	0	0	0	0	If alternative definitions of attribution or detection from the default ones are being used for any of the assessments, this must be spelled out. (UNITED STATES OF AMERICA)
19	18	0	0	0	0	Is there a way to synthesize information that is relevant to extremes as well as those that are relevant to averages? For example there is lots of discussion about impacts due to extremes but it could be useful to provide a synthesized section that connects the impacts related to extremes on both ends (highs and lows) but also to relate the impacts due to increases in averages. So when talking about temperature, for example, there are extremes but there are also increases in high temperatures and increases in low temperatures. How are those impacts detected and attributed? The idea is just an additional way to organize the chapter. Obviously this is a suggestion and could pose lots more work for the authors. (UNITED STATES OF AMERICA)
20	18	0	0	0	0	Much of the discussion of the effects of climate change on the poor in developing countries is also true of the poor in richer, developed countries - even the U.S. Also, consider thresholds like those associated with poverty traps. See Hallegatte, Stì©phane, and Valentin Przyluski. "The economics of natural disasters: concepts and methods." World Bank Policy Research Working Paper Series. 2010. (UNITED STATES OF AMERICA)
21	18	0	0	0	0	Reasons for Concern: It is important to treat these in their proper context. If these are in fact a response to the UNFCCC objective to avoid dangerous anthropogenic interference with the climate system, then the findings must draw from what we can detect and attribute to anthropogenic forcing. Given the broad definition used for climate change in this report, this is a distinct subset and conclusions that broadly reflect climate change are not sufficient. (UNITED STATES OF AMERICA)
22	18	0	0	0	0	Tables: Need more specific information on time periods and rates of change. Figures: Need to clarify definition of attribution, since it appears that its definition varies in very similar figures. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
23	18	0	0	0	0	The chapter sets an appropriate and useful standard for detecting climate impacts on physical and biological systems when it states formal detection studies provide robust evidence of where climate changes impacts [are] already being observed and where they are not, supporting near-term planned adaptation if and where necessary. (Page 6, Lines 19 - 20). Unfortunately it is not possible to follow the application of this standard within the chapter, because publications supporting detection of impacts (cf. Table 18-1, page 80, column 5 and reference footnotes) are not categorized as such. The criterion emphasized in Chapter 18, the presentation of negative results in detection of change and/or attribution of causes, does not appear to have been applied elsewhere in the AR5. To give but one example, from AR5 Chapter 6, Page 134, Table 6-5 (Responses and attribution), Phenology, the response of changes in salmon related to long-term warming (Kovach et al. 2012) is not balanced against the finding cited in Chapter 28 of lack of changes in salmon timing in the absence of long-term warming (Mundy and Evenson 2011 in references Chapter 28 but incorrectly cited, see comments on Chapter 28, Start Page Number 31, Start Line Number 8, End Page Number, 31 End Line Number, 9). (UNITED STATES OF AMERICA)
24	18	0	0	0	0	The literature on the economics of natural disasters provides many useful insights into a study of the economic effects of climate change. See: Hallegatte, Stì©phane, and Valentin Przyluski. "The economics of natural disasters: concepts and methods." World Bank Policy Research Working Paper Series. 2010. Cavallo, Eduardo, and Ilan Noy. "The economics of natural disasters: a survey." 2009. (UNITED STATES OF AMERICA)
25	18	0	0	0	0	The treatment of Reasons for Concern is not in keeping with the high-level of scientific rigor displayed in the rest of the chapter. Definitions for three of the five reasons of concern (risks from extreme weather events, aggregate impacts and risks of large-scale discontinuities) have changed from previous IPCC Assessments and notably from the key literature source cited (Smith 2009). As such it appears that the authors are using the same examples of warm water corals and the Arctic to show progress on most fronts. This comes across as the authors reaching to show progress, while ignoring the lack of conclusive observational information on droughts, floods, aggregate impacts as previously defined, thermohaline circulation and Greenland and West Antarctic ice sheets. (UNITED STATES OF AMERICA)
26	18	0	0	0	0	There is a lot of common ground in the economic components of chapters 18 and 19. I would recommend reviewing references to ensure consistency (e.g., work by Hallegatte cited in chapter 19 is also relevant to chapter 18). (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
27	18	0	0	0	0	This report uses a different definition of climate change than UNFCCC along with different definitions of detection and attribution than in other parts of IPCC AR5. This is confusing and must be addressed. To make things even more confusing, throughout the text the authors use alternative definitions to the ones they propose at the beginning (e.g., Table 18-11a and related text). The disadvantage of this choice for presenting D&A findings is that it creates a great potential for miscommunication and misinterpretation of the chapter findings. While the assessments in the chapter may be quite reasonable for the specific definitions that were (apparently) used to develop them, we expect that they will be frequently misinterpreted, leading to incorrect statements in the press, political speeches, etc. - misinterpretations that go beyond what the science says and that could undermine the credibility of the science and science communication with the public and policymaker. That would be a steep price to pay. We are not quite clear on the advantages of the revised/mixed system other than it is far easier to make detection and attribution statements (since the bar is lower so there are a whole lot more of these statements and they generally have relatively high confidence levels, especially compared to what they would have with the more conventional WG1/Ch. 10 definitions of D&A). Notably, the authors not only use different definitions of attribution within the chapter, but also (at least in the case of tropical cyclones and other phenomena in Table 18-11a and related text) are apparently using different definitions of detection within the chapter. The are three basic paths the authors could follow as a remedy. The first option, which we recommend, is to scrap this alternative/mixed system and adopt definitions of detection and attribution that are being used in WG1 Ch. 10 (i.e., detection means that an observed change is unlikely to have occurred due to internal climate variability alone; and attribution is the process of evaluating the relative contributions of multiple causal factors to a change or event with an assignment of statistical confidence. Here we would recommend evaluating the relative contribution of anthropogenic climate forcing to the observed change. This would of course require a full re-write/re-evaluation of the assessments of the chapter. The second (less desired) option is to: 1) clear up some problems resulting from the choice of new definitions, specifically related the different definitions of detection, etc. used even within the chapter for certain phenomena, such as tropical cyclones. 2) make clear how certain well-studied forms of low-frequency climate variability (such as the Atlantic multidecadal variability or AMO, and Pacific interdecadal variability or IPO) are interpreted in terms of the concept of "climate change" in this chapter and be consistent with this usage throughout; 3) make sure that for each assessment of detection or attribution within the chapter, it is precisely stated or clear which of the different definitions of detection/attribution/climate change are being used; and 4) add many more text reminders of the varying (and nonconventional) definitions throughout the text to try to reduce the occurrence of confusion and misunderstanding on the part of readers. Each table and figure caption needs an explicit reminder of which definition (hopefully only one) is used within the table. A third option could be to choose terms other than detection and attribution for this chapter and define them as entirely separate from those terms used in WG I. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
28	18	0	0	0	0	While Reasons for Concern can be a useful organizing principle for a part of the chapter, more work is needed to rigorously relate observed impacts to the framework. In particular, the methods for assignment of confidence levels in detection and attribution are not well explained. The criteria for assigning those levels of confidence need to be defined in the chapter. The chapter lacks rigorous quantification in the description of the studies of the observed impacts, e.g., time periods, rates of change, etc. The cross-talk between this chapter and the other systems and regional chapters is an achievement. However, these interactions did not fully mine all the relevant observed impacts studies. See and cite the recent review by Rosenzweig and Neofotis (2013). On the coverage of attribution, the use of the term "attribution" for both causation by climate change and causation by anthropogenic climate change is confusing to the reader. Differentiating between these two definitions is important throughout the chapter. In order for observed impacts to qualify rigorously as contributing to a Reason for Concern, they need to be linked methodologically to anthropogenic climate change. If they are not, then how these assignments are being justified needs to be explained. See Rosenzweig and Neofotis (2013) for a synthesis and map of specific anthropogenic climate change attribution studies. (UNITED STATES OF AMERICA)
29	18	0	0	0	0	I think the authors have done a tremendous job in pulling the chapter together to such a stage and commend them on their ambition in Figs 18.3 to 18.7 but I also have very strong concerns about the philosophy of what they have done when it comes to detection and the implementation for both "detection" and "detection and attribution" in terms of tracability. I do not like the structure of the WGII report in which detection and attribution is spread throughout the report and then is synthesised in chapter 18 as this add an extra layer of complexity in terms of tracing statements back from the SPM into the chapters. But if it has to be this way then more work needs to be done by Chapter 18 in tracing statements back to the source statements in the various chapters. One way to do this would be to explicitly state in the source chapters when a calibrated statement on detection and/or a calibrated statement on detection and attribution is being made. To take an example of why there is a problem. Fig 18.2 has an assessment of groundwater depletion. Groundwater depletion is detected with medium to high confidence (Fig 18-3; referring to 3.2.4) despite a statement in 3.2.4 that "detection of changes in groundwater systems is rare". I'm afraid that examples like this make me start to lose confidence in the whole enterprise. However it isn't too late of course, because you have another round to make clear where the assessments in chapter 18 come from and make them fully traceable to and justified by the underlying sections and I think it would really be worthwhile thinking out how you can do that so that you can realise your ambition in the finished product. (Stott, Peter, UK Met Office)

#	Ch	From Page	From Line	To Page	To Line	Comment
30	18	0	0	0	0	Concerning the philosophy of the WGII definition of "detection", I will provide an example of where I find the concept of detection as applied in WGII troubling. This is that of disaster losses (Fig 18-7: very high confidence in detection and very low confidence in detection and attribution). I am taking this as an illustrative example. This appears in Fig 18-7 as very high confidence in "detection" and very low confidence in "detection and attribution" This is based on an asseessment that includes statements like "no detectable trends in normalized losses consistent with anthropogenic climate change," and "failed to detect trends consistent with anthropogenic climate change" And a conclusion that "there is limited evidence of a trend in the economic impacts of extreme weather events that is consistent with a change driven by observed anthropogenic climate change." This gives the very low confidence in "detection and attribution". But what is also being seen is a very clear trend in disaster losses that has been "detected" with very high confidence as outside the range of what might be considered normal behaviour in the absence of climate change, where the reference normal behaviour "may be stationary or non-stationary and the nature of that reference needs to be spelled out clearly". Thus, according to the chapter, a very clear trend is detected with very high confidence that is a change beyond what might be considered normal behaviour. So the assessment has decided it is not normal behaviour to act in such a way as to increase the value of exposed assets, although as it says on page 29 much of this increased exposure is due to population growth and growing value of assets. Now this is a value judgement of what is normal behaviour but an increase of exposure due to increasing population and wealth seems quite normal and expected behaviour to me. (Stott, Peter, UK Met Office)
31	18	0	0	0	0	The definition of detection in WGII is important because in the SPM there is a statement that "The degree to which .. the detection of stronger early warning signals for expected impacts, can contribute to a more comprehensive risk assessment for dangerous anthropogenic interference with the climate system." So there is an implicit expectation, in the SPM at least that detection of changes matters for drawing conclusions about climate change. Yet many of the high confidence in detection statements sitting off the diagonal in the figures in chapter 18 are presumably nothing to do with anthropogenic or natural climate change even though the detection question is supposed to be dealing with changes in systems that would not be expected in the absence of climate change. The problem comes with the "normal behaviour" clause. It might be "normal behaviour" for disaster losses to increase with population and wealth or it might not as chapter 18 seem to conclude. But if this is not normal this detection of abnormality is then being used as evidence for "detection" and implicitly at least for evidence of something going wrong in some way potentially as the SPM puts it as early warning signals for a more comprehensive risk assessment for dangerous anthropogenic interference with the climate system. Again there is no evidence from the report I can see that supports increases in disaster losses as evidence for dangerous anthropogenic interference with the climate system. Personally I don't see the value of the x axis of the Figures unless they are posited as actually observational statements : there is very high confidence in an increasing trend in disaster losses seems an uncontroversial statement. My hunch is that this is what the authors intend for this axis - ie for impacts in the lower right to indicate aspects that are clearly changing but which have not been shown to be do with anthropogenic climate change. (Stott, Peter, UK Met Office)
32	18	0	0	0	0	I have some other concerns about the conclusions which relate to the need for traceability. To take an illustrative exmple : the reduction in lake and river ice duration and thickness which is discussed directly in chapter 18 rather than being discussed elsewhere in the report (although the cross reference in Fig 18.3 is wrong). Here the reference is to the WGI report chapter 4 which of course is an observational chapter. So apparently (but I may have misunderstood whaty ou are doing here because there isn't a lot of information to go on) you have assessed a high confidence in detection and a high confidence in detection and attribution based on the observational chapter 4 in WGI, which is not a detection and attribution statement at all. (Stott, Peter, UK Met Office)

#	Ch	From Page	From Line	To Page	To Line	Comment
33	18	0	0	0	0	I have read the ES and introduction, and parts of the technical text but ran out of time. The chapter has much improved since the FOD, it provides now much more detail, and is really interesting to read and much easier to understand where assessments come from, really impressive. (Hegerl, Gabi, University of Edinburgh)
34	18	0	0	0	0	It is not always clear to me how detection and attribution is meant to deal with confounders - in some cases, confounders are listed as impediments to detection (e.g. 18.3.1.2 top), in others to attribution. This could be clarified, maybe in the introduction, and a consistent framework would be really useful - or an explanation why that wouldnt be a good idea if it isnt. For example, disaster losses sometimes say that no change beyond changes in exposure is detected, and in other places there is low confidence in attribution due to confounders. I am also wondering if it wouldnt be useful to also state confidence for attribution in non-climatic factors (eg the exposure for disasters) in the attribution statement, it seems you often have confidence in that, and so a statement of low confidence in attribution to anthropogenic climate change is in some ways misleading, as you are confident in attribution - to something else. I think it would be good to state that. (Hegerl, Gabi, University of Edinburgh)
35	18	0	0	0	0	There are many statements in the chapter along the lines of "confidence in attribution to climate change is very low". I think this wording is misleading as it starts with a statement "confidence in attribution to climate change" which sounds like a strong or clear result. I think it would be better to say something along the lines of "there is very low confidence in being able to attribute these trends to climate change". (Jones, Richard, Met Office Hadley Centre)
36	18	0	0	0	0	Chapter does not address impacts outside physical science despite references to the increased use of social science analysis in chapter 1. There is evidence around for example migration, see UK Foresight report from 2011 that could have been brought in to this analysis. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)
37	18	0	0	0	0	I would, however, note that chapter 18 on detection of impacts is restricted to the physical science impacts. This is particularly interesting as chapter 1 highlights how AR5 and the underlying science analysis now embraces social science aspects to a far greater extent. This trend has not found its way into chapter 18. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)
38	18	0	0	0	0	Authors should coordinate with Chapter 12 to ensure consistent findings regarding climate change and conflicts. (Chatterjee, Monalisa, IPCC WGII TSU)
39	18	0	0	0	0	1) Overall -- The chapter team has developed a strong 2nd-order draft. In the final draft, the chapter team is encouraged to continue prioritizing compact and rigorous assessment, effective figures, clear writing, and high specificity. (Mach, Katharine, IPCC WGII TSU)
40	18	0	0	0	0	2) Coordination across Working Group II -- In the context of chapter 18, coordination across chapters is especially important, and the chapter team is strongly encouraged to continue its efforts to ensure harmonized and coordinated assessment. The chapter team should strive to harmonize its assessment text with corresponding material in the sectoral and regional chapters, and most especially, it should ensure that its key findings reverberate appropriately with the core conclusions emerging in other chapters. Where chapter 18 cross-references other chapters, the references should continue to be at the level of specific chapter sections. Additionally and importantly, where chapter 18 uses only cross-references to other chapters in support of statements within chapter 18, the chapter 18 author team bears full responsibility for ensuring a rigorous and comprehensive traceable account is available in the cross-referenced sections, for the statement within Chapter 18. (Mach, Katharine, IPCC WGII TSU)
41	18	0	0	0	0	3) Harmonization with the Working Group I contribution to the AR5 -- In developing the final draft, the chapter team should also ensure all cross-references to the Working Group I contribution are updated, with discussion of climate, climate change, and climate extremes referencing the assessment findings in that volume. Where cross-references are made, wherever possible and appropriate they should specify the specific relevant sections of Working Group I chapters, instead of generic references to whole chapters. (Mach, Katharine, IPCC WGII TSU)

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42	18	0	0	0	0	4) Presentation of uncertainty language within parentheses -- As much as possible, the chapter team should present calibrated uncertainty language within parentheses at the end of sentences. Such placement maximizes the directness and clarity of statements. Wherever possible, formulations such as "there is high confidence that" should be nixed and replaced by "(high confidence)" at the end of the sentence. (Mach, Katharine, IPCC WGII TSU)
43	18	0	0	0	0	5) Italicizing uncertainty language -- The chapter team should ensure that all calibrated uncertainty language, including summary terms for evidence and agreement, levels of confidence, and likelihood terms, is italicized within the chapter. Casual usage of likelihood terms should continue to be avoided. (Mach, Katharine, IPCC WGII TSU)
44	18	0	0	0	0	6) Report release -- The chapter team should be aware that the final drafts of the chapters will be posted publicly at the time of the SPM approval, before final copyediting has occurred. Thus, the chapter team is encouraged to continue its careful attention to refined syntax and perfected referencing. (Mach, Katharine, IPCC WGII TSU)
45	18	0	0	0	0	7) Tightening the assessment and supporting a maximally rigorous executive summary -- In developing the final draft, the chapter team is encouraged to further tighten each section so that the core nuanced key findings emerge clearly from each section with full and traceable support. Continuing with such focus, the chapter team should aim to shorten and tighten the assessment as much as possible, ideally reducing the text by 10 pages. (Mach, Katharine, IPCC WGII TSU)
46	18	0	0	0	0	8) Informing the summary products -- To support robust and insightful summary products for the report, the chapter team is encouraged to maximize nuance and traceability in its key findings, continuing to use calibrated uncertainty language effectively. The chapter team is encouraged to consider themes emerging across chapters, indicating for example how extreme events have affected human and natural systems to date and reveal adaptation deficits. The chapter team is also encouraged to continue summarizing its assessment in effective tables. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
47	18	0	0	0	0	GENERAL COMMENTS: I congratulate the author team for all their work on the SOD. Please see my detailed comments for suggestions related to ES findings and their traceable accounts, cross-chapter coordination, refining figures and tables, calibrated uncertainty language, and various specific clarifications. I have three general comments. (1) The chapter needs a careful read to ensure consistency between the executive summary and underlying chapter text, as well as between characterizations in Chapter 18 and in other chapters. I have tried to point out cases where there seem to be differences in my specific comments, but it is important to do a comprehensive comparison across chapter material and continue cross-chapter coordination as the final drafts are prepared. In this process, please make clarity of ES findings a priority, including timeframe and geographic coverage for observed changes presented. (2) I would recommend a reformulation of section 18.5. While short synopses with detailed summary tables is a good idea, the tables succeed more than the synopses, which are so abbreviated that they read as overgeneralizing without direct citations or cross-references, nor calibrated uncertainty language (all of which do appear in the tables). In a few cases, the information in tables provides a different impression than the section text. Given this, options include adding citation/cross-reference support to sections 18.5.1-8, or condensing the synopses in these sections further to summaries that explicitly link to the table entries (perhaps even as individual paragraphs in the current 18.5.9). The main information in these sections that is not captured in the tables is on changes in climate, which could be retained in close to its current form. (3) I would also recommend further consideration of options for section 18.6, ideally in consultation with Chapter 19. I expected this section to present new information on observed impacts relevant to each reason for concern, and to provide assessment based on this evidence of whether current temperature increase is already associated with a transition away from white (e.g., to yellow) in terms of the RFC color gradient or not. I found the current explanation for each category (sometimes couched as "confirming" a reason for concern, sometimes couched in other terms) somewhat confusing, and have made further specific comments related to the section text where clarification would be useful. Again, this section should also be coordinated with Chapter 19 to ensure consistency and a smooth handoff from assessment of changes to date (realized risks) to assessment of future risks. Please specifically consider the described scope of aggregate impacts in 19.6.3.5 compared to that here. Chapter 19's discussion focuses on nonmonetary aggregations, while here the focus is on monetary aggregations. (Mastrandrea, Michael, IPCC WGII TSU)
48	18	0	0	0	0	SUMMARY PRODUCTS: In preparing the final draft of your chapter and particularly your executive summary, please consider the ways in which your chapter material has been incorporated into the draft SPM and TS. For chapter 18, this includes presentation of observed impacts in section A.i, anthropogenic interference with the climate system in Box SPM.6/TS.7, and figures and tables associated with these sections. Are there opportunities for presenting chapter findings and material in a way that further supports broad themes highlighted in the summary products and that facilitates additional cross-chapter synthesis in specific findings or figures/tables? Do the existing summary product drafts suggest additional coordination that should occur between Chapter 18 and other chapters at LAM4? (Mastrandrea, Michael, IPCC WGII TSU)
49	18	0	0	0	0	Again ruined by the facts; that the globe is not warming, that the Northern Hemisphere has yet another cold winter and that the relative sea level is not rising (Gray, Vincent, Climate Consultant)
50	18	1	0	102	0	Impacts and adaptation always occur in local and regional scales. There are many peer-reviewed non-English publications analyzing the impacts and adaptation in various countries and regions of the world. Unfortunately, few such publications have been cited in this chapter and other chapters of the WG II report. One reason for the ignorance of the publications is the unbalanced distributions of the authors especially in this chapter. It would be better if there were more authors whose native languages are not English, for example Russian, Chinese and Japanese, and they would be responsible for assessing the non-English publications. (Guoyu Ren) (Ren, Guoyu, National Climate Center)

#	Ch	From Page	From Line	To Page	To Line	Comment
51	18	1	0	102	0	In a few of sections, some of the latest publications have not been cited, and they heavily rely on the relative chapters of the GW I and WG II reports, and a few of review articles. This could be improved by inviting more authors to attend the important work.(Guoyu Ren) (Ren, Guoyu, National Climate Center)
52	18	1	0	102	0	The "reasons for concern" concept is good. However, assessment bias may result if it is taken as the guiding ideology in preparing this chapter and the other chapters of the WG II report, because the authors will be encouraged to seek and rely on the studies dealing with the major negative impacts from climate change, and will hardly make an objective evaluation of the impacts having actually occurred in varied sectors and regions. On the other hand, the needs for adaptation demand a more objective assessment of both the negative and positive impacts of climate change. Perhaps another concept, "useful for adaptation", is better for guiding the preparation of the WG II report. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
53	18	1	0	102	0	A bigger problem may arise from the inconsistent definitions for "climate change" between IPCC and UNFCCC. When this chapter concludes that certain impacts (e.g. changes in floods frequency due to climate change in the executive summary) have been detected, and some of the impacts can be attributed to climate change with confidence, climate researchers and the authors themselves all understand that the impacts have not been necessarily caused by the anthropogenic climate change or global warming, and only some of the some might result from the GHG induced climate change. However, Policy-makers have their own usage of the term, and they will have a different understanding of the detected impacts and their causes. The problem has not been well solved even by introducing term "anthropogenic climate change" for some of the assessment conclusions, and a serious confusion will result from the different usages of the terms. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
54	18	1	1	1	1	it should be relatively easy for table 18-4 to add some agricultural impacts (e.g. Europe 2003, Russia 2010) which can then be referred to in chapter 7 and some regional chapters. (Lobell, David, Stanford University)
55	18	2	1	2	35	Suggestions as the above mentioned. As we know, AR5 WG2 outline defines that Ocean system as a global and sectoral chapter and the (Open) Oceans as a regional chapter and both of them have been assessed on global and regional scale, respectively. It is suggested that Ocean Systems should be as one of natural systems under section 18.3, the (Open) Oceans could be referred to as a region under section 18.5, e.g. "18.5.9 the Ocean", and the "18.5.9 Impacts across Regions" could be changed to "18.5.10 ..." (CAI, RONGSHUO, Third Institute of Oceanography)
56	18	3	1	5	53	This section is inconsistent in applying attribution statements. Some statements do not mention whether the impacts can be attributable to climate change, while others do. This is confusing, particularly where some statements, such as (pg. 4 lines 16-17) on artic ice melt, are attributable to climate change but this isn't stated. One may assume that no attribution statement means that the impact is not attributable to climate change. (AUSTRALIA)
57	18	3	4	0	0	Each conclusion in the executive summary should be followed by confidence level assessment and the writing style should be standardized in WG II report. It is suggested to make additions and modifications according to the Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties (6-7 July 2010) to avoid inconsistent formulations like “medium to high confidence”. (CHINA)
58	18	3	4	0	0	Harmonization of Key Findings in Executive Summary -- The chapter 18 author team should carefully check all key findings presented in the executive summary to ensure they are harmonized with the conclusions of relevant sectoral and regional chapters. (Mach, Katharine, IPCC WGII TSU)
59	18	3	4	0	0	Time Frames and Geographic Regions for Key Findings-- For key findings in the draft executive summary, the chapter team should ensure that it appropriately characterizes the time frames over which impacts have been observed (and attributed to climate change) and their corresponding geographic scope. The chapter team should especially ensure that statements are not overgeneralized. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
60	18	3	4	5	52	Executive Summary: Generally, this summary is not easy to interpret without reading the chapter itself. An up-front description of detection and attribution needs to be included. All confidence statements need to be clear whether they relate to detection and attribution, and the statements should be worded consistently throughout the summary. (AUSTRALIA)
61	18	3	4	5	52	There needs to be more consistency in the use of the terms 'climate change' versus' anthropogenic climate change' among the bulleted statements. Why is anthropogenic called out on page 3, line 54, but not in other statements. Providing clarity at the beginning by defining the first time it is used what is meant by 'climate change' (includes natural and anthropogenic) as elegantly described in WGII Chapter 4, would be greatly improve the readability of the chapter and enhance the communication of the findings to inform policy makers. (Webb, Robert, NOAA OAR ESRL)
62	18	3	6	3	6	change 'climate change' to 'changes in climate" (Webb, Robert, NOAA OAR ESRL)
63	18	3	6	3	6	Delete comma after 'biological' (Burt, Peter, University of Greenwich)
64	18	3	6	3	7	What is meant by climate change ? Both anthropogenic and natural ? In which case of course high confidence in detection and attribution for impacts of observed climate change does not necessarily imply implications for anthropogenic interference in the climate system. I understand the caveat at page 5 line 44-46 but even in the absence of many end to end attribution studies is it not possible to come to a multi-step assessment of attribution to anthropogenic climate change ? (Stott, Peter, UK Met Office)
65	18	3	6	3	7	It is not clear whether all types of impacts have been detected on all continents, or only some on some. Please rephrase to remove ambiguity. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
66	18	3	6	3	7	The chapter team should strongly consider presenting calibrated uncertainty language for this finding. (Mach, Katharine, IPCC WGII TSU)
67	18	3	6	3	8	… in most oceas.' Why is 'most' used? Has warming not been seen in all oceans? If not, please indicate which ocean has not experienced impacts. (AUSTRALIA)
68	18	3	7	3	7	replace 'This conclusion' with 'The detection of climate change impacts' since is unclear that the first sentence of the chapter is actually a conclusion rather than a statement. (Webb, Robert, NOAA OAR ESRL)
69	18	3	9	3	9	Would it be more accurate to say "levels of confidence"? (Mach, Katharine, IPCC WGII TSU)
70	18	3	9	3	10	This sentence needs clarification. 'The level of confidence in attribution of observed impacts to shifts in rainfall patterns is lower.' Is the reduced level of confidence in attribution 1) because of difficulties in showing causality illustrating that the observed impacts are the result of shifts in rainfall patterns or 2) because of difficulties in showing causality linking observed shifts in rainfall patterns to anthropogenic climate change. I suspect the latter and thus a slight rewrite of the sentence "The level of confidence is lower in the attribution of the impacts of observed shifts in rainfall patterns to anthropogenic climate change." (Webb, Robert, NOAA OAR ESRL)
71	18	3	10	3	10	Replace "rainfall" with "precipitation". (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
72	18	3	10	3	10	This paragraph states, 'There is emerging evidence of ocean acidification'. Has there not been evidence already and therefore it is not just 'emerging'. (AUSTRALIA)
73	18	3	10	3	10	“to shifts in precipitation amounts and patterns is generally lower than for warming.”. (“generally” because there are some attributions with high confidence in the literature.) (Cogley, J. Graham, Trent University)
74	18	3	10	3	10	"to shifts in precipitation amounts and patterns is generally lower than for warming.”. (“generally” because there are some attributions with high confidence in the literature.) (Cogley, J. Graham, Trent University)
75	18	3	12	3	14	The chapter team should consider presenting calibrated uncertainty language for this finding. (Mach, Katharine, IPCC WGII TSU)
76	18	3	18	3	18	The chapter team should assign calibrated uncertainty language for this statement. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
77	18	3	18	3	20	Is it possible to specify a timeframe over which these impacts have occurred, broadly? Also, this paragraph should be carefully coordinated with chapter 3. (Mach, Katharine, IPCC WGII TSU)
78	18	3	19	3	19	Replace " seasonal ice in many lakes and rivers" with "lake and river ices" (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
79	18	3	19	3	19	There seems to be a bit of a mismatch between the bold headline (which deals with glaciers) and seasonal ice in non-glaciated areas. (Zwiers, Francis, Pacific Climate Impacts Consortium)
80	18	3	19	3	20	Section 18.3.1.3 states high confidence in the trend of later freeze-up and earlier break-up, but does not comment on attribution of that trend. Please ensure consistency. In addition, I note that here, it is specified that a "major" part of changes can be attributed to climate change, but in most other cases major/minor is not specified, which may lead to confusion in interpretation. Please consider this when revising the executive summary. (Mastrandrea, Michael, IPCC WGII TSU)
81	18	3	20	3	20	"… to climate change, including past climate change". That is, try to capture the idea of committed change in the ES: with very high confidence, glaciers will continue to shrink even if the climate stops changing, because they are still too large for the present-day climate. Cf. Bahr, D.B., M.B. Dyurgerov, and M.F. Meier, 2009, Sea-level rise from glaciers and ice caps: a lower bound, Geophysical Research Letters, 36, L03501, doi:10.1029/ 2008GL036309. (Cogley, J. Graham, Trent University)
82	18	3	22	3	22	What is meant here by "changes"? It would be preferable to specify this more precisely. (Mach, Katharine, IPCC WGII TSU)
83	18	3	22	3	23	In place of "over the past years and decades" it would be preferable to indicate more clearly the relevant time frame. (Mach, Katharine, IPCC WGII TSU)
84	18	3	22	3	25	The chapter clearly mentions that the permafrost in the arctic has receded and on the other hand ice layer in Antarctic region has increased and hence the generalisation of decrease of ice layer of whole permafrost region seems not an accurate summary of the chapter. (NETHERLANDS)
85	18	3	24	3	24	The statement that the permafrost boundary has been moving polwards and to higher elevations is somewhat problematic and should be reconsidered. There is no clear or easily observable "permafrost boundary" in nature but an extremely complex pattern of permafrost patches in wide transition zones/belts. For this reason something like a "permafrost boundary" is not part of internationally coordinated permafrost monitored (GTN-P in GCOS/GTOS). Exact documented/measured knowledge about the "permafrost boundary" and its change, therefore, simply does not exist. It would be safer to limit the statement to the documented trends of permafrost warming/thawing and active layer thickening/subsidence from thaw settlement. The term "area reduction" might also be acceptable even though already more speculative (Haeberli, Wilfried, University of Zurich)
86	18	3	25	3	25	How should the reader interpret this description--has a major or minor part been attributed to climate change? (Mach, Katharine, IPCC WGII TSU)
87	18	3	25	3	25	Per my comment on the previous paragraph, major/minor is not specified here. In addition, this medium confidence assignment is not clear from 18.3.1.3. (Mastrandrea, Michael, IPCC WGII TSU)
88	18	3	27	0	31	Would be useful to crosslink this to WG1 ch10, and make sure its consistent as the drought attribution is assessed as very uncertain given data issues and modelling (Hegerl, Gabi, University of Edinburgh)
89	18	3	27	3	27	Replace "due to changing rainfall or melting glaciers" with "due to changing precipitation and melting cryosphere" (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)

#	Ch	From Page	From Line	To Page	To Line	Comment
90	18	3	27	3	28	Section 18.3.1.2 states that it is difficult to link observed changes in water quality to climate change, which seems to differ from the impression provided here. In addition, the medium confidence in a link between sediment transport and changes in hydrological systems is not clear from 18.3.1.4 and should be clarified. (Mastrandrea, Michael, IPCC WGII TSU)
91	18	3	27	3	31	How has the frequency of floods been altered by climate change? increased or decreased? and also has it increased or decreased due to anthropogenic climate change? (Guoyu Ren) (Ren, Guoyu, National Climate Center)
92	18	3	27	3	31	In the executive summary and other sections there is talk about droughts and floods and impacts but not about the severity of droughts and floods. The authors should consider including a discussion and/or assignment of confidence related to the severity of droughts and floods. (UNITED STATES OF AMERICA)
93	18	3	27	3	31	Is it possible to specify broadly the timeframe over which these impacts have occurred? The paragraph should also be carefully coordinated with chapter 3. (Mach, Katharine, IPCC WGII TSU)
94	18	3	28	3	28	The assessment of medium confidence should perhaps be “low to medium confidence”, given the highly variable findings about water quality and sediment transport summarized in WGII Chapter 3. (Cogley, J. Graham, Trent University)
95	18	3	28	3	28	The assessment of medium confidence should perhaps be “low to medium confidence”, given the highly variable findings about water quality and sediment transport summarized in WGII Chapter 3. (Cogley, J. Graham, Trent University)
96	18	3	28	3	28	Delete comma after 'quality'. (Burt, Peter, University of Greenwich)
97	18	3	29	3	30	For drought and flood changes, what is meant by "altered by climate change" here? That the changes are larger than would be expected from natural changes in climate alone? Or that drought and flood have been altered by climate change, but the "climate change" includes contributions from internal climate variability (AMO, etc.), which would mean that the definition of climate change from the first part of the WG2 SPM is being used. This is a good example of the ambiguities in the report. Also if the former definition is being used, the assessment is overly confident for flooding, as will be discussed in another comment. (UNITED STATES OF AMERICA)
98	18	3	29	3	31	Intensity is also mentioned in the text (18.3.1.2, which should be added to the line of sight). (Mastrandrea, Michael, IPCC WGII TSU)
99	18	3	30	3	30	suggest to" add intensity" after duration. (Xie, Liyong, Shenyang Agricultural University)
100	18	3	30	3	30	Is the "duration of drought" here means "duration of meteorological drought"? (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
101	18	3	30	3	30	Citation 18.3.1.1 should be 18.3.1.2 (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
102	18	3	30	3	30	“altered” should probably be “increased”. I am not aware of any reports that droughts have become shorter in any region. (Cogley, J. Graham, Trent University)
103	18	3	30	3	30	It would be preferable to specify which regions are relevant. (Mach, Katharine, IPCC WGII TSU)
104	18	3	35	3	36	The chapter team may consider presenting calibrated uncertainty language for this statement. Additionally, is it possible to indicate more precisely what is meant by "impacted"? (Mach, Katharine, IPCC WGII TSU)
105	18	3	35	3	43	These paragraphs should be carefully coordinated with chapter 4. Additionally, is it possible to specify broadly the relevant time frame for the observed impacts? (Mach, Katharine, IPCC WGII TSU)
106	18	3	36	3	38	The change in productivity is given to be medium confidence in executive summary but the confidence level for productivity seems not to be explicitly reported in the main text of the chapter 18. (NETHERLANDS)
107	18	3	36	3	39	It is not clear whether the sentence is trying to say that climate change can be attributable to the changes observed in phenology, productivity or geographic range. Please clarify this sentence. (AUSTRALIA)
108	18	3	37	3	37	It would be worthwhile defining 'phenology'? It is not a term in common usage. (AUSTRALIA)

#	Ch	From Page	From Line	To Page	To Line	Comment
109	18	3	37	3	37	“phenology”: this word appears twice in the ES, but is not defined until Box 18-2 (P10 L24); it is defined again at P16 L17. It is sufficiently likely to be unfamiliar to readers that it should perhaps be defined in the ES, and it should certainly be in the WGII Glossary. (Cogley, J. Graham, Trent University)
110	18	3	37	3	38	Section 18.3.2.2 states high confidence in an increase in productivity, but low confidence in attribution to climate change. It is not clear how these intersect with the medium confidence here. In addition, Chapter 4 states high confidence in range shifts and changes in abundance and phenology, which is not completely consistent with the confidence assignments here. (Mastrandrea, Michael, IPCC WGII TSU)
111	18	3	38	3	38	"Elevated rates of extinction cannot be attributed to climate change" should complement confidence; or add "so far" after climate change (Xie, Liyong, Shenyang Agricultural University)
112	18	3	38	3	38	Elevated rates of extinction cannot be attributed to climate change.' Suggest that this phrase should say 'has not been', 'is not' or 'cannot presently'. Pleasealso provide the degree of certainty of this claim. (AUSTRALIA)
113	18	3	38	3	38	The statement "Elevated rates of extinction cannot be attributed to climate change" is a very definitive statement and not a good representation of the discussion in 18.3.2.3. It can be interpretted that climate change does not influence species extinction, but climate change has been noted as a causal factor in some extinctions. Low agreement/low confidence terminology should be used for consistency. (AUSTRALIA)
114	18	3	38	3	38	Should this statement have a confidence assessment? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
115	18	3	38	3	38	Suggest the authors Include a level of confidence to inform policy makers for the sentence "Elevated rates of extinction cannot be attributed to climate change." (Webb, Robert, NOAA OAR ESRL)
116	18	3	38	3	38	Should this statement have a confidence assessment? (Jones, Richard, Met Office Hadley Centre)
117	18	3	38	3	38	For this final sentence of the paragraph, is it possible to specify a level of confidence? (Mach, Katharine, IPCC WGII TSU)
118	18	3	38	3	38	Section 18.3.2.3 states very low confidence in attribution of extinctions, which is different than saying elevated rates cannot be attributed to climate change. Please ensure consistency. (Mastrandrea, Michael, IPCC WGII TSU)
119	18	3	40	0	43	This is another case where the bold statement sounds much more certain than the text afterwards 'linked' sounds very strong please make consistent (Hegerl, Gabi, University of Edinburgh)
120	18	3	40	3	43	Please insert this para in the TS (p.9, l.20). (GERMANY)
121	18	3	40	3	49	It appears that the last paragraph of section 18.3.2.3 is also relevant to this finding (note very high confidence in detected changes, compared to high here). (Mastrandrea, Michael, IPCC WGII TSU)
122	18	3	42	3	42	What is meant by detection here ? Detection of change relative to what ? If normal behaviourin the absence of climate change is being defined separately for each system then do you need to specify here what the normal is ? (Stott, Peter, UK Met Office)
123	18	3	42	3	42	Would it be appropriate to specify a major or minor role here? (Mach, Katharine, IPCC WGII TSU)
124	18	3	45	3	45	In place of "several major terrestrial ecosystems," the chapter team should consider specifying which are meant. (Mach, Katharine, IPCC WGII TSU)
125	18	3	46	3	48	The formulation, which has the form "for this …., for that …." seems a bit awkward. (Zwiers, Francis, Pacific Climate Impacts Consortium)
126	18	3	48	3	48	Insert 'the' after 'as'. (Burt, Peter, University of Greenwich)
127	18	3	48	3	49	The statement " The recession and degradation of the Amazon forest cannot be attributed to climate change" is very definitive, and could be interpreted that climate change has had no influence. Suggest using the 'very low confidence' terminology as in section 18.3.2.4, or change 'cannot' to 'has not been', 'is not' or 'cannot presently'. (AUSTRALIA)

#	Ch	From Page	From Line	To Page	To Line	Comment
128	18	3	48	3	49	Should this statement have a confidence assessment? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
129	18	3	48	3	49	Suggest the authors Include a level of confidence to inform policy makers for the sentence " The recession and degradation of the Amazon forest cannot be attributed to climate change." (Webb, Robert, NOAA OAR ESRL)
130	18	3	48	3	49	Should this statement have a confidence assessment? (Jones, Richard, Met Office Hadley Centre)
131	18	3	48	3	49	As with the extinctions statement, section 18.3.2.4 says very low confidence in attribution, which is not the same as cannot be attributed. Please ensure consistency. (Mastrandrea, Michael, IPCC WGII TSU)
132	18	3	53	3	54	"The physical and chemical properties" seems rather broad and non-specific - wouldn't it be better to say that ocean surface temperatures have warmed over many parts of the ocean, and that there is broad evidence of ocean acidification? Also, without a calibrated assessment, these statements could be viewed as being statements of certainty - which would conflict with assessments of ocean warming and acidification elsewhere in the AR5. A further point is that acidification would be considered to be an impact of CO2 emissions, but not necessarily climate change (although climate changes, affecting things like ocean mixing and ventilation processes, would have a role). (Zwiers, Francis, Pacific Climate Impacts Consortium)
133	18	3	53	3	54	This first sentence should be associated with a confidence statement. WGI Chapter 6 presents high confidence relevant to these changes. In addition, the timeframe of the past 60 years is not mentioned in the corresponding chapter text. (Mastrandrea, Michael, IPCC WGII TSU)
134	18	3	53	4	4	The chapter team should specify a level of confidence for this statement, coordinating the paragraph with Chapters 6 and 30. (Mach, Katharine, IPCC WGII TSU)
135	18	3	54	3	54	suggest replacing 'due to' with 'primarily in response to' (Webb, Robert, NOAA OAR ESRL)
136	18	4	1	4	2	Replace "facilitated by changes in the distribution of sea ice" with "facilitated by decreasing of sea ice" (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
137	18	4	6	4	9	This paragraph should be carefully coordinated with chapter 6's key findings. Also, over what time frame have these impacts been observed? (Mach, Katharine, IPCC WGII TSU)
138	18	4	6	4	9	Please consider consistency with Chapter 6, which presents high confidence for related statements. (Mastrandrea, Michael, IPCC WGII TSU)
139	18	4	7	0	9	is there a confidence sttement - otherwise it sounds like a certainty (Hegerl, Gabi, University of Edinburgh)
140	18	4	8	4	9	Suggest the authors Include a level of confidence to inform policy makers for the statement "climate change has contributed to an increase in the frequency, geographical distribution, and severity of hypoxic areas in the ocean." (Webb, Robert, NOAA OAR ESRL)
141	18	4	11	4	13	Can an attribution statement be included here? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
142	18	4	11	4	13	Can an attribution statement be included here? (Jones, Richard, Met Office Hadley Centre)
143	18	4	16	4	16	Something seems to be missing here - again, I think the words need to be a bit more specific. I assume that "composition" refers to the mix of multi-year ice and new ice that is present in the Arctic, so something like that should be said so that readers do not imagine some other kind of change in composition. Also, as written, one could be excused for wondering how composition could shrink. (Zwiers, Francis, Pacific Climate Impacts Consortium)
144	18	4	16	4	17	Can an attribution statement be included here? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
145	18	4	16	4	17	Can an attribution statement be included here? (Jones, Richard, Met Office Hadley Centre)
146	18	4	16	4	17	Should this statement be in the cryosphere section? (Jones, Richard, Met Office Hadley Centre)

#	Ch	From Page	From Line	To Page	To Line	Comment
147	18	4	16	4	18	It is good to indicate if or in what extent the shrinking of Arctic sea ice has been attributed to anthropogenic climate change. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
148	18	4	17	0	0	Add s to indigenous peoples - (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
149	18	4	17	4	17	I think the authors should avoid the practice of reporting a confidence range (medium to high in this case). The interpretation could be that there is high confidence in some aspects of this statement, and only medium confidence in others, or it could be that the authors think they can differentiate more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have high confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
150	18	4	20	0	22	Consider rephrasing - it is convoluted and an important message is hard to understand (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
151	18	4	20	4	22	I am sceptical of this assessment, at least as currently worded. The global-average rate of sea-level change can surely be attributed to climatic change with very high confidence. Local confounding factors such as tectonic subsidence of large deltas, glacio-isostatic adjustment and the self-gravitational effects of water mass redistribution ought not to compromise this conclusion to the extent implied by the present wording. (Cogley, J. Graham, Trent University)
152	18	4	20	4	22	This finding should be clarified. Is detection possible at all? (Mach, Katharine, IPCC WGII TSU)
153	18	4	20	4	22	Please specify whether "coastal systems" in line 20 refers to both human and natural systems. In addition, does "preclude the confident detection" mean "cannot be detected"? This could be clearer. Finally, it would be useful to state what can be attributed for the Arctic as implied in line 22. (Mastrandrea, Michael, IPCC WGII TSU)
154	18	4	24	4	26	The chapter team should consider presenting calibrated uncertainty language for these statements. (Mach, Katharine, IPCC WGII TSU)
155	18	4	28	4	29	The wording is awkward and redundant. Reverse the clauses and it is more straightforward: Agricultural crop yields have changed in many regions in response to climate, even accounting for changes in technology and other non-climate factors. (Levy, Marc, Columbia University)
156	18	4	28	4	30	suggest to add "with adequate adaptation" after "… due to warming and higher CO2". (Xie, Liyong, Shenyang Agricultural University)
157	18	4	28	4	33	Ag crop yields have changed due to warming etc. but how about the relation to other factors such as rainfall (heavy events) and droughts. Perhaps there should be a discussion on the relation of crop yields to extremes in precipitation if the literature on detection warrants. (UNITED STATES OF AMERICA)
158	18	4	28	4	33	The timeframe for these impacts should be specified. (Mach, Katharine, IPCC WGII TSU)
159	18	4	29	4	30	A higher confidence (medium to high confidence) can be assigned to the conclusion that yields have increased in mid to high latitude regions due to warming and higher CO2. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
160	18	4	29	4	30	Section 18.4.1.1 states high confidence that warming has benefited crop production in such regions, while Table 18-9 states low confidence for the UK. Please ensure consistency across all sources or explain differences. (Mastrandrea, Michael, IPCC WGII TSU)
161	18	4	31	4	33	Please provide the degree of certainty for the agricultural market claim. (AUSTRALIA)
162	18	4	33	3	33	Insert 'to the' after 'due'. (Burt, Peter, University of Greenwich)
163	18	4	33	4	33	Chapter 18 - The word 'to' is missing in the line. The phrase should read due 'to' presence of other drivers (INDIA)
164	18	4	35	0	39	The confidence statement (very low) seems to be in direct contradiction to the bold statement above - please rephrase the bold sentence to make consistent (Hegerl, Gabi, University of Edinburgh)

#	Ch	From Page	From Line	To Page	To Line	Comment
165	18	4	35	4	39	Discussion of fisheries currently on lines 6-7 could be moved to this paragraph, perhaps? The general time frame for statements here should be specified. (Mach, Katharine, IPCC WGII TSU)
166	18	4	35	4	39	Is not overfishing a major confounding factor which should be mentionned ? (Petit, Michel , CGIET rue de Bercy)
167	18	4	35	4	40	The statement that fisheries "at high latitudes" have increased in productivity is somewhat misleading in being overly broad, in that it refers to the North Atlantic and Barents Sea and it is not applicable to the North Pacific and adjacent high latitude waters. Average Spring sea ice cover in the northern Bering Sea south of the Bering Strait has fluctuated about the same mean value since 1961 (cf Mundy, P. R., and Evenson, D. F. 2011. ICES Journal of Marine Science, 68: 1155-1164.) and future changes in Spring sea ice cover are unlikely because spring sea ice is decoupled from Arctic summer ice cover of the preceding year (Stabeno et al. 2012 Deep Sea Research II 65-70; 14-30.). The lack of ice in the summer above the Arctic Circle has little impact on spring ice extent in the northeastern Bering Sea above 60N (Stabeno et al. 2012). The marine productivity of the northeastern Bering Sea is dominated by the sea ice cover in March/April and the corresponding persistence of the oceanographic feature known as the "cold pool." Dominance of the spring cold pool which is independent of summer Arctic ice and a complex of other biological and oceanographic features enumerated by Cooper et al. 2012 Deep Sea Research II 65-70, 141-162, make predictions about future trends in spring productivity at these latitudes (~ 60 ‰ÛÒ 66N) problematic. (UNITED STATES OF AMERICA)
168	18	4	39	4	39	Section 18.5.7 does not seem directly relevant to this finding. (Mastrandrea, Michael, IPCC WGII TSU)
169	18	4	41	4	42	A confidence assignment is needed for this finding. Chapter 11 presents medium confidence for related statements. (Mastrandrea, Michael, IPCC WGII TSU)
170	18	4	41	4	43	The statement of "attribution" in bold seems to be a contradiction with the very low confidence in attribution in the following sentence. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
171	18	4	41	4	43	The statement of "attribution" in bold seems to be a contradiction with the very low confidence in attribution in the following sentence. (Jones, Richard, Met Office Hadley Centre)
172	18	4	41	4	43	The logic of these 2 sentences with respect to one another should be refined. Also, is a major or minor part of the disease increases being attributed to climate change? (Mach, Katharine, IPCC WGII TSU)
173	18	4	42	4	43	Is it acceptable to assess that the increasing trend of Dengue fever and malaria were attributed to climate change only with very low confidence? A higher confidence can be assigned. (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
174	18	4	42	4	43	This statement on dengue and malaria differs from statements in the chapter text/tables (which also differ themselves). Section 18.4.5 discusses malaria in East Africa, but not dengue. Section 18.5.6 presents high confidence in detection and medium confidence in attribution of increase in the frequency and extension of dengue in Central and South America. Table 18-9 state high confidence in detection and low confidence in attribution for increase in frequency and extension of dengue, as well as high confidence in detection and medium confidence in attribution for increase in frequency and extension of malaria in Central and South America. Please ensure consistency across these discussions, including the representation in the executive summary. (Mastrandrea, Michael, IPCC WGII TSU)
175	18	4	45	0	0	change groups to peoples (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
176	18	4	45	4	47	The inclusion of cultural identity here is odd and not consistent with the key finding on Pg 5 lines 1-2 nor supported by the text in the chapter. Suggest deleting "cultural identity". (UNITED STATES OF AMERICA)
177	18	4	45	4	47	Overlap with lines 16-18 could be reduced. Additionally, what is the general time frame for these statements? For the attributed impacts, is a major or minor part being attributed? (Mach, Katharine, IPCC WGII TSU)
178	18	4	45	4	47	For clarity, I would suggest moving the "medium confidence" to the end of the bold sentence. I also note that this paragraph overlaps with lines 16-18 above. (Mastrandrea, Michael, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
179	18	4	47	4	48	Have we not more than a medium confidence in the fact that "Climate impacts on Arctic indigenous groups have been detetected and attirbuted to climate change" ? This implies that it is quite possible that no change at all has occured. This is not consistent with chapter 28, page 4, line 25 and line 35, where impacts on health, well-being and fod security are reported with hign confidence (Petit, Michel , CGIET rue de Bercy)
180	18	4	49	4	49	I do not know what a “livelihood asset” is. (Cogley, J. Graham, Trent University)
181	18	4	49	4	50	The chapter team should present calibrated uncertainty language for this statement. Additionally, the chapter team could consider indicating that this statement is being made (presumably) independently from climate change. (Mach, Katharine, IPCC WGII TSU)
182	18	4	49	4	52	"with a documented contribution of climate change and variability in some cases". In most cases, when term "climate change and variability" is used, researchers will understand that the "climate change" is the anthropogenic change in climate, and the "variability" is usually the natural decadal to multi-decadal climate variation. What are the authors meaning by saying so here? (Guoyu Ren) (Ren, Guoyu, National Climate Center)
183	18	4	49	4	52	This section refers to both "extreme climate events" and "extreme weather events". Please clarify if this difference is intentional, and, if so, what the different is. (AUSTRALIA)
184	18	4	49	4	52	Confidence level is missing. (GERMANY)
185	18	4	49	4	52	Suggest the authors Include a level of confidence to inform policy makers for the statement "Extreme climate events have impacted natural and physical livelihood assets, incomes, public health, and social institutions. Economic losses due to extreme weather events have increased globally, mostly due to increase in wealth and exposure, but with a documented contribution of climate change and variability in some cases." (Webb, Robert, NOAA OAR ESRL)
186	18	4	50	4	52	This statement seems to go against what is stated later in the chapter, e.g. section 18.4.4.1 pg 30 - 'there is limited evidence of a trend in the economic impacts of extreme weather events that is consistent with a change driven by observed anthropogenic climate change'. Provide consistency. (AUSTRALIA)
187	18	4	51	3	51	I don’t know what is meant by 'exposure' here. (Burt, Peter, University of Greenwich)
188	18	4	51	4	52	Please specify which cases are referred to here. Specific types of events, or events of a certain type with specific characteristics? (Mastrandrea, Michael, IPCC WGII TSU)
189	18	4	51	4	53	For impacts of extreme events, please check results from SREX. (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
190	18	4	52	4	52	Which cases are meant? It would be helpful to specify this. (Mach, Katharine, IPCC WGII TSU)
191	18	5	1	5	5	perhaps inlcude reference to the adaptation that is taking place - and that this will shape impacts - this is mentioned later in the text. --- It may not be feasible but I am missing a tighter focus on to multiple stressors and have they interact to shape impacts. It is noted that such factors exist, but this could be strenghtened. It is important to convey that climate change alone almost never impact society - we always consider the multiple factors when assessing vulnerabilty and perhaps we have to do the same when assessing detection and attribution. (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
192	18	5	1	5	5	This paragraph should be coordinated with Chapter 13 to ensure consistency and harmonized assessment. (Mach, Katharine, IPCC WGII TSU)
193	18	5	1	5	5	Please clarify whether the bold finding implies that there are some cases where impacts have been detected with confidence or whether evidence is limited in all cases, as implied by the nonbold sentences. This finding and underlying chapter text also should be discussed and coordinated with Chapter 13. (Mastrandrea, Michael, IPCC WGII TSU)
194	18	5	3	5	3	Replace "impact of climate on" with "impact of climate change on" (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)

#	Ch	From Page	From Line	To Page	To Line	Comment
195	18	5	4	5	4	Delete comma after 'migration'. (Burt, Peter, University of Greenwich)
196	18	5	7	5	8	This sentence does not communicate well; "supports assessment of current conditions" - what is the result of the assessment? I think what you want to say is that observed impacts, when assessed in the RFC framework, provide evidence that some of those reasons for concern are already being realised. Rephrase? (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
197	18	5	7	5	8	The chapter team should consider presenting calibrated uncertainty language for this finding. (Mach, Katharine, IPCC WGII TSU)
198	18	5	10	5	10	It would be helpful to clarify what is meant by "risk assessment" here--in terms of impacts to date, I assume? It would seem strongly preferable to leave assessment of future risks to Chapter 19. (Mach, Katharine, IPCC WGII TSU)
199	18	5	12	0	15	is there detection and attribution there? It doesn't really come across… (Hegerl, Gabi, University of Edinburgh)
200	18	5	12	5	12	What is the definition of the "unique and threatened systems"? (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
201	18	5	12	5	20	For the described increases in risks, it would be helpful to clarify further that the chapter team is referring to risks "observed" to date, rather than future risks, leaving assessment of future risks to Chapter 19. (Mach, Katharine, IPCC WGII TSU)
202	18	5	12	5	37	It would be useful to consider the terminology used in this section, as observed impacts provide insight into risks related to each reason for concern, but risks themselves are forward-looking and thus outside the scope of this chapter--they cannot be "observed." I would suggest a clear distinction in these descriptions, focusing on observed impacts relevant to each category and what level of risks has been "realized" in each case. (Mastrandrea, Michael, IPCC WGII TSU)
203	18	5	14	5	14	I think the authors should avoid the practice of reporting a confidence range (medium to high in this case). The interpretation could be that there is high confidence in some aspects of this statement, and only medium confidence in others, or it could be that the authors think they can differentiate more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have high confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
204	18	5	14	5	18	The paragraph on coral reefs on page 4, lines 11-14 states very high confidence, while high confidence is mentioned here in lines 14 and 18. The meaning of this difference is unclear if intended. (Mastrandrea, Michael, IPCC WGII TSU)
205	18	5	15	5	15	I do not think you can "confirm a reason [for a concern]". This usage appears elsewhere in the chapter. It should be replaced by something like "reinforce this concern". (Cogley, J. Graham, Trent University)
206	18	5	15	5	15	"confirm"--as in confirming risks for temperature increase realized to date? (Mach, Katharine, IPCC WGII TSU)
207	18	5	15	5	37	The repeated phrase "confirms reasons for concern" is unclear. Suggest rephrasing "… that some aspects of this reason for concern are already becoming reality", or something along those lines? (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
208	18	5	15	5	37	As mentioned in my general comments, it is not clear what "confirm" means in lines 15, 31, and 36. Does this mean that risks to unique and threatened systems is an appropriate category in the reasons for concern, or does this imply a certain realized risk level associated with current temperatures? (Mastrandrea, Michael, IPCC WGII TSU)
209	18	5	17	5	18	Citing coral as evidence of extreme weather events is weak justification for increases for extreme weather events as a whole. This treatment would be more robust and more consistent with previous reports and the underlying literature if it discussed droughts, floods, cyclones, extreme precipitation and other events commonly understood to be extreme weather events. In these cases, as discussed in the report, detection and attribution is far less certain. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
210	18	5	17	5	20	Should there also be a mention of health impacts here, particularly as a consequence of extreme heat? (Zwiers, Francis, Pacific Climate Impacts Consortium)
211	18	5	18	5	18	When the chapter team refers to confirming the reason for climate-related concern, the statement should be qualified further to indicate that the statement is based on observed impacts for one very specific system. Appropriate nuance should be ensured in the key findings here. (Mach, Katharine, IPCC WGII TSU)
212	18	5	22	5	25	"Impact of climate change have now been documented globally, covering all continents and the ocean (high confidence)". Here do the authors mean anthropogenic climate change or the UNFCCC climate change? (Guoyu Ren) (Ren, Guoyu, National Climate Center)
213	18	5	22	5	25	It would be useful to consider the available information about multidimensional vulnerability (e.g., Chapter 13) relevant to this reason for concern. (Mastrandrea, Michael, IPCC WGII TSU)
214	18	5	22	5	31	Distribution of impact and aggregate impacts original referred to impacts on human welfare. Don't change a concept just so that it fits into some outline; change the outline instead. (Tol, Richard S.J., Vrije Universiteit Amsterdam)
215	18	5	23	5	25	How does this sentence rise to the level of 'reason for concern' if "research coverage is still insufficient and too heterogeneous" to move beyond the local case studies. (Webb, Robert, NOAA OAR ESRL)
216	18	5	27	5	27	Again (cf. comment above), changes in permafrost extent are much less safely known than changes in permafrost conditions (thermal state and maximum summer thaw depth) (Haeberli, Wilfried, University of Zurich)
217	18	5	27	5	31	The chapter team's interpretation of aggregate impacts should be coordinated with Chapter 19. (Mach, Katharine, IPCC WGII TSU)
218	18	5	28	5	28	I think the authors should avoid the practice of reporting a confidence range (medium to high in this case). The interpretation could be that there is high confidence in some aspects of this statement, and only medium confidence in others, or it could be that the authors think they can differente more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have high confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
219	18	5	28	5	28	"limited evidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
220	18	5	29	5	30	Care should be taken regarding the statement about economic losses, ensuring appropriate qualification and coordination with chapter 10. (Mach, Katharine, IPCC WGII TSU)
221	18	5	31	5	31	"confirm"--as in confirming risks for temperature increase requested to date? This could be clarified. (Mach, Katharine, IPCC WGII TSU)
222	18	5	33	5	34	Would it be more accurate to say that risks from large-scale singularities have yet to be "realized"? "Robust evidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
223	18	5	33	5	37	Citing corals and Arctic biota as evidence of robust evidence of this RFC is shifting the definition of this from previous assessments and the underlying literature. This should be focused on the large scale singularities such as deglaciation of Greenland and West Antarctica as well as thermohaline circulation. To use the very real changes seen in corals and the Arctic as the rationale for unique and threatened systems is legitimate and compelling. To stretch to use those same changes for risks from extreme weather events and large scale singularities reads like a stretch to change definitions to show observed increases. (UNITED STATES OF AMERICA)
224	18	5	34	5	35	Consistency with page 3, lines 45-49, should be ensured. (Mach, Katharine, IPCC WGII TSU)
225	18	5	36	5	37	Again, "confirms" in what sense? (Mach, Katharine, IPCC WGII TSU)
226	18	5	39	5	39	Replace first 'of' with 'in the'. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
227	18	5	39	5	40	Can any broad statements be made about what regions have more or less evidence available? (Mastrandrea, Michael, IPCC WGII TSU)
228	18	5	39	5	46	The chapter team should consider combining these paragraphs. (Mach, Katharine, IPCC WGII TSU)
229	18	5	39	5	52	These are the main conclusions on joint attribution, which is treated rather superficially in this chapter. It is also somewhat surprising that the only apparent attempt to seek anthropogenic attribution out of the assessed material refers to attribution of impacts of extremes, which on the face of it would appear to be one of the most difficult attribution challenges there is! The attempt is made in Figure 18-5, and doesn't really succeed due to a mis-match of events with impacts. Why couldn't something similar have been attempted for large-scale climate trends (robustly attributed to anthropogenic forcing) in concert with large-region, well established impact trends? The data should be more comprehensive for undertaking such an analysis than was the case for AR4, so has this been attempted in the literature, or should it be attempted in this assessment? (Carter, Timothy, Finnish Environment Institute)
230	18	5	40	5	46	The nonbold sentence in lines 40-41 overlaps with the bold sentence in lines 45-46. Consider combining these paragraphs to reduce redundancy. (Mastrandrea, Michael, IPCC WGII TSU)
231	18	5	41	5	42	“to improve knowledge about detection”. I do not see what timeliness has to do with this point. (Cogley, J. Graham, Trent University)
232	18	5	42	5	42	Would it be more accurate to say "impacts of extreme events" here? (Mach, Katharine, IPCC WGII TSU)
233	18	5	42	5	42	It would be useful to add 18.1 to the line of sight here. (Mastrandrea, Michael, IPCC WGII TSU)
234	18	5	44	5	44	What does "all changes in climate" means? (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
235	18	5	44	5	46	A better wording. But how smaller is the number of the robust attribution studies? (Guoyu Ren) (Ren, Guoyu, National Climate Center)
236	18	5	44	5	46	This section should clarify the difference between the studies of 'climate change' and 'anthropogenic climate change'. (AUSTRALIA)
237	18	5	44	5	46	This is a critically important point that should be elevated and inserted as the second paragraph in the executive summary on page 3, line 11 (Webb, Robert, NOAA OAR ESRL)
238	18	5	44	5	46	I feel this is of such importance (and the chapter otherwise so easily misinterpreted) that this statement deserves to be lifted up front and integrated into the statement on P3L6-8. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
239	18	5	46	5	46	Why is 'anthropogenic' in italics? (Burt, Peter, University of Greenwich)
240	18	5	46	5	46	Section 18.2.1.3 could be the most relevant line of sight here. (Mastrandrea, Michael, IPCC WGII TSU)
241	18	5	52	5	52	This should be Box 18-2 instead of 18-1. (Mastrandrea, Michael, IPCC WGII TSU)
242	18	6	5	6	5	Insert comma after 'and'. (Burt, Peter, University of Greenwich)
243	18	6	6	6	6	Delet 'out' to remove tautology. (Burt, Peter, University of Greenwich)
244	18	6	13	6	14	The juxtaposition of words here could suggest to some that assessments are considered to be just part of the body of literature. (Zwiers, Francis, Pacific Climate Impacts Consortium)
245	18	6	16	0	0	change a word to: coupled human - environmental systems - not natural (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
246	18	6	19	6	20	Is this a feasible approach to informing adaptation? Can detection studies provide robust evidence at a scale directly relevant to adaptation? It would be useful to revisit its feasibility at the end of the chapter based on the material assessed. (Mastrandrea, Michael, IPCC WGII TSU)
247	18	6	20	6	20	Insert "are" at the beginning of this line. (Zwiers, Francis, Pacific Climate Impacts Consortium)

#	Ch	From Page	From Line	To Page	To Line	Comment
248	18	6	20	6	20	More nuance could be appropriate here, as a variety of types of information informed planned adaptation. (Mach, Katharine, IPCC WGII TSU)
249	18	6	22	6	25	It could be appropriate to acknowledge that detection and attribution is a very important component, also very importantly complemented by future-oriented risk assessment. (Mach, Katharine, IPCC WGII TSU)
250	18	6	22	6	26	Although outside the scope of this chapter, it would be useful to point to assessment of future risks in Chapter 19 and many other chapters of the report as another key element of the evidence base. (Mastrandrea, Michael, IPCC WGII TSU)
251	18	6	25	6	26	Reference for quoted text required. (Burt, Peter, University of Greenwich)
252	18	6	28	6	28	Is "anthropogenic climate" missing "change", i.e. should it be refered to as "anthropogenic climate change"? (CAI, RONGSHUO, Third Institute of Oceanography)
253	18	6	28	6	28	Insert "change" after "anthropogenic climate". (Zwiers, Francis, Pacific Climate Impacts Consortium)
254	18	6	29	0	33	I wonder if in this part of the text it wouldn't be useful to reiterate what you mean by climate change - it comes later but would be helpful herel, also to avoid confusion with some perceptions that equate climate change with anthropogenic climate change (Hegerl, Gabi, University of Edinburgh)
255	18	6	31	6	32	Please clarify what is meant by "full and partial attribution" here. (Mastrandrea, Michael, IPCC WGII TSU)
256	18	6	38	7	17	AR4 conclusions about human systems were on detection, not attribution to anthropogenic climate change. Also, "less obviously" wording (p. 7 line 7) is awkward. (UNITED STATES OF AMERICA)
257	18	7	1	7	1	"likely" should be italicized for clarity. (Mach, Katharine, IPCC WGII TSU)
258	18	7	24	7	24	Delete comma after 'impact'. (Burt, Peter, University of Greenwich)
259	18	7	26	7	27	This statement doesn't seem to be very clear - is it making the point that adaptation is regarded as an impact (something we are driven to do as a consequence of climate change)? If so, does this implicitly represent an assessment that there are not yet any examples of adaptation that have been undertaken in anticipation of projected climate change? However, such as assessment would be a bit off the mark, because there are examples of infrastructure, such as the Confederation Bridge connecting Prince Edward Island to the Canadian mainland, that have been built taking projections of future change into account. (Zwiers, Francis, Pacific Climate Impacts Consortium)
260	18	7	27	7	29	"Third, …": this statement assumes silently that anthropogenic climatic change is due to agents that are well-mixed in the global atmosphere. It is true that the FCCC mentions only "greenhouse gases", but even in this restricted set not all of the species are well-mixed. (Cogley, J. Graham, Trent University)
261	18	7	27	7	30	"Third,.....are typically affected by local or regional climate change, ...be difficult." "local or regional" should be replaced by "both anthropogenic and natural climate changes ", as even in larger spatial scales the natural climate change or variability can not be overlooked. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
262	18	7	29	7	29	Split infinitive: move 'best' to after 'impacts'. (Burt, Peter, University of Greenwich)
263	18	7	37	7	37	Would it be more accurate to say "coupled" here instead of "connected"? (Mach, Katharine, IPCC WGII TSU)
264	18	7	37	7	42	Some suggestions for definition of "three subsystems" as the above mentioned general comments. (CAI, RONGSHUO, Third Institute of Oceanography)
265	18	7	38	7	42	Is the terminology "natural system" useful? It seems to imply that neither climate nor humans are natural, which is confusing and incorrect. Please use a different term, or define the terms and their implications clearly. (AUSTRALIA)
266	18	7	52	7	52	Given the context, it might be a bit more accurate to say "If an observed change produced by the human system impacts the climate system…" (replacing "in" with "produced by"). I think this would more clearly indicate that human decisions drive things like greenhouse gas emissions that impact the climate system. (Zwiers, Francis, Pacific Climate Impacts Consortium)

#	Ch	From Page	From Line	To Page	To Line	Comment
267	18	8	8	8	8	Insert 'the' after 'across'. (Burt, Peter, University of Greenwich)
268	18	8	12	8	13	"a specified baseline" instead of "normal behavior in climate change" could go further to make this definition fully consistent with usage across the volume. (Mach, Katharine, IPCC WGII TSU)
269	18	8	12	8	21	The definitions of detection and of attribution both refer to "climate change," without clarifying whether this refers only to anthropogenic climate change, or to any climate change (including natural variability). One can presume that the latter is intended, but it would be good to be 100% specific about this, since these are crucial definitions (UNITED STATES OF AMERICA)
270	18	8	14	8	15	Would it be more accurate to simply say that this chapter considers observed changes for which climate change is hypothesized as a driver? (Mach, Katharine, IPCC WGII TSU)
271	18	8	15	8	15	The phrase "in not just considering any observed changes" is poorly composed and unclear. At a minimum, "in considering not just any observed changes" would be better. Even better would be "in that it does not ecompass any observed change." (UNITED STATES OF AMERICA)
272	18	8	16	8	16	“stationary” is a technical term and should be either explained or avoided in an assessment for a general readership. And I am not sure that glaciers are a good example of stationary “reference” behaviour (whatever that might be; is the text trying to allude to glaciers at equilibrium with an unchanging climate, and thus exhibiting only natural variability?). (Cogley, J. Graham, Trent University)
273	18	8	16	8	16	I don't think either of these examples of "reference normal" behaviour are particularly good. I'm not an economist, and I'm not sure that the economics community would know how to describe a normal state of economic activity (an economist would have to weigh in on that; it would be hazardous for the chapter to offer this as an example unless economics lies well within the expertise of one of its authors). I am also not an expert on glaciers, but my understanding is that the current widespread retreat is occuring against a backdrop of long-term retreat that predates the modern industrial era. See, for example, 4.3.3.1, WG1 AR5. This again begs the question, what would be considered to be reference normal behaviour for such systems during the past 150 years (ie, in the absence of anthropogenic forcing)? Simple stationarity is probably not the right answer. (Zwiers, Francis, Pacific Climate Impacts Consortium)
274	18	8	25	8	29	This is a very important foundational statement for the chapter that is unfortunately ignored in much of the following analysis and findings. (Webb, Robert, NOAA OAR ESRL)
275	18	8	26	8	26	I'm not sure that this problem is particular to time series analysis, so I would suggest replacing "It is a particular problem" with "For example, this can be a problem". (Zwiers, Francis, Pacific Climate Impacts Consortium)
276	18	8	28	8	28	Sentence should not begin with "This" -- ambiguous referent (Levy, Marc, Columbia University)
277	18	8	34	0	0	Would this be a useful place to say that this concern doesn’t apply to process models where the model is tuned to something other than climate change (Hegerl, Gabi, University of Edinburgh)
278	18	8	36	8	39	Could citations be provided with relevant examples? (Mach, Katharine, IPCC WGII TSU)
279	18	8	36	8	39	Are there examples of these studies in the literature that should be cited here? (Mastrandrea, Michael, IPCC WGII TSU)
280	18	8	38	8	38	Insert comma after 'but'. (Burt, Peter, University of Greenwich)
281	18	8	48	0	0	Jessica et al (2013) empirically tested the space-for-time assumption by constructing orthogonal datasets of compositional turnover of plant taxa and climatic dissimilarity through time and across space from Late Quaternary pollen records in eastern North America, then modeling climate driven compositional turnover. Predictions relying on space-for-time substitution were ~72% as accurate as “time-for-time” predictions. (Jessica L. Blois, John W. Williams, Matthew C. Fitzpatrick, Stephen T. Jackson, and Simon Ferrier. Space can substitute for time in predicting climate-change effects on biodiversity, 2013. www.pnas.org/cgi/doi/10.1073/pnas.1220228110) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))

#	Ch	From Page	From Line	To Page	To Line	Comment
282	18	9	1	0	0	Box 18-1: Given the widespread usage of "climate sensitivity" as shorthand for "equilibrium climate sensitivity" in a specific physical science sense, I would recommend using "sensitivity to climate change" or another alternative to avoid confusion. (Mastrandrea, Michael, IPCC WGII TSU)
283	18	9	3	9	3	Some readers will be confused by this title because they will understand "climate sensitivity" to be the sensitivity of the climate to, for example, CO2 doubling. In particular, the "equilibrium climate sensitivity" (the eventual warming that would occur if CO2 were doubled and then held constant) is a standard metric of the potential for warming that is extensively used (and abused) in the policy community. Climate sensitivity here refers not to the sensitivity of the climate, but rather, to the sensitivity of a system to climate change. So it seems to me that "system sensitivity" [to climate change] would provide a clearer description of what is discussed in this box. Would it be possible to change the title so that it reflects the thing that is sensitive (e.g., human systems) rather than the agent that produces the sensitivity (climate change in this case). (Zwiers, Francis, Pacific Climate Impacts Consortium)
284	18	9	3	9	3	Suggest changing "Climate sensitivity" which has a specific "WG1-type" meaning to "Sensitivity to Climate" (as is used in line 5). (Jones, Richard, Met Office Hadley Centre)
285	18	9	3	9	3	Wording here should be clarified to ensure that the reader does not interpret "climate sensitivity" as "equilibrium climate sensitivity." (Mach, Katharine, IPCC WGII TSU)
286	18	9	3	9	27	The term 'climate sensitivity' is used in this box inconsistently with the glossary definition. (AUSTRALIA)
287	18	9	11	9	11	This should be Mann and Emanuel (2006). Also the reference has errors. (UNITED STATES OF AMERICA)
288	18	9	12	9	12	Do you mean the LACK OF a long observational weather time series? (Levy, Marc, Columbia University)
289	18	9	18	9	18	I don't think there is consensus on a hot summer being a "weather event". Most meteorological services would consider a forecast of seasonal mean conditions (for the next season) as a climate forecast, not a weather forecast, since they would be forecasting not individual weather events, but rather, seasonal mean conditions. The community that studies weather and climate extremes makes a similar kind of distinction. See for example Karl et al., 2008 (CCSP, 2008: Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. [Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)]. Department of Commerce, NOAA's National Climatic Data Center, Washington, D.C., USA, 164 pp.) (Zwiers, Francis, Pacific Climate Impacts Consortium)
290	18	9	20	9	20	versus' should be in italics. (Burt, Peter, University of Greenwich)
291	18	9	23	9	27	An example would help clarify the point being made here. (Mastrandrea, Michael, IPCC WGII TSU)
292	18	9	24	9	24	I do not understand "an observed measure of climate under climate change". Does it mean "observations of the changing climate"? If so, "measures of observed climate" at L26 could become "climate observations". (Cogley, J. Graham, Trent University)
293	18	9	25	9	25	'via' should be in italics. (Burt, Peter, University of Greenwich)
294	18	9	26	9	27	This is confusing text on its own. Please give an example of what is meant. (UNITED STATES OF AMERICA)
295	18	9	34	9	35	It's not clear how Table 18-1 suppors this statement. (Zwiers, Francis, Pacific Climate Impacts Consortium)
296	18	9	36	9	39	The first approach to attribution of impacts to climate change is not robust for the reasons present in this chapter on page 8, lines 25-29, and thus insufficient for an IPCC assessment for inform policy makers. (Webb, Robert, NOAA OAR ESRL)

#	Ch	From Page	From Line	To Page	To Line	Comment
297	18	9	40	9	43	The Parmesan et al 2011 paper make a very powerful statement that "The biological world is responding rapidly to a changing climate, but attempts to attribute individual impacts to rising greenhouse gases are ill-advised." that the IPCC should embrace. This second approach to attribution of impacts to climate change is robust and describe the analysis process to produce valuable information on the impacts of local to regional changes in climate that can be communicated to decision makers. (Webb, Robert, NOAA OAR ESRL)
298	18	9	42	9	42	Would it be helpful to specify further that the complexity of the causal chain is especially relevant in coupled human-natural systems? (Mach, Katharine, IPCC WGII TSU)
299	18	9	45	9	54	A difference as depicted in Figure 18-2 is that climate observations do not come directly into the single-step approach, although ostensibly the climate model used has already been compared against observations to a certain extent. It would be worth mentioning this point in the discussion here. (Mastrandrea, Michael, IPCC WGII TSU)
300	18	9	47	9	49	This sentence is unclear to me, perhaps because it does not mention the fundamental fact that the model(s) must be run with and without the forcing that is of interest. The test for attribution is which among the model runs best match the observations. (Cogley, J. Graham, Trent University)
301	18	10	10	10	13	This Rosensweig (2008) approach is problematic. In contrast, the approach used and described in AR5 WG2 Chapter 4 is highly defensible vast improvement because it documents connections of impacts to changes in regional to local climate (both natural variability and anthropogenic climate change) and will only go further (given the challenges in making causal linkages between observed regional to local changes in climate conditions and anthropogenic climate change) when there is robust detection and attribution of the regional to local climate conditions. Using this approach, valuable information on the impacts of local to regional changes in climate can be communicated to decision makers without waiting for the robust detection and attribution of local to to regional climate change that may be forthcoming as the science advances and/or time series of observations become sufficiently long to detect local to regional trends that can be demonstrated to be the result of anthropogenic global climate change. Suggest the Chapter 18 authors embrace and promote the approach used in AR5 WG2 Chapter 4 to climate change impact detection and attribution rather than a pattern matching approach that ignores the critical role causality and can lead to erroneous conclusions as pointed out two pages earlier in this chapter on page 8. (Webb, Robert, NOAA OAR ESRL)
302	18	10	13	0	0	Simliarly Drought-Induced Reduction in Global Terrestrial Net Primary Production during (2002-2009) was reported by Zhao and Running(2010). Maosheng Zhao and Steven W. Running, 2010. Drought-Induced Reduction in Global Terrestrial Net Primary Production from 2000 through 2009. Science 20 August 2010 VOL 329 (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
303	18	10	17	0	37	Very interesting box - would it be useful to discuss confounders here though? Some large scale confounders could be conceivable (maybe habitat loss for extinctions or something like it) that could cause similar spatial associations? (Hegerl, Gabi, University of Edinburgh)
304	18	10	19	10	19	Mismatch of singular and plural tenses: change 'are' to 'is'. (Burt, Peter, University of Greenwich)
305	18	10	19	10	22	The problem with using associative or regression rather identifying causal linkages is that one can produce a result of detected and attributed anthropogenic climate change impact in a location where there is no detected and attributed anthropogenic climate change. For example, if multidecadal climate variability produces an observed regional change in climate that is similar to the expected change due to anthropogenic climate change, the observed climate impact can be incorrectly attributed to anthropogenic climate change or can be grossly overestimated and unfortunately lead to erroneous conclusions as pointed out two pages earlier in this chapter on page 8. (Webb, Robert, NOAA OAR ESRL)
306	18	10	26	0	0	Is this the same Chen et al. 2011 as in line 21? There are 2 Chen et al 2011's in the references, but with different Chen's. (Parker, David, Met Office Hadley Centre)

#	Ch	From Page	From Line	To Page	To Line	Comment
307	18	10	26	10	27	I agree that synthesis across multiple species can do this - but don't we still need to be convinced that they are not all being affected by a common set of confounders to actually increase confidence? Perhaps the subsequent text can add that confidence is increased when it is evident that the species/ecosystems and locations are not all affected by a small number of common confounding influences (e.g., development pressure). (Zwiers, Francis, Pacific Climate Impacts Consortium)
308	18	10	34	10	34	Use of etc is imprecise and tells the reader nothing. Please give all relevant examples (or use 'for instance'). (Burt, Peter, University of Greenwich)
309	18	10	34	10	34	'a priori' should be in italics. (Burt, Peter, University of Greenwich)
310	18	10	50	0	0	---- upwards should be specified -- increasing altitude or something like that. (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
311	18	11	9	0	0	Presumably risks of publication bias have been considered for AR5 as well? (Bunce, Matthew, Institute of Marine Engineering, Science and Technology)
312	18	11	9	0	10	I am not sure it is possible to separate by timescale, as at least climate varies on all timescales - I don't think its necessary to assume that either. This might be a better place to discuss that a longer timescale (longer records) allows better understanding of variability and if its only determining that recent changes are unusual compared to a time horizon, and the signal-to-noise ratio is higher for longer term changes (Hegerl, Gabi, University of Edinburgh)
313	18	11	9	11	9	Delete 'time'. The use of the word here is tautologous, as 'time' is a 'period'. (Burt, Peter, University of Greenwich)
314	18	11	14	0	0	Spatially consistent and high temporal satellite datasets are also found useful to certain extent.Recent datasets on continuous satellite-derived global record of land surface evapotranspiration from 1983 to 2006 revealed changing patterns and impact of soil moisture stress(Zhang et al,2010). (Ke Zhang, John S. Kimball, Ramakrishna R. Nemani and Steven W. Running, 2010. A continuous satellite-derived global record of land surface evapotranspiration from 1983 to 2006 WATER RESOURCES RESEARCH, VOL. 46, W09522, doi:10.1029/2009WR008800, 2010) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
315	18	11	16	11	20	It would be useful to say something about the additivity or non-additivity of responses to different drivers. In the physical climate system, the assumption that the perturbations caused by external forcing on the system from different sources (GHGs, aerosols, etc.) add linearly has generally held up quite well, enabling a particular analytic approach that has been very successful. That concept is obviously much more difficult, if not impossible, to extend to the detection and attribution of the causes of observed changes in impacted systems, with the result that paradigms should not be expected to carry over easily. (Zwiers, Francis, Pacific Climate Impacts Consortium)
316	18	11	24	0	26	This is an excellent place to link to WG1, and the finding that attributing regional climate changes to external drivers is difficult due to larger variability on regional scales, and due to impact of poorly constrained local other forcings such as land use change - you cite a paper, but in addition it would be good to backrefer to WG1 ch10 (can provide a section if needed) (Hegerl, Gabi, University of Edinburgh)
317	18	11	24	11	26	A strictly correct statement, but it omits anthropogenic drivers that are not globally well-mixed. (See comment at P7 L27-29.) (Cogley, J. Graham, Trent University)

#	Ch	From Page	From Line	To Page	To Line	Comment
318	18	11	29	11	40	A discussion of publication bias is a welcome inclusion in this chapter but not effectively addressed by this paragraph. How have the methods for detecting and correcting publication bias in formal quantitative synthesis analysis (Rothstein et al. 2005) been applied to AR5 Chapter 18 or elsewhere in the AR5? How is the availability of information from the phenological monitoring network in the area of flowering, leafing and fruiting plants relevant to the broader literature incorporated into Chapter 18 and throughout the AR5? As noted in the text on Page 6, Lines 19-20, publication bias is readily apparent in that negative results are frequently not reported, and conclusions based on geographic areas with large volumes of observations, such as the North Atlantic, are incorrectly generalized to other parts of the globe (see also comments Chapter 18, Start Page Number, 4, Start Line Number, 35, End Page Number, 4, End Line Number, 40). If systematic steps have been taken to correct for publication bias in Chapter 18 and/or other Chapters of the AR5, this would be the place to so state, and if not, that should be so stated here. (UNITED STATES OF AMERICA)
319	18	11	31	11	40	Publication bias, refer to availability os mostly greay literature?, It is not clear for me the context of this paragraph (Marengo, Jose, CCST INPE)
320	18	11	38	11	38	Delete comma after 'flowering'. (Burt, Peter, University of Greenwich)
321	18	11	45	11	46	Give references to these other chapters, or indicate where the references can be found (maybe in Rosenzweig et al?). (Zwiers, Francis, Pacific Climate Impacts Consortium)
322	18	11	46	11	49	If I understand correctly, this paragraph shifts much of the burden of literature review and analysis to the thematic chapters plus chapter 30 (with a similar statement on page 35 for regional chapters). This is a reasonable and pragmatic approach, but it does place quite some reliance on the quality of the assessment in these other chapters, some of which may not include detection/attribution experts on their author teams. How has this been cross-checked? Furthermore, should reviewers understand to look for details on D/A literature in the core chapters or in this chapter? (Carter, Timothy, Finnish Environment Institute)
323	18	11	48	11	48	Capital 'C' required for 'chapter' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
324	18	11	48	11	48	Please give chapter names not just numbers. (Jones, Richard, Met Office Hadley Centre)
325	18	11	49	0	0	not sure what methodlogical framework this is referring to. Please clarify. (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
326	18	11	49	11	49	What is the "methodological framework with these chapters" and where is it explained? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
327	18	11	49	11	49	I'm not sure what this means - do you mean that the chapters share a common methodological framework? If so, where is that introduced? (Zwiers, Francis, Pacific Climate Impacts Consortium)
328	18	11	49	11	49	What is the "methodological framework with these chapters" and where is it explained? (Jones, Richard, Met Office Hadley Centre)
329	18	12	3	12	4	Are there any islands on which the hydrological cycle is not affected by climate change? And is it necessary to say the effects differ from region to region? I would say just “by climate change everywhere.” (Cogley, J. Graham, Trent University)
330	18	12	4	12	4	Please remove "on all continents and probably most islands". (AUSTRALIA)
331	18	12	5	11	6	Capital 'C' required for 'chapter' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
332	18	12	5	12	5	The word "their" be removed or if at all required be changed by the word "its". (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
333	18	12	6	12	6	The word "their" be removed or if at all required be changed by the word "its". (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))

#	Ch	From Page	From Line	To Page	To Line	Comment
334	18	12	9	12	9	Figure 18-3 seems broadly consistent with the corresponding elements of the figure accompanying Table 3-1. (Cogley, J. Graham, Trent University)
335	18	12	15	11	15	Capital 'S' required for 'section' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
336	18	12	17	11	21	Use of 'Ch' as an abbreviotion is a style change. Also, these are not chapters, they are sections (Sections!). I suggest either replacing 'ch' with 'Section' or leaving just the numbers, as is done elsewhere and the meaning is clear. (Burt, Peter, University of Greenwich)
337	18	12	25	13	45	Please consider to use calibrated language, since some changes have been assigned medium confidence only (WGI D&A of streamflow changes); Section 18.3.1.2 should also refer to WGI which is currently not the case. (Plattner, Gian-Kasper, IPCC WGI TSU)
338	18	12	27	12	28	“The regional surface water balance …”. Water use is not necessarily a loss term in the water balance. Some irrigation water may return to streams, as may some water drawn off for municipal and industrial uses. I would say “groundwater discharge/recharge” rather than the less explicit “inflow/outflow”. (Cogley, J. Graham, Trent University)
339	18	12	29	12	31	Total and direct solar irradiative received on surface are more important than temperature for evapotranspiration, and they should be included as a major factor (Gao et al., 2007: Gao, G., D.L. Chen, G.Y. Ren, Y. Chen, Y.M. Liao. 2006. Spatial and temporal variations and controlling factors of potential evapotranspiration in China: 1956-2000, Journal of Geographical Sciences 16, (1), 3-12)) (Guoyu Ren) (Ren, Guoyu, National Climate Center)
340	18	12	30	12	31	Please provide references for the information on evapotranspiration. (AUSTRALIA)
341	18	12	30	12	31	The CO2 effect on water use by vegetation should be mentioned here. (Jones, Richard, Met Office Hadley Centre)
342	18	12	33	12	38	Please cite specific sections of the WGI chapters referenced here. (Mastrandrea, Michael, IPCC WGII TSU)
343	18	12	34	0	0	WG1 has 'medium condidence' in attribution of pcp changes (Hegerl, Gabi, University of Edinburgh)
344	18	12	34	12	34	"medium confidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
345	18	12	36	12	36	Regarding observed trends in extreme precipitation, perhaps it would also be appropriate to cite Westra et al., 2013, who survey trends in extreme precipitation at precipitation gauge stations across the globe. They find statitically significant upward trends at significantly more locations that would be expected by random chance and estimate a global sensitity in observed precipitation extremes to global mean temperature change that corresponds well to the Clausius-Clapeyron relation. Westra, S., L.V. Alexander, F.W. Zwiers, 2013: Global increasing trends in annual maximum daily precipitation. Journal of Climate, doi:10.1175/JCLI-D-12-00502.1. (Zwiers, Francis, Pacific Climate Impacts Consortium)
346	18	12	37	0	38	is there a likelyhood or confidence level? (Hegerl, Gabi, University of Edinburgh)
347	18	12	37	12	38	Does human influence here refer to anthropogenic climate change or other human activities like land use change? Please clarify. (Mastrandrea, Michael, IPCC WGII TSU)
348	18	12	40	0	51	Concerning the trends in river flow and the differing definitions of "detection" and "climate change" used in the chapter, we checked on the Dai et al. 2009 reference and think it qualifies as a climate change detection under the lower bar generally used in this chapter, but not the higher bar used in WG I, Ch. 10. In other words, it's not convincing in terms of being a change that's unusual compared with natural climate variability (including internal variability). (UNITED STATES OF AMERICA)
349	18	12	41	12	42	I assume that the counts (45 and 19) refer to statistically significant trends, since all calculated trend coefficients are virtually certain not to be exactly zero, indicating that the observations have trends everywhere (this is just a description of what is seen in the obs - if you fit a straight line it will have some kind of slope, although the slope might not be statistical significant). (Zwiers, Francis, Pacific Climate Impacts Consortium)

#	Ch	From Page	From Line	To Page	To Line	Comment
350	18	12	42	12	44	As noted in Chapter 12 of IPCC AR5 WG1 the work cited here is no longer the most current and more recent studies (Dai, 2011; Hoerling et al., 2010; Seager and Vecchi, 2010; Seager and Naik, 2012) suggest that regional reductions in precipitation are primarily due to internal variability and the anthropogenic forced trends remain currently weak compared to those caused by internal variability within the climate system." (Webb, Robert, NOAA OAR ESRL)
351	18	12	43	11	43	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
352	18	12	44	0	0	might be useful to mention that Barnett et al. is analyzing temperature related changes in streamflow only (they controlled for pcp related changes as they didn't trust them) (Hegerl, Gabi, University of Edinburgh)
353	18	12	45	12	46	What has happened since 2000? It is unclear whether there was a negetive streamflow post 2000, or the study simply only looked at data up to 2000. (AUSTRALIA)
354	18	12	47	12	49	For the Yellow River and other large rivers of China, there are a few of important publications, and they should be cited. These studies show, for example, that changes in key climatic variables relative to catchments water balance have occurred, and some of the trends are statistically significant and they have exerted obvious impacts on water resources on the catchments. It is still difficult at present, however, to make a robust attribution of the observed hydro-climatic changes to anthropogenic climate change (e.g. Qin, D. H., Ding, Y. H. and Su, J. L. (eds). 2005. Changes of Climate and Environment in China (Vol. 1), Beijing: Science Press (in Chinese); Ren, G.Y. (ed.). 2007. Climate Change and Water Resources in China, Beijing: China Meteorological Press. pp314 (in Chinese); Zhang, J.Y., G.Q. Wang (eds). Studies of Climate Change Impact on Water Resources. Beijing: Science Press. pp214 (in Chinese); Ren G.Y., H.B. Liu, Z.Y. Chu, et al. 2011. Climate change over eastern China and implications for South-North Water Diversion Project, Journal of Hydrometeorology, 12 (8): 600-617. DOI: 10.1175/2011JHM1321.1). (Guoyu Ren) (Ren, Guoyu, National Climate Center)
355	18	12	48	12	51	The Amazon and La Plata basins are not very good examples of monsoon systems. (Cogley, J. Graham, Trent University)
356	18	12	51	12	51	Please refer to the Soth American Monsoon egion and not Amazon (Marengo, Jose, CCST INPE)
357	18	13	1	13	45	No metion to the droughts of Amazonia in 2005, 2010, and northeast Brazil in 2012, and to floods in Amazonia in 2009 and 2012. They impacted heavily in those regions, and references can be found in the Chapter 27 of WG2, plus Marengo et al (2013) listed in the reference section in Chapter 18, that has been accepted for publication. (Marengo, Jose, CCST INPE)
358	18	13	3	0	8	I consider that the floods didn´t increase in the recent decades but it has been urnabizated in flooding areas. (Gómez Cantero, Jonathan, Universidad de Alicante)
359	18	13	3	13	3	I think it might be clearer to say something like, "River floods, defined as..." (Mach, Katharine, IPCC WGII TSU)
360	18	13	3	13	5	Delete "impact-relevant". The definition specifies that any overtopping is a flood. (Cogley, J. Graham, Trent University)
361	18	13	3	13	5	Do you mean globally or in various locations (ie all floods have increased in magnitude and frequency, or only some)? (Burt, Peter, University of Greenwich)
362	18	13	3	13	8	Please reconsider this paragraph. The statement in line 3 and 4 seems somewhat inconsistent with the rest of the paragraphs. The first statement infer the increase in the magnitude and frequency of the floods but in the next line questions that instrumental records of impact of this floods. And finally, it is referred that there is medium confidence level in global detection of flood which seems inconsistent with the first line which suggest rise in frequency and magnitude of floods. (NETHERLANDS)
363	18	13	3	18	8	Unless the authors can provide a robust set of citations for the global increase in floods I don't believe the global statement is appropriate, even with a low confidence rating. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)

#	Ch	From Page	From Line	To Page	To Line	Comment
364	18	13	6	13	6	“highest annual discharge”. This instance of “flood” has a meaning different from that given at L3. (Cogley, J. Graham, Trent University)
365	18	13	6	13	8	Please specify whether the detection of changes in floods is climate change specific, or general changes, possibly due to other factors. The former is assumed. (AUSTRALIA)
366	18	13	7	13	7	I think the authors should avoid the practice of reporting a confidence range (low to medium in this case). The interpretation could be that there is medium confidence in some aspects of this statement, and only low confidence in others, or it could be that the authors think they can differentiate more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have medium confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
367	18	13	7	13	8	It's not clear where this "low to medium confidence in global detection of a change in floods" comes from. Does the text mean that flood changes are unusual compared to natural variability and internal climate variability (strong definition) or only that some statistically significant trends have been found for some flow measures, and these may actually reflect just internal climate variability (weaker definition). If it's the weaker definition you are using, OK. But if you are assuming the stronger definition, the references provided don't really make the case. In any case, you need to be explicit about what definition of detection is being used here. The low to medium claim is clearly stronger than that made in SREX, and without any clear justification, unless its because you've lowered the bar for detection. From Table 18.11a there seems to be distinction between inland and coastal flooding. If its just coastal flooding that is referred to by low to medium here, that should be clearly spelled out. (UNITED STATES OF AMERICA)
368	18	13	7	13	8	Is there a specific reason why the range of low to medium confidence is given here, as opposed to one or the other? Please clarify (Mastrandrea, Michael, IPCC WGII TSU)
369	18	13	8	13	8	The conclusion here is not borne out by the opening statement of the section on line 3. Please check. Do you mean there is only low to medium confidence in detecting floods due to climate change? (Burt, Peter, University of Greenwich)
370	18	13	10	0	11	No only the Central Europe has been affected by heavy rains and pluvial floods in the last years, also a lot of countries in the South region as Spain. (Olcina Cantos, 2010) (Gómez Cantero, Jonathan, Universidad de Alicante)
371	18	13	10	13	10	Replace "increase" with "increases". What is a "supposable consequence"? This sounds like a consequence that is not observed, but that logic dictates that you might speculate about. In my view, it would be best not to speculate. (Zwiers, Francis, Pacific Climate Impacts Consortium)
372	18	13	10	13	14	Add: "The review on the world-wide impacts of climate change on rainfall extremes and urban drainage by Willems et al. (2012) has shown that typical increases in rainfall intensities at small urban hydrology scales range between 10% and 60% from historical control periods in the recent past (typically 1961-1990) up to 2100. These climate change impacts on extreme short-duration rainfall events may have significant impacts in terms of surcharge of urban drainage systems and pluvial flooding. Results so far indicate more problems with sewer surcharging, sewer flooding and more frequent CSO spills. o Extreme rainfall changes in the range 10-60% may lead to changes in flood and CSO frequencies and volumes in the range 0-400% depending on the system characteristics. This is because floods and overflows are due to exceedance of runoff or sewer flow thresholds and react to rainfall (changes) in a highly non-linear way (Willems et al., 2012). Ref: Willems, P., Olsson, J., Arnbjerg-Nielsen, K., Beecham, S., Pathirana, A., Bülow Gregersen, I., Madsen, H., Nguyen, V-T-V. (2012), ‘Impacts of climate change on rainfall extremes and urban drainage’, IWA Publishing, 252p., Paperback Print ISBN 9781780401256; Ebook ISBN 9781780401263 (Willems, Patrick, KU Leuven)
373	18	13	13	13	13	This is obscure. “detectable” is an unfortunate word to use in a sentence discussing attribution, and I cannot reconcile the 20% increase of flood risk with Figure 3-1 (which is based on Figure 4 of Pall et al. 2011). Should it be 200%, near to the mode of the Pall aggregate distribution? (Cogley, J. Graham, Trent University)

#	Ch	From Page	From Line	To Page	To Line	Comment
374	18	13	13	13	13	Suggest replacing "is detectable for a 20%..." with "resulted in a 20% …". The latter formulation states the attribution that is intended more directly. (Zwiers, Francis, Pacific Climate Impacts Consortium)
375	18	13	13	13	13	This is unclear. What is a 20% increase in risk of an event that happened? Please rephrase/clarify. (Jones, Richard, Met Office Hadley Centre)
376	18	13	14	13	14	In the case of Mediterranean countries, a certain increase of minor floods (mainly flash-floods) have been found, mainly as a consequence of changes of hydrological conditions (i.e. uses of soil) and an increasing exposure and vulenrability in flood-prone areas, usually located near the coast. See as reference: Llasat, M. C., Llasat-Botija, M., Petrucci, O., Pasqua, A. A., Rosselló, J., Vinet, F., Boissier, L., 2013. Towards a database on societal impact of Mediterranean floods in the framework of the HYMEX project. Nat. Hazards Earth Syst. Sci., 13, 1–14, 2013. www.nat-hazards-earth-syst-sci.net/13/1/2013/ doi:10.5194/nhess-13-1-2013; (Llasat, Maria-Carmen, University of Barcelona)
377	18	13	16	0	24	explicitly give link to glacier melt - also where is the detection attribution here? The topic returns on the next page. (Hegerl, Gabi, University of Edinburgh)
378	18	13	18	13	18	Please remove 'anywhere in the world'. (AUSTRALIA)
379	18	13	20	0	0	The trends in lake cover were negative in the Hindu Kush and Karakorum but positive further east. (Parker, David, Met Office Hadley Centre)
380	18	13	21	13	21	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
381	18	13	22	13	22	A statement should be added pointing to the increasing long-term risk of floods from impact waves in new lakes triggered by rock avalanches released in glacier de-buttressed mountain flanks or in steep slopes withwith degrading permafrost (cf. Haeberli, W. (2013): Mountain permafrost — research frontiers and a special long-term challenge. Cold Regions Science and Technology. http://dx.doi.org/10.1016/j.coldregions.2013.02.004). This development relates to an important integrated aspect of climate change. (Haeberli, Wilfried, University of Zurich)
382	18	13	22	13	22	Replace "these lakes" with "glacial lakes" for clarity. (Zwiers, Francis, Pacific Climate Impacts Consortium)
383	18	13	22	13	23	Please provide the degree of certainty, or references, for the claim of increased liklihood of GLOFs. (AUSTRALIA)
384	18	13	25	13	25	I cannot work out what a “more intense” drought might be, unless the sentence is about agricultural droughts in which the soil becomes “intensely” dry. If so, the sentence should be clarified. (Cogley, J. Graham, Trent University)
385	18	13	25	13	29	If you are using a lower bar for detection in the report, then perhaps you can make stronger claims about drought changes than was done in SREX, which used more conventional definitions of detection and climate change. Alternatively, if you are using the same definitions as SREX, then this is an exception to your terminology defined in the introduction and needs to be clarified. The statements later in the section on Arctic sea ice, cryosphere, etc. are much clearer in terms of what you mean. (UNITED STATES OF AMERICA)
386	18	13	25	13	29	The chapter team should also consider cross-referencing the working group 1 contribution to the 5th assessment report, beyond the special report on extremes. (Mach, Katharine, IPCC WGII TSU)
387	18	13	26	13	29	Please provide a reference/s for the sentence relating to drought conditions increasing. (AUSTRALIA)
388	18	13	27	13	28	This increase is inconsistent with the statement in Table 18.7 and in Table 25.1 in Chapter 25.(Althoguht not comment on drought in Table 18.7 below. (Whetton, Penny, Commonwealth Scientific and Industrial Research Organization - Marine and Atmospheric Research)

#	Ch	From Page	From Line	To Page	To Line	Comment
389	18	13	29	0	0	The studies on relationship between Standardized Precipitation Index and the climate indices over Nepal using monthly climate data of last 33 years revealed that one of the causes for summer droughts is El Nino, while the winter droughts are related with positive Indian Ocean Dipole Mode Index (DMI)(Sigdel and Ikeda,2010). (M. Sigdel and M. Ikeda, 2010. Spatial and Temporal Analysis of Drought in Nepal using Standardized Precipitation Index and its Relationship with Climate Indices. Journal of Hydrology and Meteorology, Vol. 7, No. 1, Dec 2010: 59 – 74) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
390	18	13	31	13	32	Please provide confidence intervals and references for the claim that groundwater is decreasing, and that this is primarily attibuted to anthropogenic activites. (AUSTRALIA)
391	18	13	31	13	34	Please re-write as two sentences. Split after 'activities', and remove 'such as'. (AUSTRALIA)
392	18	13	32	13	33	"For the 21st century" seems a bit unclear - would it be correct to say "detected in satellite data collected since year 2000"? In any case "detected by" should be replaced with "detected in", since the detection inference presumably depends upon some one doing the analysis of the satellite data. (Zwiers, Francis, Pacific Climate Impacts Consortium)
393	18	13	33	13	33	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
394	18	13	39	13	40	Please provide confidence intervals and references for the claim that water quality will change with temperature. (AUSTRALIA)
395	18	13	39	13	45	Temperature is one of the most important factors in eutrophication. There should be some discussion on this connection even if the connection is a non-linear response. If there is in general a high confidence that temperatures are increasing then there is a connection to eutrophication - even if indirectly. (UNITED STATES OF AMERICA)
396	18	13	40	0	0	eutrophication (Mooij et al. 2005). It is difficult…. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
397	18	13	41	0	0	here a reference could be included. Huber et al. 2008; where we tested climate impacts as modified by changes in eutrophication. Full reference see above. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
398	18	13	41	0	0	in Adrian et al. 2009 we discuss confounding factors such as catchment effects, trohic state, biological interactions, recovery from acidification, groundwater, and habitat modification - for a set of abiotic and biotic response variable towards cliamte change for lakes. Adrian R, O'Reilly CM, Zagarese H, Baines SB, Hessen DO, Keller W, Livingstone DM, Sommaruga R, Straile D, Van Donk E, Weyhenmeyer GA, Winder M (2009). Lakes as sentinels of current climate change. Limnol. Oceanogr. 54 (6):2283-2297. There is a clear signal e.g. in Müggelsee that climate induced enhances in internal nutrient loads have fully counteracted the reduction in external loads in the early 1990ties. Hilt et al. in press. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
399	18	13	41	13	41	Suggest replacing "untreated" with "inadequately treated" - treatment would not remove nutrients in all cases. (Zwiers, Francis, Pacific Climate Impacts Consortium)
400	18	13	43	13	45	It would be helpful to specify the timeframe for these impacts. (Mach, Katharine, IPCC WGII TSU)
401	18	13	50	13	50	Components has been misspelt as 'Componentes' (INDIA)
402	18	13	50	13	53	It would be preferable to provide line of sight references to the specific chapter sections that are relevant. Also, is it possible to indicate the approximate time frame for these impacts? (Mach, Katharine, IPCC WGII TSU)
403	18	14	2	14	3	How does this assignment of high confidence intersect with the "likely" on page 13, line 52? Please clarify. (Mastrandrea, Michael, IPCC WGII TSU)
404	18	14	4	14	4	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
405	18	14	9	14	15	This section should be combined with the section on GLOFs in 18.3.1.2, p. 13. (AUSTRALIA)

#	Ch	From Page	From Line	To Page	To Line	Comment
406	18	14	10	14	17	This material overlaps with the previous section. It is worth considering whether this material should be presented together in one or the other location. (Mastrandrea, Michael, IPCC WGII TSU)
407	18	14	13	14	13	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
408	18	14	13	14	13	Change 'damages' to 'damage'. (Burt, Peter, University of Greenwich)
409	18	14	22	14	0	"in western and south-central China" should be changed to "in western and southwestern China". (Guoyu Ren) (Ren, Guoyu, National Climate Center)
410	18	14	28	14	28	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
411	18	14	28	14	28	Remove apostrophes: the years are not possessives. (Burt, Peter, University of Greenwich)
412	18	14	29	14	31	The average reader will have difficulty seeing the implications of this statement. Some context should be provided. (Cogley, J. Graham, Trent University)
413	18	14	34	14	34	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
414	18	14	40	0	0	more specifics on ice earlier break-up or later freeze-up: However, several factors modify this general trend. Because of the approximately sinusoidal form of the air temperature curve, the calendar dates on which the air temperature falls below and rises above 0 °C, which are crucial for the timing of ice-on and ice-off, respectively, are not linear functions of air temperature. Instead, they are arc cosine functions of air temperature, which implies that the sensitivity of the timing of ice-on, the timing of ice-off, and the duration of ice cover is greater in warmer regions than in colder regions, and will increase as the climate warms (Weyhenmeyer et al., 2004, 2011; Jensen et al., 2007; Livingstone & Adrian, 2009). Thus, the impact of climate warming on lake ice phenology will be disproportionately large in those areas where winters are mild or variable and the duration of ice cover on lakes is already short compared to those areas where winters are consistently cold and the duration of ice cover is much longer. Livingstone D.M. & Adrian R. (2009). Modeling the duration of intermittent ice cover on a lake for climate-change studies. Limnology and Oceanography, 54(5), 1709-1722. Weyhenmeyer G.A., Livingstone D.M., Meili M., Jensen O.P., Benson B. & Magnuson J.J. (2011). Large geographical differences in the sensitivity of ice-covered lakes and rivers in the Northern Hemisphere to temperature changes. Global Change Biology, 17, 268–275. Weyhenmeyer G.A., Meili M. & Livingstone D.M. (2004). Nonlinear temperature response of lake ice breakup. Geophysical Research Letters, 31(7), L07203, doi:10.1029/2004GL019530 Jensen O.P., Benson B.J., Magnuson J.J., Card V.M., Futter M.N., Soranno P.A. & Stewart K.M. (2007). Spatial analysis of ice phenology trends across the Laurentian Great Lakes region during a recent warming period. Limnology and Oceanography, 52(5), 2013-2026. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
415	18	14	46	14	46	'in-situ' should be in italics. (Burt, Peter, University of Greenwich)
416	18	14	49	14	50	I think I would tone this down slightly by deleting the emphasis on the 60% contribution to the change. This is only a single study that uses a specific downscaling and hydrologic modelling approach, so a lot of uncertainty remains. Also, the reader is not told what the observed changes were - so they would not be able to interpret the 60% contribution. (Zwiers, Francis, Pacific Climate Impacts Consortium)
417	18	14	51	0	0	Decline in Snow Covered Area(SCA) and its to changing temperature was reported using MODIS based remote sensing data for the period 2002-2009 over Bhutan Himalayas (Deoraj et al,2011). (Deo Raj Gurung, Anil V. Kulkarni, A. Giriraj, Khun San Aung and Basanta Sreshtha.2011. Monitoring of Seasonal Snow Cover in Bhutan using Remote Sensing Technique. Current Science, Vol. 101, No. 10, 25 November 2011) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))

#	Ch	From Page	From Line	To Page	To Line	Comment
418	18	14	54	15	1	Same comment as for page 3 (Haeberli, Wilfried, University of Zurich)
419	18	15	2	15	2	Should "hardly" be replaced with "not" (are there any studies?). (Zwiers, Francis, Pacific Climate Impacts Consortium)
420	18	15	3	15	4	Flow acceleration is also documented for creeping permafrost in the Brooks Range, Alaska (Daanen, R.P., Grosse, G., Darrow, M.M., Hamilton, T.D., Jones, B.M., 2012. Rapid movement of frozen debris-lobes: implications for permafrost degradation and slope instability in the south-central Brooks Range, Alaska. Natural Hazards and Earth System Sciences 12, 1521–1537. http://dx.doi.org/10.5194/nhess-12-1521-2012). This shows that similar processes are taking place at a much larger scale than just the Alps. (Haeberli, Wilfried, University of Zurich)
421	18	15	4	15	4	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
422	18	15	18	16	3	No examples on South America?, please refer to WG2 Chapter 27 (Marengo, Jose, CCST INPE)
423	18	15	21	15	21	It is not exactly clear what is assessed to have medium confidence, whether that assessment is made by the authors or Wulf et al, and whether the evidence basis for the assessment includes more than one study. If there is only one study, is there sufficient evidence/agreement to warrent medium confidence? (Zwiers, Francis, Pacific Climate Impacts Consortium)
424	18	15	21	15	21	"medium confidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
425	18	15	22	0	0	The daily 3 hr TRMM based satellite rainfall data during 1998-2008 revealed that the mountainous Himalaya has almost twice as many extreme events as the Ganges Plain or the Tibetan Plateau and are more common in the dry interior rather than the wet exterior of the orogen. This important finding suggests the location of profound surface erosion to be in the lee of the orographic barrier where barren landscapes are susceptible to intense rainstorm (Bodo,2013). (Bodo Bookhagen, 2010. Appearance of extreme monsoonal rainfall events and their impact on erosion in the Himalaya. Geomatics, Natural Ha rds and Risk Vol. 1, No. 1, March 2010, 37–50) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
426	18	15	24	15	24	"Dam construction is an important driver" not exact, should include "vegetation recovering". Namely "Dam construction and vegetation recovering are important drivers" (xia, chaozong, academy of forest inventory and planning)
427	18	15	33	15	43	This is another illustrative example of the lack of full traceability and a lack of clarity with some of the attribution assessments. The assessment is for a medium-high confidence on detection and a medium confidence on detection and attribution of "soils and rock" and a high confidence of detection and a medium confidence of detection and attribution on "increasing frequency of Apline rock failures" (Fig 18.3) This paragraph contains a variety of different types of attribution statement which I would describe as follows : Sentence 1 (high/medium/low confidence depending on region/global) is an observational statement Sentence 2 (high confidence) is a statement attributing high-mountain rock slope failures to glacier retreat/permafrost degradation/high-temperature events Sentence 3 (medium to high confidence) is an end to end attribution statement attributing costs of tens of millions of dollars in the Swiss alps from rock fall to anthropogenic climate forcing. Sentence 4 (factual statement; no confidence) is a statement attributing glacier lake impacts and downstream damage to rock and ice avalanches from destabilised slopes. The next paragraph then goes on to say "other than for the above mentioned types of landslides there is no clear evidence that their frequency and magnitude has changed over the past decades". Then "In general detection of changes in the occurrence of landslides is complicated by incomplete inventories, both in time and space, and inconsistency in terminology". This then apparently supports either high (Apline rock failures) or medium to high (soils and rock) confidence on detection. It isn't clear to me what supports the assessment shown in Fig 18.3 - label 8 and label 11. (Stott, Peter, UK Met Office)
428	18	15	34	15	34	Insert 'is' after 'There'. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
429	18	15	34	15	36	"high confidence" could be placed within parentheses at the end of the sentence to maximize directness of wording. (Mach, Katharine, IPCC WGII TSU)
430	18	15	35	15	35	The word "downwasting" is not found in the dictionary e.g in Oxford Advanced Learners Dictionary and needs to replaced by some other meaningful word. (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
431	18	15	35	15	35	Delete 'is'. (Burt, Peter, University of Greenwich)
432	18	15	39	15	39	I think the authors should avoid the practice of reporting a confidence range (medium to high in this case). The interpretation could be that there is high confidence in some aspects of this statement, and only medium confidence in others, or it could be that the authors think they can differentiate more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have high confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
433	18	15	42	15	42	“impacted glacier lakes”: this needs to be expanded. The impact is literal: when the debris hits the lake water, the resulting wave can breach the dam holding in the water, causing a “GLOF”. (Cogley, J. Graham, Trent University)
434	18	15	45	15	45	It would be good to write " ... above mentioned ice-related types of landslides ..." in order to make clear that the relation to ice is essential for adequately interpreting observed trends in frequency. (Haeberli, Wilfried, University of Zurich)
435	18	15	46	15	47	Should this be read as "shallow landslides in regions with a relatively complete event record" or separately for shallow landslides and for regions with a relatively complete event record for all landslides? Please clarify. (Mastrandrea, Michael, IPCC WGII TSU)
436	18	15	47	15	47	Here, "detection of changes" can include changes due to internal climate variability, I assume, so this could be noted. (UNITED STATES OF AMERICA)
437	18	16	2	16	2	Here, "detection of changes"□can include changes due to internal climate variability, I assume, so this could be noted. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
438	18	16	4	16	5	Gully Erosion The Nanka erosion gullies in Anambra State are the most complex single gully erosion site in the whole world (Akpojide et al., 2010), with those of Imo and Anambra States of Nigeria estimated to be causing loss of over 20 tons of fertile soil per annum and amounting to a cost of over 2 million dollars, with gullies extending to depths of over 120m to 2km wide in some places (Jimoh, 2006) The gully is estimated to have a mean advance rate of 150 metres every 3-5 years. The years are often years of exceptionally heavy rainfall (Ajaero, 2010) When compared with available scientific models and information on climate change from around the world, it may be seen how climate change could be attributed to the severe gully erosion and landslide problems happening in south eastern Nigeria, even in the absence of comprehensive local climate data. Hitherto, while some local scientists have attributed the underlying cause of gully erosion to include other human activities (Igokwe et al, 2008), others haves stressed that the soil properties (friable and flood-prone) and hydrologic processing (rainfall, surface and sub-surface flooding) are the major culprits. Interestingly though, most of the gully erosion sites including that of the famous Nanka, Agulu, Ekwulobia and Oko communities are located in typical rural areas with minimal presence of such human activities like road construction, intensive agriculture and deforestation, heavy industries' activities, etc. especially with reference to the period of inception of the gullies around early-to-mid nineties. However, sand excavation activities were noticed in recent times in some of these areas, but only for a while due to government intervention. More so, other surrounding areas within Nigeria with higher degree of industrial activities and un-sustained road construction, sand excavation, intensive farming and deforestation have not witnessed severe gully devastation (Ezenekwe, 2009). With the introduction of the climate change phenomenon, there appears to be better understanding as to why gully erosion and landslides are becoming more rampant. Ezenekwe (2009) compared traditional knowledge and local scientific understanding of the causes of the gully erosion problems with models from the IPCC to investigate for a link. This revealed that while some dedicated and noble scientists working for the IPCC are using sophisticated mathematical and computer simulated models to give examples of possible hotspots at risk from hydro (or a combination of hydro and drought) for a region within Nigeria located thousands of miles away, some humble citizens are, in actual fact and within the same precincts captured by the IPCC simulation, experiencing worsening gully erosion and landslide problems responsible for the widespread degradation of arable land and biodiversity, destruction of homes, transportation, electricity and communication systems, contamination of water supply, isolation of settlements, migration of communities etc. (Akpokodje et al., 2010). Research efforts in the tropics show that the most important factor that is of direct relevance to erosion studies is rainfall (Jimoh,

#	Ch	From Page	From Line	To Page	To Line	Comment
438.2	18	16	4	16	5	2006), and according to (Aaron, 2011), recorded volumes of torrential rains increased 20 percent across various southern states in Nigeria over the past forty years, some of which already see up to 160 inches of rainfall a year, with wet seasons lasting eight to ten months. Ezenekwe (2009) attributes gully erosion to flood activities with a 68 per cent confidence level. Low bulk density, high hydraulic conductivity, low organic matter content and hence friability of soil (Onwuka and Okoye, 2012) are soil properties that contribute to the vulnerability of these landscapes to hydro or flood activities. References [Enuvie G. Akpokodje, Akaha C. Tse, Nnamdi Ekeocha. GULLY EROSION GEOHAZARDS IN SOUTHEASTERN NIGERIA AND MANAGEMENT IMPLICATIONS Scientia Africana, Vol. 9 (No.1), March, 2010, pp 20-36 © Faculty of Science, University of Port Harcourt. Printed in Nigeria. ISSN 1118 – 1931] [Isah H. Jimoh. THE ECOLOGICAL PROBLEMS OF SOIL EROSION IN NIGERIA. Faculty of Business and Social Sciences, University of Ilorin, Ilorin, Nigeria. 2006 And Vantage Publishers Ltd. ISBN 978-071-973-3] Chukwuedozie Kelechukwu AJAERO, Arinze Tagbo MOZIE. The Agulu-Nanka gully erosion menace in Nigeria: what does the future hold for population at risk? Department of Geography, University of Nigeria, Nsukka. Email:ajaerock@yahoo.co,mTel: +234(0)803-7511-422 [Igbokwe J. I., Akinyede B. Dang, Alaga T., Ono M. N., Nnodu V. C., Anike L. O. 2008 Mapping and Monitoring of the Impact of Gully Erosion in South eastern Nigeria with Satellite Remote Sensing and Geographic Information System. The International Archives of the Photgrammetry, Remote Sensing and Spatial Information Sciences Vol. XXXVII. Part B8 Beijing] [Ezenekwe Elochukwu. Investigation into Climate Change Contribution to the worsening gully/landslide activities in Anambra state of south eastern Nigeria (case study: Nanka community). Report for the Zeeler Campaign Initiative of Peace Advocacy and Sustainable Development Outreach, PASDO, 2009] Onwuka, S.U.; Okoye, C. O.; Nwogbo, N. The Place of Soil Characteristics on Soil Erosion in Nanka and Ekwulobia Communities in Anambra State. Journal of Environmental Management and Safety, 2012 (Ezenekwe, Elochukwu, Nnamdi Azikiwe University)
439	18	16	10	16	10	"high agreement" and "robust evidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
440	18	16	11	16	11	The use of the term "outside of their natural variation" is confusing, because one can think of natural variation as including changes due to natural (non-anthropogenic) changes in climate such as internal climate variability. But under the definitions of detection and climate change proposed in this chapter, the internal climate variability can be a form of "climate change" so you can have detection without the changes being different from internal climate variability. Is a stronger definition of detection being used here or are we misinterpreting? (UNITED STATES OF AMERICA)
441	18	16	11	16	14	This statement is contrary to statement in TS (p. 9, l. 21-24), to statements in chapter 4 and statements later in chapter 18.3.2. Please check for consistency. (NORWAY)
442	18	16	14	16	14	Replace "review" with "assessment" (presumably that authors have performed an assessment, and have not just provided a review). (Zwiers, Francis, Pacific Climate Impacts Consortium)

#	Ch	From Page	From Line	To Page	To Line	Comment
443	18	16	14	16	15	The science presented in IPCC AR5 WG2 Chapter 4 is a vast improvement over the analysis presented in IPCC AR4 WGII in 2007. However referring the reader the "statements of confidence for detection and attribution are given without references, as detailed traceability is provided in chapter 4." is a bit misleading since as noted in Chapter 4, page 20, lines 7-, "Note that a slightly different definition than Chapter 18 for detection is used, because detection here is based solely on the presence of a temporal trend and does not attempt to distinguish natural from climate related variation. Referring the reader to Chapter 4 only makes sense if Chapter 18 adopts and implements the same definitions for detection and attribution that are used in Chapter 4. (Webb, Robert, NOAA OAR ESRL)
444	18	16	14	16	15	See my general comments about traceability but I do not think it acceptable to provide statements without references. There has to be a thread the reader can follow from the SPM to the chapter assessment by subsection and it shouldn't lose the thread in the additional layer of complexity imposed on the WGII structure by having an attribution synthesis chapter. (Stott, Peter, UK Met Office)
445	18	16	14	16	15	But in some cases citations are provided, which could be clarified. (Mach, Katharine, IPCC WGII TSU)
446	18	16	15	16	15	Capital 'C' required for 'chapter' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
447	18	16	15	16	15	Detailed cross-links to chapter 4, providing traceability, should be included here. (Zwiers, Francis, Pacific Climate Impacts Consortium)
448	18	16	17	0	0	Consider using 'the timing of recurring developmental (life-cycle) events in plants and animals, such as , bud burst in trees, migration of birds and appearance of insects' as a definition of phenology. (Donnelly, Alison, Trinity College Dublin)
449	18	16	18	0	0	include: timing of algal blooms (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
450	18	16	22	16	24	these changes "can be assumed" to be due to recent climate change/CO2 increase. Is this because other drivers have limited importance or is this more of a hypothesis to be tested? (Mastrandrea, Michael, IPCC WGII TSU)
451	18	16	23	16	23	Would it be more accurate to say "are hypothesized to be due to..."? (Mach, Katharine, IPCC WGII TSU)
452	18	16	23	16	24	Confusing here. The changes referenced - said to apply to this entire chapter - are said to be "beyond natural variability" but due to "recent climate change". But under the definitions being used in the chapter, the recent climate changes can be due to natural climate variability. Unless different definitions are being used here. Please clarify. (UNITED STATES OF AMERICA)
453	18	16	23	16	25	“assumed” and “assumptions” are rather disturbing. I trust that what is meant is “shown” and “observations of natural variability”. (Cogley, J. Graham, Trent University)
454	18	16	26	16	26	replace 'the assessment' with 'the rigorour quantitative assessment' (Webb, Robert, NOAA OAR ESRL)
455	18	16	31	16	31	I think it would be good to replace "significant" with a synonym such as "substantial", unless the intent is to refer to statistical significance, in which case, it would be good to be specific and say "statistically significant". The word significant is used so heavily in statistical contexts that I worry that readers may confound "statistical significance" with other interpretations. (Zwiers, Francis, Pacific Climate Impacts Consortium)
456	18	16	33	16	33	"medium agreement" should be used instead of "moderate agreement." Additionally, "robust evidence" and "medium agreement" should be italicized. (Mach, Katharine, IPCC WGII TSU)
457	18	16	33	16	33	"Moderate" should be "medium" here. (Mastrandrea, Michael, IPCC WGII TSU)
458	18	16	35	16	35	It would be good to provide spatial ranges and error bars around the "5.4" and "6.6" days. (Jones, Richard, Met Office Hadley Centre)

#	Ch	From Page	From Line	To Page	To Line	Comment
459	18	16	35	16	48	There is inconsistency with capitalsition. Here, we have 'northern hemisphere', on line 48 it is 'Northern hemisphere'. Elsewhere in the chapter/document it is Northern Hemsiphere. I recommend 'Northern (and Southern) Hemisphere throughout, as it is a proper noun, as used on page 23, line 35. (Burt, Peter, University of Greenwich)
460	18	16	36	0	0	The global level analysis of temperature seasonality (ST) and vegetation seasonality (SV) using satellite and ground based data over 30 years indicated both temperature and vegetation seasonality diminishment over northern lands (Xu et al,2013). (L. Xu, R. B. Myneni, F. S. Chapin III, T. V. Callaghan, J. E. Pinzon, C. J. Tucker, Z. Zhu, J. Bi, P. Ciais, H. Tømmervik, E. S. Euskirchen, B. C. Forbes, S. L. Piao, B. T. Anderson, S. Ganguly, R. R. Nemani, S. J. Goet, P.S. A. Beck, A. G. Bunn, C. Cao and J. C. Stroeve, 2013. Temperature and vegetation seasonality diminishment over northern lands. Nature Climate Change 2013, NCLIMATE 1836 / doi: 10.1038) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
461	18	16	37	0	0	The timing of the spring algal bloom occurred about a month earlier from the year 1988 as compared with the preceding decade in a north temperate lake (Huber et al. 2008). Reference: Huber V., R. Adrian, D. Gerten. 2008. Phytoplankton response to climate warming modified by trophic state. Limnology and Oceanography, 53 (1): 1-13. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
462	18	16	38	0	0	Abundant winter injury to the foliage and shoots of Rhododendron arboreum and Quercus semecar-pifolia became apparent in winters of 2010-2011 in Subalpine-timber line regions of western Himalayas of India due to unusual climatic conditions such as low winter temperature and heavy snow fall (Ishwari et al,2012). (Ishwari Datt Rai, Bhupendra Singh Adhikari, Gopal Singh Rawat, 2012. Mass Foliar Damage at Subalpine-Timberline Ecotone in Western Himalaya Due to Extreme Climatic Events. American Journal of Climate Change, 2012, 1, 104-107) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
463	18	16	48	16	48	I suggest deleting "now" or replacing it with some other word. Using "now" suggests that terrestrial ecosystems were not net carbon sinks in the past (i.e., that this is a change that has recently occurred). Perhaps a better sense of the situation could be given by saying "... ecosystems currently remain net sinks ...". That gives a sense of their status over recent decades, and at the same time suggests a concern for the future. (Zwiers, Francis, Pacific Climate Impacts Consortium)
464	18	16	53	16	53	It would be preferable to provide specific reference to the relevant sections of chapter 6 in the working group 1 contribution. (Mach, Katharine, IPCC WGII TSU)
465	18	16	54	17	3	Please also add "rising atmospheric CO2 concentration" due to the fact that an increased CO2 level also will affect growth. (NORWAY)
466	18	17	6	0	0	Section 18.3.2.3. For all statements supported by assessment in chapter 4, specific cross-reference to relevant sections of chapter 4 should be further clarified. Additionally, the chapter team should strongly consider providing examples of core citations in support of more findings. (Mach, Katharine, IPCC WGII TSU)
467	18	17	12	17	13	The statement regarding an 'increase in the number of species studies has incresed considerably since AR4' would be strengthened if a selection of key exemplar references were provided. (NETHERLANDS)
468	18	17	13	17	16	The sentence starting 'overall, many terrestrial species have recently moved' doesn't appear to reflect the variability and uncertainty in the movement of species reflected in chapter 4. (AUSTRALIA)
469	18	17	13	17	16	This is rather awkwardly constructed - breaking it into a couple of separate sentences would probably help, one stating what has been observed, and another stating precisely what is being assessed to have high confidence. Also, the statement does not give a good sense of how many species are represented in the averages that are reported, or whether there is confidence that these measured movements are representative of a broader group of species, and how that broader group is constituted. (Zwiers, Francis, Pacific Climate Impacts Consortium)
470	18	17	14	17	14	'per' should be in italics. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
471	18	17	22	0	0	something on zooplankton diversity: In a study on the association between zooplankton species richness in lakes spanning Canada, USA Germany and Switzerland it was found that temporal fluctuations in the chemical environment tend to exclude zooplankton species while temperature variability promotes greater zooplankton species richness (Shurin et al. 2010). Reference: Shurin, J. B., M. Winder, R. Adrian, W. (Bill) Keller, B.Matthews, A. M. Paterson, M. Paterson, B.Pinel-Alloul, J. A. Rusak, N.Yan. 2010. Environmental stability and lake plankton diversity- contrasting effects of chemical and thermal variability. Ecology Letters 13: 453-463. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
472	18	17	23	17	23	In the sentence: " Across the world, ……fossil record", the word species appears twice, the word species appearing the second time, better be replaced by the word "their". (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
473	18	17	23	17	30	I think the authors need to provide a number of peer-reviewed publications that support the statement throughout the paragraph. It is surprising that there are no citations supporting the assessments being presented. (Webb, Robert, NOAA OAR ESRL)
474	18	17	23	17	30	Specific cross-reference to relevant sections of chapter 4 should be provided. (Mach, Katharine, IPCC WGII TSU)
475	18	17	24	17	26	Important to point out that these are, although serious threats, also (undoubtedly) antropogenic drivers - i.e. possible for humankind to affect with decisions and behaviours and thus reduce their impact and hopefully increase resilience and robustness of (NORWAY)
476	18	17	26	0	0	This is one of the cases where I worry that 'very low confidence' to me suggests you think its due to human influence but cant prove it while the text clarifies that it is quite likely (likelyhood language??) due to other factors. Maybe this would be clearer if phrased differently (Hegerl, Gabi, University of Edinburgh)
477	18	17	29	17	29	"Anthropogenic forcing" is a better term than "global warming" in this context. (UNITED STATES OF AMERICA)
478	18	17	29	17	29	Linked to the general point made about low confidence statements, perhaps insert "suggested" before "attribution". (Jones, Richard, Met Office Hadley Centre)
479	18	17	36	17	37	Does the traceback apply to this whole subsection? In general, I think the traceability of evidence that is assessed in other chapters should be more detailed. (Zwiers, Francis, Pacific Climate Impacts Consortium)
480	18	17	40	0	0	this section states 'high confidence' but has very few references. Why? (Gutknecht, Jessica, Helmholtz Centre for Environmental Research-UFZ)
481	18	17	40	0	0	Section 18.3.2.4. For all statements supported by assessment in chapter 4, specific cross-reference to relevant sections of chapter 4 should be further provided. Additionally, the chapter team should strongly consider further providing examples of key references in support of findings. (Mach, Katharine, IPCC WGII TSU)
482	18	17	42	17	42	Capital 'B' for 'Boreal' (as used elsewhere in chapter/document). (Burt, Peter, University of Greenwich)
483	18	17	46	17	52	Specific cross-reference to relevant sections of chapter 4 should be provided. (Mach, Katharine, IPCC WGII TSU)
484	18	17	50	18	16	Some additional caveats needed. The authors could consider: "facilitates attribution to climate change in general, including possible natural climate variability." The reader should be reminded that the attribution to climate change referred to in this section includes climate change due to natural variations as well as anthropogenic forcing, not just anthropogenic climate change. (UNITED STATES OF AMERICA)
485	18	18	1	18	1	Capital 'B' for 'Boreal' (as used elsewhere in chapter/document). (Burt, Peter, University of Greenwich)
486	18	18	1	18	12	Specific cross-reference to relevant sections of chapter 4 should be provided. (Mach, Katharine, IPCC WGII TSU)
487	18	18	4	18	4	Small 's' for 'southern'. (Burt, Peter, University of Greenwich)
488	18	18	4	18	4	Is "perceived" the clearest word here? (Mach, Katharine, IPCC WGII TSU)
489	18	18	9	18	12	Here, and elsewhere in this chapter, references should be cited. (Ren, Guoyu, National Climate Center)

#	Ch	From Page	From Line	To Page	To Line	Comment
490	18	18	9	18	12	What about a reference about this statement? (Marengo, Jose, CCST INPE)
491	18	18	16	18	17	Does the traceback apply to this whole subsection? In general, I think the traceability of evidence that is assessed in other chapters should be more detailed. (Zwiers, Francis, Pacific Climate Impacts Consortium)
492	18	18	18	0	0	include invarion of the tropical Cycindrospermopsis raciborskii into european lakes -see comment on chapter 4 page 28, line11 (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
493	18	18	20	18	20	18.3. The title is somehow misleading. Most of this section is about changes in physicochemical parameters and sea level rise, thereby covering WGI issues only (except 18.3.4.). This is fine if this sets the stage for a treatmant of impacts on biological and human systems but the title should reflect this. What about "Detection and Attribution of Observed Climate Changes in Natural Systems" Alternatively, 18.3.4. is a nice model how to change 18.3.1. to 3. if needed. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
494	18	18	23	18	23	Temperatures don't warm, they increase, replace 'warmed' with 'increased', and quantify. (Burt, Peter, University of Greenwich)
495	18	18	24	18	24	18.3.3. WG1 Ch3, p3 L 4 reads „high confidence" for ocean warming. Where does „very high confidence" come from? This chapter is about impact, not the physical change. Ch6 reads in 6.6 p51 L4 „very high confidence" for Temperature effects. This tells us that increasing temperature will have an effect on specimens/species (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
496	18	18	25	18	25	Is this statement about temperature extremes about water temperature in coastal regions, or air temperature? (Zwiers, Francis, Pacific Climate Impacts Consortium)
497	18	18	29	18	29	18.3.3. Tab 5-1 cited should be Tab 5-2 now (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
498	18	18	31	18	31	18.3.3. IPCC guidance note from 2010 defines in ascending order of probability in percent „likely", „very likely", „virtually certain", but not „extremely likely" (WGI AR5 Chapter 10.4.3 p 34 L 42-46 reads „extremely certain". Is this the same as „extremely likely"?) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
499	18	18	31	18	54	These two paragraphs are somewhat overlapping and could be shortened/combined. (Mastrandrea, Michael, IPCC WGII TSU)
500	18	18	32	18	34	Isostatic rebound (which continues after the last glaciation) is an important confounder in some places as well - and depending upon location, can contribute to or offset relative sea level rise. (Zwiers, Francis, Pacific Climate Impacts Consortium)
501	18	18	32	18	40	Isn't it also very relevant that many of the expected impacts of sea-level rise are by worsening rare catastrophic events, for which statistical sampling is inevitably problematic? (Ingram, William, Met Office)
502	18	18	37	18	40	18.3.3. not sure whether teleconnection issues have been considered in this treatment. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
503	18	18	45	18	46	This statement would appear to at least partially contradict the statement on lines 34 and 35 of this page "Thus far, it has not been possible to isolate an anthropogenic climate signal in local sea level changes from the contributions of these confounding factors". (Zwiers, Francis, Pacific Climate Impacts Consortium)
504	18	18	49	18	49	Bongaerts et al (2010) is not the correct reference for this statement about mangroves respodning to warming and OA. (Lough, Janice, Australian Institute of Marine Science)
505	18	18	53	18	54	18.3.3.1. The treatment of polar regions then deserves more room. What about the confidence levels for those? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
506	18	19	8	0	9	Coastal aquifers are crucial for Small Island environments but also in any coastal environments that depends of the groundwaters because of their dry climate. (Velasco López, 2013) (Gómez Cantero, Jonathan, Universidad de Alicante)
507	18	19	8	19	8	I don't know why 'Small Island' is capitalised (elsehwere, eg, page 38, line 45, it is given as 'small island(s))'. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
508	18	19	13	19	14	I think the wording of this statement could be a bit more subtly nuanced. Perhaps replace "Attribution to climate change, in particular incremental sea level rise, is not supported …" with "Attribution of a contribution from climate change to coastal aquifer degradation, particularly from coastal sea level rise, is not currently supported ...". This makes it clearer what is being attributed, and leaves open the possibility that further research might alter this assessment at some point. (Zwiers, Francis, Pacific Climate Impacts Consortium)
509	18	19	23	19	23	18.3.3.2. see comment above, confidence said to be very high in Executive summary (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
510	18	19	23	19	24	Over what time frame have such impacts been detected? (Mach, Katharine, IPCC WGII TSU)
511	18	19	24	19	24	18.3.3.2. Another way to say this is as in Ch5 where p 20 L 4 reads: „... climate-related drivers are the primary cause of mass coral bleaching and mortality (very high confidence)...“ So the first statement would be on climate as before and then your could disentable and say it is mostly temperature until now. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
512	18	19	28	19	28	It should also be acknowledged that hypoxia is a natural phenomenon within the oceans. (Mach, Katharine, IPCC WGII TSU)
513	18	19	32	19	32	18.3.3.2. Fig S1 in Diaz and Rosenberg 2008 does not show doubling from 1990 to 2000.... (they write „doubled since the 1960s“, but the figure shows different results?) Maybe write something like: increased in number from below 50 to over 400 since 1960? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
514	18	19	34	19	50	in ch 5 p 15 to 16, all these paragraphs are on „rocky shores“. Each paragraph should mention rocky shore to make this clear (e.g. rocky shore intertidal...). In fact, this part is actually the same as ch5 5.4.2.2. , although the wording is a bit different. Maybe refer to chapter 5 and provide a brief summary here? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
515	18	19	39	19	40	What is the role of human-introduced invasives, beyond climate-induced shifts? (Mach, Katharine, IPCC WGII TSU)
516	18	19	42	19	42	Insert "the" before "overriding". Also, insert "the" before "timing". (Zwiers, Francis, Pacific Climate Impacts Consortium)
517	18	19	44	19	45	This last sentence seems disconnected from the rest of the paragraph - it's not clear to me (as a non-expert) how I should use this information. (Zwiers, Francis, Pacific Climate Impacts Consortium)
518	18	19	47	19	47	"Changes in musselbeds in response to higher temperatures induced by climate change" A confidence level is needed for the link between temperatures and the mussel bed changes. As to the climate change link to temperatures, the reader should be reminded that the climate change referred to here can include contributions from natural variability (e.g., internal climate variations). (UNITED STATES OF AMERICA)
519	18	19	47	19	50	It would be helpful to specify the relevant time frames for these impacts. (Mach, Katharine, IPCC WGII TSU)
520	18	19	48	19	48	Change 'West coasts' to 'west coast'. (Burt, Peter, University of Greenwich)
521	18	20	4	20	38	As appropriate, the relevant time frames for these impacts should be specified. (Mach, Katharine, IPCC WGII TSU)
522	18	20	6	20	6	Confidence level needed for temperature/sea grass link (UNITED STATES OF AMERICA)
523	18	20	11	20	11	Change 'North' to 'north'. (Burt, Peter, University of Greenwich)
524	18	20	11	20	11	Confidence level needed for kelp population-ocean warming link (UNITED STATES OF AMERICA)
525	18	20	19	20	19	ch 5 p 30 L 31 reads "very high confidence"for global decline salt marshes and mangroves. Maybe include this here? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
526	18	20	35	20	35	I don't know why 'Small Island' is capitalsied (elsewhere it is given as 'small island(s)'). (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
527	18	20	36	20	36	"Both climate variability and change impact fishermen livelihoods" - To be consistent with the definition of climate change used in the chapter, you could say, "Both short term climate variations (e.g., El Nino) and climate change (due to anthropogenic or natural factors) impact fishermen livelihoods." (UNITED STATES OF AMERICA)
528	18	20	41	20	41	Insert space after 'see'. (Burt, Peter, University of Greenwich)
529	18	20	46	20	46	Box 18.3. The statements in this box or the box overall needs a reference to the underlying chapters 5, 6, 30. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
530	18	21	2	21	2	Use of 'ibid' confusing, as there are two previous references cited. (Burt, Peter, University of Greenwich)
531	18	21	3	21	3	Is this number (16%) known to wthin 1% accuracy? (That is the level of accuracy that is implied by reporting 16% - i.e., not 15%, or 17%, but 16%). If the state of knowledge is not judged to support that level of precision, would it be more appropriate to say that there was a loss of 1/6th? (which would imply that you know this number to within about +/-8% (+/- 1/12th) rather than +/-0.5%). Note that I think there are many opportunities in the chapter where the authors can ask themselves these kinds of questions (and thus perform subtle, but very useful, forms of assessment). (Zwiers, Francis, Pacific Climate Impacts Consortium)
532	18	21	6	21	7	“seawater temperature”. But “small” and “> 1°C” seem to conflict. Is the sentence trying to say “increases of as little as 1°C”? Further, I do not understand “above the summer maxima”; does this mean “above mean summer maxima”? Italicize “very high confidence”. (Cogley, J. Graham, Trent University)
533	18	21	6	21	7	This description of temperature exceeded could be further clarified. Also, "very high confidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
534	18	21	9	21	9	Box 18.3. can you present a level of confidence? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
535	18	21	9	21	9	What does “Symbiodinium” mean? (Cogley, J. Graham, Trent University)
536	18	21	9	21	9	In place of "broad agreement" it would be preferable to specify a summary term for agreement. (Mach, Katharine, IPCC WGII TSU)
537	18	21	15	21	15	There seems to be a grammatical problem - maybe something is missing? (Zwiers, Francis, Pacific Climate Impacts Consortium)
538	18	21	15	21	16	This sentence is garbled. Should it be “… have evolved substantially greater thermal tolerance …, nor can they be expected to do so”? (Cogley, J. Graham, Trent University)
539	18	21	15	21	16	This sentence is not easy to understand. Please clatrify. (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
540	18	21	16	0	0	This statement strikes me as too strong; cf assessment in chapters 6, 25, 30 amongst others. We have little reason to hold high hopes about adaptation occurring, but I don't think we can make a positive statement that adaptation cannot be expected at all. Rephrase. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
541	18	21	27	21	30	The authors are correlating the mass corals bleaching to elevated temperature in the sections above the statement in question. In this statement, authors conclude that mass coral bleaching is attributed to the anthropogenic effect of climate change, by implicitly assuming that the rise in temperature of the ocean is largely caused by anthropogenic influences on the climate. Strictly seen they should also provide some references substantiating this assumption. Please add some citation. (NETHERLANDS)
542	18	21	29	0	30	this seems a very confident attribution to anthropogenic climate change given that we don’t have attribution of ssts to anthropogenic factors at the spatial scale of coral regions - lthough its probably a large part of the tropics but it still seems very indirect for such a strong assessment. It also would be good to link to the WG1 assessment of SST changes in relevnt regions (Hegerl, Gabi, University of Edinburgh)
543	18	21	35	21	35	Suggestions as the above mentioned general comments. (CAI, RONGSHUO, Third Institute of Oceanography)

#	Ch	From Page	From Line	To Page	To Line	Comment
544	18	21	37	21	38	This statement should be supported with a confidence statement. (AUSTRALIA)
545	18	21	37	21	38	What about a reference about this statement? (Marengo, Jose, CCST INPE)
546	18	21	37	21	38	No reference cited for the statement. Please do so. To connect to the statement in line no. 27 - 30, it would moreover be interesting if the authors could also provide information (e.g. an adequate references) on how anthropogenic warming effects the risk of exceeding threshold (mentioned at line no. 6 on page no. 21) of 1 degree for the summer maximum sea temperature that would effect corals. A rise in temperature of 0.1 degree per decade (as mentioned in line no. 37), would result in a 0.5 degree rise (of the average termperature) after 5 decades. The question now is what can be stated on the summer maximum sea temperature trend under these conditions. (NETHERLANDS)
547	18	21	37	21	38	Need a traceable account of where these numbers come from - perhaps a cross-link back to the WG1 oceans chapter? (Zwiers, Francis, Pacific Climate Impacts Consortium)
548	18	21	37	21	38	Please provide references or cross-references to WGI to support these statements. (Mastrandrea, Michael, IPCC WGII TSU)
549	18	21	38	21	38	18.3.4. include reference to WGI ch 3 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
550	18	21	38	21	38	Insert space between number and unit. (Burt, Peter, University of Greenwich)
551	18	21	40	21	40	"seawater" to be written as "sea water" (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
552	18	21	41	21	41	18.3.4. This is not explicitly mentioned in the CC Box OA. The box rather contains projections, impacts, Risks, and Mitigation. The decrease by 0.1 pH units and greatest reduction at high latitudes is inWGI and in WGII ch6 p7 L 31-35. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
553	18	21	41	21	41	It could be helpful to also provide specific cross-reference to the relevant chapter sections in the working group 1 report. (Mach, Katharine, IPCC WGII TSU)
554	18	21	43	21	45	18.3.4.can you present confidence levels here? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
555	18	21	44	21	44	Delete comma after 'distribution'. (Burt, Peter, University of Greenwich)
556	18	21	49	21	51	Here you could say just "attribution" and leave out "detection". Under the definition of climate change and detection being used in the chapter, the PDO and AMO would appear to qualify as "climate changes"especially when relatively short records are being analyzed. A clear statement of how the AMO and similar low-frequency variations are viewed (included? Excluded?) with regard to climate change in the chapter is needed. (UNITED STATES OF AMERICA)
557	18	21	49	21	52	ENSO operates on inter-annual time scales whereas the PDO and AMO are interdecadal time scales; i.e. not just "long-term variability". (Lough, Janice, Australian Institute of Marine Science)
558	18	21	50	21	51	"El Nino-Southern Oscillation" which belongs to short-term variability should be removed, because it is one of inter-annual natural variablities. (CAI, RONGSHUO, Third Institute of Oceanography)
559	18	21	51	21	53	"fragmentary nature of ocean observations" - presumably of marine organisms and ecosystems? (Lough, Janice, Australian Institute of Marine Science)
560	18	21	52	21	52	Delete comma after 'alteration'. (Burt, Peter, University of Greenwich)
561	18	22	4	22	13	It would be helpful to specify the general time frames for these statements. (Mach, Katharine, IPCC WGII TSU)
562	18	22	5	22	5	By "controversial" do you mean this rather than "inconsistent" or "both increasing and decreasing"? Please clarify. (Jones, Richard, Met Office Hadley Centre)
563	18	22	9	22	9	Is this statement referring to net primary production in the ocean? If so, it would be helpful to clarify this. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
564	18	22	9	22	10	We assume that detection here leaves open the possibility that the changes have large (perhaps even dominant) contributions from natural variability of ocean temperatures on multidecadal time scales. The reader should be reminded of this. (UNITED STATES OF AMERICA)
565	18	22	12	22	12	Change 'invertebrate' to 'invertebrates'. (Burt, Peter, University of Greenwich)
566	18	22	14	22	14	18.3.4.1. suggested to add the word presently as the future my show otherwise: In many regions, temperature presently exerts the strongest influence... (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
567	18	22	14	22	14	Small 't' for 'Temperatures' (Burt, Peter, University of Greenwich)
568	18	22	23	22	28	Relevant sections of chapters 6 and 30 should be cross-referenced, and additionally, relevant time frames for these statements should be indicated. (Mach, Katharine, IPCC WGII TSU)
569	18	22	26	22	26	18.3.4.1. ch6 p 158 reads "high confidence" in Figure 6-16 for attribution. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
570	18	22	26	22	26	We assume the warming that the changes are attributed to could in turn have large (perhaps even dominant) contributions from natural variability of ocean temperatures on multidecadal time scales. The reader should be reminded of this. (UNITED STATES OF AMERICA)
571	18	22	26	22	28	18.3.4.1. maybe cite 6.3.3 here? If you wish to present confidence levels, some are given in ch6 p 34 L 5-10 for different issues. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
572	18	22	40	22	40	Replace 'Chapter' with 'Section'. (Burt, Peter, University of Greenwich)
573	18	22	42	22	42	"Regional climate variation and long-term global trends" is vague/unclear. We suggest rewording to something like "relative contributions of internal or natural climate variability vs. long-term changes due to anthropogenic forcing".(UNITED STATES OF AMERICA)
574	18	22	44	22	44	I think it would be good to replace "significant" with a synonym such as "substantial", unless the intent is to refer to statistical significance, in which case, it would be good to be specific and say "statistically significant". The word significant is used so heavily in statistical contexts that I worry that readers may confound "statistical significance" with other interpretations. (Zwiers, Francis, Pacific Climate Impacts Consortium)
575	18	22	48	22	51	Does Chapter 18 have a view? The task is to provide an assessement, so it would be helpful if the chapter could do more than report from the literature. (Zwiers, Francis, Pacific Climate Impacts Consortium)
576	18	22	51	22	51	18.3.4.1. maybe add reference to 6.3 here. 6.3 has a broad literature base and goes into detail for different climate-related factors. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
577	18	22	51	22	51	"climate change (including natural and internal variations)"(UNITED STATES OF AMERICA)
578	18	23	1	23	3	18.3.4.1. is it possible to merge this paragraph with the previous paragraphs? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
579	18	23	7	23	7	Replace 'Chapter' with 'Section'. (Burt, Peter, University of Greenwich)
580	18	23	9	23	9	"Regional climate variation and long-term global trends" is vague/unclear. We suggest rewording to something like "relative contributions of internal or natural climate variability vs. long-term changes due to anthropogenic forcing".(UNITED STATES OF AMERICA)
581	18	23	12	24	11	Suggestions as the above mentioned general comments. (CAI, RONGSHUO, Third Institute of Oceanography)
582	18	23	14	23	14	This statement, 'while climate change is evident across the Ocean', is inconsistent with the statement on pg 3, and in the SPM…'in most oceans'. Are the effects of climate change evident across all oceans or most oceans? (AUSTRALIA)
583	18	23	15	23	15	It would be preferable to specify the specific relevant sections of chapter 3 in the working group 1 contribution. (Mach, Katharine, IPCC WGII TSU)
584	18	23	18	23	18	18.3.4.2. add ocean basins (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

#	Ch	From Page	From Line	To Page	To Line	Comment
585	18	23	19	23	19	Where are the EBUEs? (Burt, Peter, University of Greenwich)
586	18	23	20	23	20	18.3.4.2. abbreviation EBUE not needed here because is currently not used anywhere else in ch18 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
587	18	23	23	23	23	18.3.4.2. Box 30.8.2 does not seem to exist. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
588	18	23	25	23	25	"attributed to anthropogenic emissions" ? (UNITED STATES OF AMERICA)
589	18	23	27	23	27	18.3.4.2. once again this seems only related to physicochemical issues but should include biological and human systems. Probably this statement and table 18-3 should go across chapter 5,6, and 30 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
590	18	23	28	23	28	Change 'Deep Sea' to 'deep sea'. (Burt, Peter, University of Greenwich)
591	18	23	33	23	33	Unclear: is the attribution to anthropogenic emissions (UNITED STATES OF AMERICA)
592	18	23	35	23	35	What kind of "bloom systems"? Phytoplankton? (Zwiers, Francis, Pacific Climate Impacts Consortium)
593	18	23	35	23	39	The first two sentences read together suggest that the Bering Sea shows strong warming and associated effects, which is not the case (Overland et al. 2012 Deep-Sea Research II 65-70; Lomas et al. 2012 Deep-Sea Research II 65-70, 126-140; Stabeno et al. 2012 Deep-Sea Research II 65-70, 14-30; Stabeno et al. 2012 Deep-Sea Research II 65-70, 31-45). Apparent poleward changes in latitudinal gradients of Bering Sea epibenthic invertebrate megafauna and fishes is associated with short-term (5-yr) fluctuations in position of cold pool, which is under the influence of spring sea ice distribution (Stevenson and Lauth 2012 Deep-Sea Research II 65-70, 251-259; Stabeno et al. 2012 Deep-Sea Research II 65-70, 14-30). Further, although loss of sea ice necessarily leads to the northward retreat of the cold pool in the northeastern eastern Bering Sea, the converse is also true, and there is no clear trend in loss of sea ice between ~60N ‰ÛÒ 66N (Stabeno et al. 2012 Deep-Sea Research II 65-70, 14-30). There is no northward expansion of productivity apparent in the Bering Sea (see for example Lomas et al. 2012 Deep-Sea Research II 65-70, 126-140, and other references in this special edition of DSR II 65-70). (UNITED STATES OF AMERICA)
594	18	23	37	23	37	"climate variability, climate change" Comment: climate variability is subsumed within climate change under the definition used in this chapte. (UNITED STATES OF AMERICA)
595	18	23	41	23	42	18.3.4.2. ch30 p 32 L18 reads "robust evidence and high agreement" for this. According to guidance notes (Mastrandrea et al 2010) this is "very high confidence" (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
596	18	23	41	23	42	"high confidence" could be placed within parentheses at the end of the sentence to maximize directness of wording. (Mach, Katharine, IPCC WGII TSU)
597	18	23	42	23	42	For clarity, it might be helpful to insert "in marginal seas" after "fisheries yields" so that the sentence containing the assessment can stand alone if quoted by a user of the report . (Zwiers, Francis, Pacific Climate Impacts Consortium)
598	18	23	43	23	44	18.3.4.2. ch30 p 32 L19-20 reads "medium evidence and medium agreement" for this. Policymakers may wish to find this confidence language here? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
599	18	23	46	23	46	Bad English: change 'like' to 'such as' (Burt, Peter, University of Greenwich)
600	18	23	47	23	47	ch30 p31 L12 refers to Semi enclosed seas for the statements on hypoxia, not only to the Baltic and Black Sea? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
601	18	23	48	23	48	18.3.4.2. The respective sections in ch. 30 are formulated as a perspective whereas chapter 18 is about detection and attribution in present day oceans. However, expanding hypoxia is not only the case for the Baltic and Black Seas. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
602	18	23	48	23	48	18.3.4.2. should read „the Red Sea... (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

#	Ch	From Page	From Line	To Page	To Line	Comment
603	18	23	48	23	49	delete "appear to have" - they did experience bleaching see, for example, Status of Coral Reefs of the World 2000, C Wilkinson (ed), Global Coral Reef Monitoring Network, AIMS, Qld, Australia. (Lough, Janice, Australian Institute of Marine Science)
604	18	23	50	23	50	"long-term variability that has, combined with climate change" But long-term variability is part of the definition of climate change being used in the chapter. Please revise. (UNITED STATES OF AMERICA)
605	18	23	50	23	50	Given the level of confidence presented with this statement, it would be best to avoid "highly likely," which somewhat ambiguously sounds like a likelihood term. (Mach, Katharine, IPCC WGII TSU)
606	18	24	1	24	1	Have these mass mortality effects affected systems other than coral reefs? It could be helpful to specify this. (Mach, Katharine, IPCC WGII TSU)
607	18	24	2	24	2	18.3.4.2. the section cited is on the Black Sea. The tropicalisation is mentioned in 30.5.3.1.5. ch 30 p 30 L14 presents "high confidence" for this, maybe include it here as well? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
608	18	24	4	24	4	18.3.4.2. Is it possible to give the confidence level for mass coral bleaching and mortality? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
609	18	24	6	24	6	18.3.4.2. please give a reference for high-quality databases (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
610	18	24	7	24	7	Which types of ecological changes? (Mach, Katharine, IPCC WGII TSU)
611	18	24	8	24	8	One would assume that the PDO would be part of the definition of climate change used in this chapter. Where is the defining line? If a record is fairly short, a trend could be detected that is just due a fluctuation due to the PDO, but is not that the point of including internal climate variability in the definition of climate change:? it gives a lower threshold to meet for climate change detection. (UNITED STATES OF AMERICA)
612	18	24	17	24	23	It would be preferable to provide more citations for this paragraph. (Mach, Katharine, IPCC WGII TSU)
613	18	24	19	24	19	Insert "is" before "ocean mixing". (Zwiers, Francis, Pacific Climate Impacts Consortium)
614	18	24	21	24	22	Box 18-4: do you mean time series? please clarify. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
615	18	24	29	24	30	Also cite AR5 WG1 Chapter 2, which assess surface temperature changes (land and ocean). (Zwiers, Francis, Pacific Climate Impacts Consortium)
616	18	24	34	24	35	Presumably this is strongly constrained by light availability … ? (Zwiers, Francis, Pacific Climate Impacts Consortium)
617	18	24	40	24	40	"other" not needed here (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
618	18	24	43	24	43	what are confounding effects? could you give a reference here? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
619	18	24	44	24	44	could you give a reference here? should read dependent (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

#	Ch	From Page	From Line	To Page	To Line	Comment
620	18	24	50	34	26	Howe and Cochrane (1993) provide a useful framework for classifying the economic effects of natural hazards, one that is also relevant to the range of effects associated with climate change. Other typologies of economic effects of disasters might also be useful in organizing the content on economic losses and ensuring its completeness, including those by Lindell and Prater 2003, Rose 2004, and Pelling 2002. Howe, Charles W., and Harold C. Cochrane. "Guidelines for the uniform definition, identification, and measurement of economic damages from natural hazard events: With comments on historical assets, human capital, and natural capital." (1993). Lindell, Michael K., and Carla S. Prater. "Assessing community impacts of natural disasters." Natural Hazards Review 4.4: 176-185. 2003. Rose, Adam. "Economic principles, issues, and research priorities in hazard loss estimation." Modeling Spatial and Economic Impacts of Disasters: 13-36. 2004. Pelling, Mark, Alpaslan ìÐzerdem, and Sultan Barakat. "The macro-economic impact of disasters." Progress in Development Studies 2.4: 283-305. 2002. (UNITED STATES OF AMERICA)
621	18	24	52	25	1	Is that climate is playing a minor role or is because of sparse literature/evidence or because it is difficult to evaluate the contribution of confunding factors. Changes detected in the human systems have been increasing at an unprecedented pace and therefore one should look for ways by which this incremental change can be measured. (Opondo, Maggie, University of Nairobi, Kenya)
622	18	24	54	25	2	The "it is therefore…" sentence is overly restrictive. In addition to these reasons, you might want to add the absence of adequate monitoring networks. Some of these things probably could be detected and attributed, in spite of the dynamic nature of the systems and the high number of confounding factors, if we had better monitoring systems. (Levy, Marc, Columbia University)
623	18	25	3	25	3	Some readers may be a bit confused by this because they will understand "climate sensitivity" to be the sensitivity of the climate to for example, CO2 doubling. In particular, the "equilibrium climate sensitivity" (the eventual warming that would occur if CO2 were doubled and then held constant) is a standard metric of the potential for warming that is extensively used (and abused) in the policy community. Climate sensitivity here refers not to the sensitivity of the climate, but rather, to the sensitivity of a sector to climate change. I don't have a really good suggestion, but it seems to me that "sector sensitivity" [to climate change] would provide a clearer description of what is being discussed. Would it be possible to change the term that is used so that it reflects the thing that is sensitive (e.g., the sector) rather than the agent that produces the sensitivity (climate change in this case). (Zwiers, Francis, Pacific Climate Impacts Consortium)
624	18	25	6	25	7	Given the findings across chapters, how rigorous is this statement? (Mach, Katharine, IPCC WGII TSU)
625	18	25	11	25	11	Capital 'C' required for 'chapters' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
626	18	25	18	25	20	It would be preferable to present calibrated uncertainty language for these statements. (Mach, Katharine, IPCC WGII TSU)
627	18	25	21	25	26	Indeed this supports the comment above (p. 24-25 Ln 52-1), that the difficulty is in measurement and not necessarily climate playing a minor role. (Opondo, Maggie, University of Nairobi, Kenya)
628	18	25	29	25	29	'et al.' should be in italics. (Burt, Peter, University of Greenwich)
629	18	25	30	25	30	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
630	18	25	31	25	31	Replace 'find' with 'found'. (Burt, Peter, University of Greenwich)
631	18	25	35	0	0	Section 18.4.1.1 needs to cross reference chapter 7. Chapter 7 has extended discussion on attribution of climate change impacts on agricultural crops (Yao, Xiangjun, Food and Agriculture Organization of the United Nations (FAO))

#	Ch	From Page	From Line	To Page	To Line	Comment
632	18	25	37	25	54	Some new results should be cited as ' The wheat phenology at more than 100 national agro-meteorological experiment stations across China spanning the years 1981–2007 was examined (Tao et al., 2012; Xiao et al., 2013). Heading dates and maturity dates advanced significantly at 40% of the investigated stations; Lengths of growing period (from sowing to maturity) and vegetative growing period (from sowing to heading) were significantly reduced at about 30% of the investigated stations, especially for spring wheat in northwestern China, despite thermal accumulation during the periods increased. In contrast, although significantly and negatively related to mean temperature, lengths of reproductive growing period (from heading to maturity) increased at 60% of the investigated stations, owing to increase in crop cultivars thermal requirements or/and decrease in mean temperature. '1)Tao F., Zhang S, Zhang Z. 2012. Spatiotemporal changes of wheat phenology in China under the effects of temperature, day length and cultivar thermal characteristics. European Journal of Agronomy, 43, 201-212.2)Xiao Dengpan, Tao F., Liu Yujie, Shi Wenjiao, et al., 2013. Observed changes in winter wheat phenology in the North China Plain for 1981-2009. International Journal of Biometeorology.57, 275-285. (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
633	18	25	40	25	40	'via' should be in italics. (Burt, Peter, University of Greenwich)
634	18	25	43	25	53	It could be helpful for the reader to clarify further how production and yields are distinct given the differing findings across these paragraphs. (Mach, Katharine, IPCC WGII TSU)
635	18	25	43	26	5	It would be helpful if greater detail tracing back to the evidence and assessments in chapter 7 could be provided. (Zwiers, Francis, Pacific Climate Impacts Consortium)
636	18	25	44	25	44	Replace 'Chapter' with 'Section'. (Burt, Peter, University of Greenwich)
637	18	25	44	25	50	The chapter team should consider presenting the levels of confidence parenthetically at the end of the respective sentences to maximize directness of wording. (Mach, Katharine, IPCC WGII TSU)
638	18	25	48	25	50	Which regions are in mind here? As mentioned in the context of the ES, Table 18-9 talks about positive yield changes in the UK, but associated with low confidence. (Mastrandrea, Michael, IPCC WGII TSU)
639	18	25	49	25	49	Is it possible to specify further which cold regions are meant? (Mach, Katharine, IPCC WGII TSU)
640	18	25	50	34	26	Many of the economic effects of climate change are impossible to discern in macroeconomic data, like those associated with the reallocation of resources to new uses (e.g., by governments reallocating capital improvement funds to cover increased maintenance costs and households whose time reallocated from leisure, cleaning, food preparation to disaster response and preparation). Benson, Charlotte, and Edward J. Clay. ‰ÛÏUnderstanding the Economic and Financial Impacts of Natural Disasters.‰ÛÏ Disaster Risk Management Series No.4. The World Bank, Washington DC. 2004. Howe, Charles W., and Harold C. Cochrane. "Guidelines for the uniform definition, identification, and measurement of economic damages from natural hazard events: With comments on historical assets, human capital, and natural capital." (1993). (UNITED STATES OF AMERICA)
641	18	25	52	25	54	Some new results should be cited as ' For China, the planting area-weighted average showed that climate trends from 1980−2008 reduced wheat, maize and soybean yields by 1.27, 1.73 and 0.41%, respectively, while increasing rice yields by 0.56%. As a result, climate trends as a whole reduced wheat and maize production by 3.60E5 t and 1.53 E6 t, respectively, and increased rice and soybean production by 7.44 E4 t and 4.16 E3t, respectively (Tao et al., 2008; 2012). '1)Tao, F., Zhang, Z., Zhang, S., Zhu, Z., & Shi, W. 2012. Response of crop yields to climate trends since 1980 in China. Climate Research, 54, 233-247.2)Tao, F., M. Yokozawa, J. Liu, Z. Zhang. 2008. Climate-crop yield relationships at province scale in China and the impacts of recent climate trend. Climate Research, 38, 83–94. (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
642	18	26	9	26	9	Suggest inserting "Global scale" ahead of "Changes in the patterns of rainfall …" since the supporting paper considered only changes in extremes at the global scale. (Zwiers, Francis, Pacific Climate Impacts Consortium)

#	Ch	From Page	From Line	To Page	To Line	Comment
643	18	26	9	26	10	This is a highly augmented question, and in my knowledge, most of the researchers do not agree with Min et al. (2011). The observed changes in the patterns of precipitation and intense precipitation events on globe and the continents in the past a hundred years are dominantly induced by the inner natural variability on decadal to multi-decadal time scales. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
644	18	26	11	26	11	Zwiers et al., 2011, looks at cold temperature extremes (annual minima of daily minimum temperature and daily maximum temperature), but it doesn't look at frost events per se. You might want to cite Donat et al, 2013, JGR, doi:10.1002/2012JD018606, which is an update of the Alexander et al., 2006 paper. (Zwiers, Francis, Pacific Climate Impacts Consortium)
645	18	26	12	26	12	Change 'nighttime' to 'night time'. (Burt, Peter, University of Greenwich)
646	18	26	16	26	16	You might also want to cite Chritidis et al, 2011, JCLIM, doi:10.1175/2011JCLI4150.1 (Zwiers, Francis, Pacific Climate Impacts Consortium)
647	18	26	18	26	19	Is virtually certain IPCC language? (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
648	18	26	19	0	0	spelling "concentrations" (WOODS, Paul, World Vision)
649	18	26	20	0	0	spelling "effects" (WOODS, Paul, World Vision)
650	18	26	23	26	24	"high confidence" could be placed within parentheses at the end of the sentence to maximize the directness of wording. (Mach, Katharine, IPCC WGII TSU)
651	18	26	23	26	27	In this discussion, I suggest inserting "tropospheric" before "ozone" or "O_3", so that it is clear that this is ozone change in the lower part of the atmosphere. Is there any literature on the impacts on crops of stratospheric ozone depletion via changes in downwelling UV radiation? (Zwiers, Francis, Pacific Climate Impacts Consortium)
652	18	26	30	26	31	I think it would be important to included pointers to a traceable account for these statements. I would be a bit sceptical of statements that variability has changed since, in general, variability change is substantially more difficult to detect than change in mean conditions. This would be further exaserbated by the spatial extent of the question (localized, urban scale rather than regional, subcontinental or continental scale). (Zwiers, Francis, Pacific Climate Impacts Consortium)
653	18	26	30	27	2	18.4.1.2. The writing should be toned down a bit (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
654	18	26	32	0	0	The climate impacts on fisheries however do not sufficiently deal with ecosystem level impacts and feedback loops and focus on species of single fishery levels. Worth highlighting the need for a broader view? (Bunce, Matthew, Institute of Marine Engineering, Science and Technology)
655	18	26	33	26	36	Make sure that these statements (e.g., increased probability of flooding, drought, etc) are consistent with assessments elsewhere in the chapter. The evidence is not all black and white. (Zwiers, Francis, Pacific Climate Impacts Consortium)
656	18	26	34	26	36	This statement should be coordinated with chapter 6 as well. Should the role of other drivers be acknowledged? (Mach, Katharine, IPCC WGII TSU)
657	18	26	36	26	36	18.4.1.2. you may also cite chapter 5.4.3.3 here (ch5 p 27) as well as chapter 7 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
658	18	26	38	25	39	you may also cite here 6.3 (ch6 p 28): a bit more detailed or 6.6.3 (ch6 p 52): chapter conclusions (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
659	18	26	38	26	39	There are more recent studies than Perry 2005 that should be cited such as: William W. L. Cheung, Reg Watson, Daniel Pauly 16 May 2013), Signature of ocean warming in global fisheries catch Nature, Vol. 497, No. 7449. 365-368, doi:10.1038/nature12156 (Webb, Robert, NOAA OAR ESRL)

#	Ch	From Page	From Line	To Page	To Line	Comment
660	18	26	38	26	44	On one hand authors said that there is high level of confidence in detection and attribution and in line no. 42 authors said that the ability to attribute changes in fisheries to climate change is confounded by host of other factors. This seems to indicate a contradiction. Please reformulate or spend some attention to this (NETHERLANDS)
661	18	26	40	26	41	Ocean acidification is out of context here. As far as I know OA does not affect fisheries directly, and if it does it has to be stated how this happens. (Hovelsrud, Grete, Center for International Climate and Environmental Research - Oslo)
662	18	26	42	26	44	this is an important statement, and should not be hidden in the middle of a section. Chapter 6.?.?. discusses this in detail. May be move it to the end of 18.4.1.2? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
663	18	26	43	26	43	Delete comma after 'pollution' (Burt, Peter, University of Greenwich)
664	18	26	43	26	43	One would assume that "decadal climate variability" would be part of the definition of climate change used in this chapter. Where is the defining line? If a record is fairly short, a trend could be detected that is just due a fluctuation due to decadal variability. (UNITED STATES OF AMERICA)
665	18	26	48	26	49	This does not read like a sentence suitable in a chapter strictly on DaA as it summarizes both the present and future perspectives. Above it reads, that attribution of detected changes to climate change is confounded???? it seems to be possible for coastal fisheries. Please clarify. (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
666	18	26	49	26	49	The use of "strong traceable account" is not fully clear here--a strong basis for attributing the impacts? (Mach, Katharine, IPCC WGII TSU)
667	18	26	52	26	52	same comment (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
668	18	27	1	27	1	important for what? foodweb, economics? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
669	18	27	2	27	2	maybe include 6.6.2 (ch6 p 14) here. This section deals with the thermal biology of species (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
670	18	27	5	0	0	Section 18.4.1.3 Food Security. This section focuses only on production and price, but food security also depends on things like natural disasters, incomes, migration, and political conflict, all of which have their own set of connections to climate change. Production is already covered in another section. I would consider moving the price discussion to a the earlier production section and just dropping this food security section. If you want a stand-alone food security section it needs to touch on all the relevant drivers of food security that have a plausible connection to climate change. (Levy, Marc, Columbia University)
671	18	27	5	0	0	There are a series of papers by R. Lal that could be interesting to cite here: Lal R., Follett F., Stewart B.A., Kimble J.M. (2007) Soil carbon sequestration to mitigate climate change and advance food security. Soil Science 172:943-956. DOI: 10.1097/ss.0b013e31815cc498.; Lal R. Managing soils for a warming earth in a food-insecure and energy-starved world. Journal of Plant Nutrition and Soil Science 173:4-15. DOI: 10.1002/jpln.200900290; Lal R. (2009) Soils and food sufficiency. A review. Agronomy for Sustainable Development 29:113-133. DOI: 10.1051/agro:2008044. (Gutknecht, Jessica, Helmholtz Centre for Environmental Research-UFZ)
672	18	27	6	27	13	Overall, I think the message from this paragraph comes across ok (high income countries seem to be resilient in the face of a 1 C change, but low income countries are not). However, it would be useful if you could assign a confidence level to this assessment. A minor comment is that 15-year normals (lines 6-7) would generally be considered short; the WMO standard is to define climate in terms of 30-year normals. Another minor comment is that it is not clear, from the sentence that spans lines 6 and 7, what the circumstances are under which impacts become large; do they become large whent there is a 1 C change in these 15-year means? (Zwiers, Francis, Pacific Climate Impacts Consortium)
673	18	27	9	27	9	'per capita' should be in italics. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
674	18	27	16	0	18	Sentence "Increased demand…": what is the confidence level do the authors assign to this statement? Needs to cross reference Chapter 7 which discusses this topic extensively. (Yao, Xiangjun, Food and Agriculture Organization of the United Nations (FAO))
675	18	27	16	27	16	Perhaps I'm getting to be a bit saturated at this point, but I don't see a detection aspect discussed in this sub-section. Presumably there should be. (Zwiers, Francis, Pacific Climate Impacts Consortium)
676	18	27	19	27	19	Capital 'F' required for 'figure' (Burt, Peter, University of Greenwich)
677	18	27	20	27	20	I think it would be good to replace "significant" with a synonym such as "substantial", unless the intent is to refer to statistical significance, in which case, it would be good to be specific and say "statistically significant". The word significant is used so heavily in statistical contexts that I worry that readers may confound "statistical significance" with other interpretations. (Zwiers, Francis, Pacific Climate Impacts Consortium)
678	18	27	22	27	24	What is the timeframe for this statement? (Mach, Katharine, IPCC WGII TSU)
679	18	27	23	27	23	Consider clarifying: "temperature and precipitation trends (natural or anthropogenic in origin)"(UNITED STATES OF AMERICA)
680	18	27	27	0	0	Section 18.4.2. Cities and Urbanization. Drop the "and urbanization," because it gives the impression that you are looking at how climate change affects the process of urbanization. Either call the section "cities" or "urban areas." (Levy, Marc, Columbia University)
681	18	27	27	27	45	This section could be greatly improved. Actually, urban climate change is overlapped to global and regional climate changes, making big cities the most rapid warming areas of the planet, and probably the most discernible places where increased precipitation and intense precipitation frequency have been caused by local human activities. In recent years, studies of urban climate change including those examining urbanization effect on changes in surface air temperature and precipitation over the regions like mainland China, U.S.A., Europe and Japan, have witnessed a big progress (e.g. Chung U, Choi J, Yun J I. (2004) Urbanization effect on observed change in mean monthly temperature between 1951-1980 and 1971-2000 in Korea. Climate change, 66(1-2): 127-136; Fujibe, F. (2009), Detection of urban warming in recent temperature trends in Japan, Int. J. Climatol., 29, 1811–1822, doi:10.1002/joc.1822; Ren GY. Zhou YQ. Chu ZY, et al. (2008) Urbanization effect on observed surface air temperature trend in North China, J Clim, 21(6): 1333-1348; Zhang AY, Ren GY, Zhou JX, et al. (2010) On the urbanization effect on surface air temperature trends over China. Acta Meteorol Sin 68:957-966 (in Chinese); Zhou L M, Dickinson R E, Tian Y H, et al. (2004) Evidence for a significant urbanization effect on climate in China, Proc. Natl. Acad. Sci. 101(26): 9540-9544; Zhou YQ, Ren GY (2009) The effect of urbanization on maximum, minimum temperature and daily temperature range in North China. Plateau Meteorol 28(5): 1158-1166 (in Chinese); 103. Yang, P., G. Y. Ren, W. Hou and W.D. Liu, 2012, Spatial and diurnal characteristics of summer rainfall over Beijing Municipality based on a high-density AWS dataset, Int. J. Climatol. (2012) Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/joc.3622). (Guoyu Ren) (Ren, Guoyu, National Climate Center)
682	18	27	29	27	29	Suggest deleting "standard" (who determines what is a "standard" design criterion - these are presumably site/plant specific). (Zwiers, Francis, Pacific Climate Impacts Consortium)
683	18	27	30	27	30	"robust evidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
684	18	27	31	27	31	It should be clarified what is meant by "consistent with climate change projections." Is reference to mechanistic understanding more appropriate? (Mach, Katharine, IPCC WGII TSU)
685	18	27	33	27	36	The key findings of working group 1 should be cross-referenced here. (Mach, Katharine, IPCC WGII TSU)
686	18	27	38	27	44	Is it clear that the D+A problem is inherently difficult or just that no studies have been done - it would be good if this were clarified with an assessment of available references. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)

#	Ch	From Page	From Line	To Page	To Line	Comment
687	18	27	38	27	44	Is it clear that the D+A problem is inherently difficult or just that no studies have been done - it would be good if this were clarified with an assessment of available references. (Jones, Richard, Met Office Hadley Centre)
688	18	27	49	0	0	Section 18.4.3.1. Economic Growth. Is it possible to assign a confidence statement to the income effect? This would be a very important finding if its confidence could be characterized. (Levy, Marc, Columbia University)
689	18	27	51	27	51	'per capita' should be in italics. (Burt, Peter, University of Greenwich)
690	18	27	51	27	54	Cross-reference to chapter 10 could be considered. (Mach, Katharine, IPCC WGII TSU)
691	18	27	53	0	0	Complexity is not an excuse for not understanding causality. We understand causality in all kinds of complex systems. You need to say something about the data or the theories not being adequate relative to the complexity. (Levy, Marc, Columbia University)
692	18	28	1	28	1	I think it would be important to included pointers to a traceable account for the statement concerning increased precipitation variability. I would be a bit sceptical of statements that variability has changed since, in general, variability change is substantially more difficult to detect than change in mean conditions. This would be further exaserbated by the spatial extent of the question (localized to winter tourist destinations rather than regional, subcontinental or continental scale). Was the intent was to say something about snowfall rather than precipitation in general? (Zwiers, Francis, Pacific Climate Impacts Consortium)
693	18	28	2	28	3	'per capita' should be in italics. (Burt, Peter, University of Greenwich)
694	18	28	5	28	5	Replace 'degree' with degree symbol, for consistency. (Burt, Peter, University of Greenwich)
695	18	28	5	28	5	An increase in temperature over space or time?? (Mach, Katharine, IPCC WGII TSU)
696	18	28	6	28	6	Insert hyphen between '15' and 'year'. (Burt, Peter, University of Greenwich)
697	18	28	6	28	7	Climate is more than just "averages of weather" but also statistics of variability of the weather. Please rephrase (and reinterpret the results if required) accordingly. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
698	18	28	6	28	7	Climate is more than just "averages of weather" but also statistics of variability of the weather. Please rephrase (and reinterpret the results if required) accordingly. (Jones, Richard, Met Office Hadley Centre)
699	18	28	10	28	10	Suggest Dunne et al. Nature, 2013 as another reference here. (UNITED STATES OF AMERICA)
700	18	28	11	28	11	Replace 'degree' with degree symbol, for consistency. (Burt, Peter, University of Greenwich)
701	18	28	16	28	43	This section should also be rewritten, and it should focus on energy consumption. Many studies in China and other countries were conducted to investigate into the impacts of climate change and variability on national and regional energy consumptions, and found that although the increasing temperature raised the energy consumption in summer, it also led to a decline of energy consumption in winter, and the decrease in winter significantly overpasses the increase in summer in mainland China, U.S.A. and probably other countries in mid-latitude continents. The impacts can be attributed to the anthropogenic climate change. (Guoyu Ren) (Ren, Guoyu, National Climate Center)
702	18	28	18	28	43	The key findings of chapter 10 could potentially be further cross-reference in these paragraphs. (Mach, Katharine, IPCC WGII TSU)
703	18	28	37	28	37	Change 'regions' to 'region'. (Burt, Peter, University of Greenwich)
704	18	28	38	28	38	Delete comma after 'storms'. (Burt, Peter, University of Greenwich)
705	18	28	39	28	34	This para seems to have nothing to do with observed impacts and hence should be deleted. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
706	18	28	46	0	0	Section 18.4.3.3. Further cross-reference to the key findings of chapter 10 should ideally be provided. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
707	18	28	51	28	51	The word "lower" needs to replaced by "low" as the sentence does not show any comparison of two areas. (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
708	18	28	53	28	53	Change '1980's' to '1980s' (it is not possessive). (Burt, Peter, University of Greenwich)
709	18	29	1	29	1	This is physically meaningless, replace 'warm' with 'higher' or 'increased'. (Burt, Peter, University of Greenwich)
710	18	29	3	29	4	The sentence 'Eijgelaar et al. (2010) argue that so-called “last chance tourism” is a strong pull for tourists to visit Antarctica to admire the glaciers while they still can' is not suitable for an IPCC report. Especially, considering that the Antarctic ice sheet will under any conceivable circumstances last for thousands of years. (ICELAND)
711	18	29	5	29	6	The sentence reads 'In contrast, Zeppel (2012) states a low level of concern for coral bleaching by tourists visiting the GBR'. The author of the paper quoted advised that the paper does not mention levels of concern about coral bleaching. It is suggested that this sentence and the reference be deleted. Alternative references for tourism and commercial fishing in the Great Barrier Reef include: Marshall, N., Tobin, R., Marshall, P., Gooch, M., and Hobday, A. (2013) Vulnerability of marine resource users to extreme weather events. Ecosystems DOI 10.1007/s10021-013-9651-6 Gooch, M., Vella, K., Marshall, N., Tobin, R., and Pears, R. (2012) A rapid assessment of the effects of extreme weather on two Great Barrier Reef industries. Australian Planner DOI:10.1080/07293682.2012.727841 Marshall, N.A., Tobin, R.C. (2012). More Than What Meets the Eye: The Social and Economic Impacts of Recent Natural Disasters on Marine Resource Dependent Industries of the Great Barrier Reef Region. Great Barrier Reef Marine Park Authority, Townsville, pp. 1-82. (ISBN 978-1-921682-98-8) Moon, K. and Gooch, M. (unpublished) Rapid Impact Assessment of Great Barrier Reef commercial fishing and tourism sectors affected by floods and cyclones during 2010/2011. Internal Report prepared for the Great Barrier Reef Marine Park Authority. (AUSTRALIA)
712	18	29	20	30	2	Section 18.4.4.1 appears misplaced or should be summarised. Why focus only on the economic impacts of extreme events and not other impacts like fatalities? Perhaps could be summarised by cross referencing to Ch.10 (Opondo, Maggie, University of Nairobi, Kenya)
713	18	29	25	29	25	This should be 'Section' rather than 'chapter'. (Burt, Peter, University of Greenwich)
714	18	29	28	29	29	"high confidence" could be placed within parentheses at the end of the statement. (Mach, Katharine, IPCC WGII TSU)
715	18	29	29	29	29	This should be 'Section' rather than 'chapter'. (Burt, Peter, University of Greenwich)
716	18	29	33	29	35	"high confidence" could be placed within parentheses at the end of the sentence to maximize directness of wording. (Mach, Katharine, IPCC WGII TSU)
717	18	29	33	29	36	How is the contribution from the anthropogenic climate change? Is it a small positive or a negative contribution? (Ren, Guoyu, National Climate Center)
718	18	29	36	29	36	Besides the growing value of assets it would be necessary to consider the increasing number of premiums paid by customers (a major number of insurances). It is well explained in the reference of Barredo et al, 20012, about losses due to floods in Spain, that is already cited in line 44. This work shows the great influence of the value of insured losses considering the premiums paid by customers and the total value of dwellings. Reference: Barredo, J.I., D. Saurí, and M. C. Llasat, 2012. Assessing trends in insured losses from floods in Spain 1971–2008. Nat. Hazards Earth Syst. Sci., 12, 1723–1729, 2012. www.nat-hazards-earth-syst-sci.net/12/1723/2012/ doi:10.5194/nhess-12-1723-2012 (Llasat, Maria-Carmen, University of Barcelona)
719	18	29	36	29	36	This should be 'Section' rather than 'chapter'. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
720	18	29	38	30	2	Re lack of signal in normalised inusred losses and extreme wether events: my understanding is that another potentially confounding factor in detecting such a signal is that as the patterns of extremes are changing, adapation actions (eg better hazard reducton for wildfires, more rigorous building standards in cylone-prone areas etc) may have contributed to teh lack of signal but is very difficult to account for statistically.This is later refered to on p30 line 44 but perhaps the role of adapation needs to be made more strongly here as well. (Hughes, Lesley, Macquarie University)
721	18	29	39	29	54	The statement in lines 53-54 is incompatible with statements in lines 39-48; the statement of 53-54 can better be skipped. Indeed so far no convincing evidence can be shown (based on statistical analysis) that growth in extreme weather related losses can be partly attributed to climate change (next to factors such as growth in wealth). (Perrels, Adriaan, Finnish Meteorological Institute FMI)
722	18	29	46	29	46	About the trend of tornadoes in Europe, you can find, in English language, the paper of Gayà et al (2011), where it si showed that a positive and significative trend in the annual number of tornadoes have been found since 1950, but that could be more related to the reporting improvement by population and proffesional people (plus a major exposure), than to climate change. Reference: Gayà, M., M.C. Llasat and J. Arús: Tornadoes and waterspouts in Catalonia (1950-2009). Nat. Hazards Earth Syst. Sci., 11, 1875–1883, 2011 (Llasat, Maria-Carmen, University of Barcelona)
723	18	29	49	29	49	What is century scale damage and loss of life? (UNITED STATES OF AMERICA)
724	18	29	53	29	53	Change 'are' to 'is' to avoid mismatch of singular and plural. (Burt, Peter, University of Greenwich)
725	18	29	53	30	2	The point being made here is not clear. Does this mean that there is some evidence of a trend consistent with anthropogenic climate change? Such evidence has not been presented in the section. Or is the discussion in the next section meant? Please clarify. (Mastrandrea, Michael, IPCC WGII TSU)
726	18	30	7	30	7	The word "of" needs to be replaced by "on". (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
727	18	30	9	30	11	There is value in understanding the role and contribution of anthropogenic climate change in extreme weather and climate events that is missed in the current form of that sentence. Thus suggest modifying the the sentence to read: "While useful as predictability assessments to advance early warning and risk management on seasonal and shorter climate timescales, assessing the contribution of climate change to a specific event poses particular challenges, both in terms of methodology and communication of results." (Webb, Robert, NOAA OAR ESRL)
728	18	30	12	30	12	Insert 'of' after 'question'. (Burt, Peter, University of Greenwich)
729	18	30	13	30	14	'et al.' should be in italics. (Burt, Peter, University of Greenwich)
730	18	30	21	30	23	"high confidence" could be placed within parentheses at the end of the sentence to maximize directness of wording. (Mach, Katharine, IPCC WGII TSU)
731	18	30	21	30	28	Given that there is not much evidence/literature on Detection and Attribution in human systems is it possible for Ch. 18 to look at the evidence of Detection and Attribution in the physical systems and link this to the human systems? As done in Line 21-28 on page 30? (Opondo, Maggie, University of Nairobi, Kenya)
732	18	30	22	30	22	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
733	18	30	35	30	35	“increasingly vulnerable infrastructure” needs to be clarified. The infrastructure itself is becoming mechanically less vulnerable all the time. The point is that there is more and more of it, including more and more in vulnerable locations. (Cogley, J. Graham, Trent University)
734	18	30	39	30	40	Change to read ""The storm surge hazard is expected to increase with additional contributions to rising local sea level as a result of anthropogenic emissions," (Webb, Robert, NOAA OAR ESRL)

#	Ch	From Page	From Line	To Page	To Line	Comment
735	18	31	8	31	8	Is "climate change" as referred to in this sentence the same as used in the WG2 report now? If not, this needs to be clarified. (UNITED STATES OF AMERICA)
736	18	31	12	31	13	The relevant time frame for these changes could be specified. (Mach, Katharine, IPCC WGII TSU)
737	18	31	12	31	16	Research shows in Korea that temperature rise in spring is highly related to increase in patients who visit hospital with tree pollen allergy. (Source: Impact of meteorological variation on hospital visits of patients with tree pollen allergy. BMC Public Health. 2011 Nov 24;11:890) (REPUBLIC OF KOREA)
738	18	31	28	31	29	Although not peer reviewed - there is increasing evidence of the link between climate and health in this reference: ' World Health Organization (WHO) and World Meteorological Organization (WMO) (2012), Atlas of Health and Climate. WHO Press: Geneva'. Perhaps reference/assessment could be made to it in this section. (Opondo, Maggie, University of Nairobi, Kenya)
739	18	31	30	31	30	Within the parentheses, it would be helpful to specify that all of these lists are examples. (Mach, Katharine, IPCC WGII TSU)
740	18	31	42	31	43	Does this mean there is some evidence regarding the role of observed warming or none? This is not clear from the paragraph, unless the last sentence is meant--this could be clearer, if so. (Mastrandrea, Michael, IPCC WGII TSU)
741	18	31	42	31	49	Research shows in Korea that Scrub typhus carried by mites are highly correlated with high temperature and humidity in summer. (Source: Correlations between climate change-related infectious diseases and meteorological factors in Korea, J of Preventive Medicine and public health 2010;43(5); 436-444) (REPUBLIC OF KOREA)
742	18	31	48	31	49	Is there any literature on Lyme disease in North America related to the expansion of the range of the tick vector? (Zwiers, Francis, Pacific Climate Impacts Consortium)
743	18	32	2	32	4	There are other studies indicating this trend of increasing incidence of malaria in the Kenyan highlands e.g. 'Wandiga, S., et. al., (2010) Vulnerability to epidemic malaria in the highlands of Lake Victoria basin: the role of climate change/variability, hydrology and socio-economic factors, Climatic Change, Volume 99, Issue 3-4,473-497.' (Opondo, Maggie, University of Nairobi, Kenya)
744	18	32	2	32	13	Is there any literature that links the spread of the West Nile Virus to climate change, and if so, should it be assessed here? (Zwiers, Francis, Pacific Climate Impacts Consortium)
745	18	32	16	0	0	Section 18.4.6: It is important that this section cross-references and coordinates with Chapters 12 and 19. In addition, low confidence should not be equated with no confidence. (Mastrandrea, Michael, IPCC WGII TSU)
746	18	32	16	33	16	Section 18.4.6.1. - more cross referencing to Ch. 12 necessary (Opondo, Maggie, University of Nairobi, Kenya)
747	18	32	18	0	0	18.4.6.1 Violent Conflict and Social Disruptions. The flow of the argument from research results based on variability to confidence statements based on climate change needs to be spelled out. The logic is not spelled out so the argument as it is transcribed is incorrect. My own undertanding of the logic is something like this: 1) we know with medium confidence or better that climate stress elevates violent conflict risk; 2) we know with high confidence that some of the observed climate stress is attributable to climate change; 3) therefore there is some basis for believing that some of the observed elevation in conflict risk in the recent past is attributable to climate change, though we cannot say either a) which specific climate stresses are attributabe to climate change, or b) which specific conflicts are attributable to climate change. (Levy, Marc, Columbia University)
748	18	32	18	0	0	Section 18.4.6.1. The chapter team should ensure consistent, harmonized assessment with the key findings of chapter 12 and also Chapter 19 in this section. (Mach, Katharine, IPCC WGII TSU)
749	18	32	18	32	45	Please make sure that your valuation is in line with section 19.4.2.2 - currently, the two texts show deviating valuations. It may be advisable to reference the other sub-chapter and explicitly show differing points of view. (Rock, Joachim, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)
750	18	32	20	32	21	It would be helpful to specify the timeframe for this statement. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
751	18	32	20	32	45	The assessment here seems to be at least somewhat inconsistent with that in Chapter 19 (see 19.4.2.2 and 19.6.1.3.3), where the view seems to be that there is evidence that climatic events have been contributing factors to conflict. (Zwiers, Francis, Pacific Climate Impacts Consortium)
752	18	32	21	32	21	Bad English: change 'like' to 'such as' (Burt, Peter, University of Greenwich)
753	18	32	25	32	26	Where "climate" is mentioned on these lines, is "climate change" meant? (Mach, Katharine, IPCC WGII TSU)
754	18	32	32	32	33	The paragraph is about climate variability and civil conflict, but it ends with sentence about climate change and civil conflict, which is a complete non-sequitor. I don't see anything in the section to support any statement at all about detection of observed climate change impacts in the form of civil conflict. (Levy, Marc, Columbia University)
755	18	32	35	32	38	This is another case where the text summarizes literature on variability and draws inferences about climate change. The implication is that if there is no evidence of something we can speak of there being low confidence about it, but that doesn't make sense. In the absence of any positive research results, the assumption should be zero confidence, not low confidence. (Levy, Marc, Columbia University)
756	18	32	40	32	45	This is another case where the text summarizes literature on variability and draws inferences about climate change. The implication is that if there is no evidence of something we can speak of there being low confidence about it, but that doesn't make sense. In the absence of any positive research results, the assumption should be zero confidence, not low confidence. (Levy, Marc, Columbia University)
757	18	32	48	0	0	18.4.6.2 Migration. The text doesn't say anything about detection and attribution of climate change impacts in the form of migration. I would drop the section and if you want add a sentence elsewhere in the chapter that migration is a phenomenon for which there is no d&a. A link to chapter 12, section 4 would enable people who are curious about the available evidence more broadly to read more. (Levy, Marc, Columbia University)
758	18	32	48	0	0	Section 18.4.6.2. The chapter team should ensure consistent, harmonized assessment with the key findings of chapter 12 throughout this section. (Mach, Katharine, IPCC WGII TSU)
759	18	32	50	32	54	There are an increasing number of studies on pastoral systems showing that migration/mobility as an age old coping mechanism to climate variability and change. For example, 'Little, P.D., McPeak, J., Barrett, C.B., and Kristjanson, P., (2008) Challenging Orthodoxies: Understanding Poverty in Pastoral Areas of East Africa, Development and Change, 39 (4): 587–611' and 'Burke, W.J. and Jayne, T.S. (2010) Spatial disadvantages or spatial poverty traps Household evidence from rural Kenya, Overseas Development Institute (ODI) Working Paper 327 and Chronic Poverty Research Centre (CPRC) Working Paper 167'. (Opondo, Maggie, University of Nairobi, Kenya)
760	18	33	4	33	7	It would be helpful to specify the relevant time frames for these statements. (Mach, Katharine, IPCC WGII TSU)
761	18	33	9	33	9	'per' should be in italics. (Burt, Peter, University of Greenwich)
762	18	33	11	33	11	Define short- and long-distance. (Zwiers, Francis, Pacific Climate Impacts Consortium)
763	18	33	16	0	0	Banerjee et al. (2012) report from an empirical study on labour migration in the flood affected settlements of the Hindu Kush Himalayan region that majority of migrant households perceived economic reasons as the most important determinant of migration for work. Other non-environmental factors included inadequate income, unemployment, and insufficient land for faming or grazing. Many of these non-environmental determinants of labour migration are sensitive to the impacts of rapid or slow water hazards. Also, nearly 80% of the sampled migrant households considered water hazards (viz. flood, flash flood and drought) to have important influence on the decision to migrate. [(Banerjee, Soumyadeep, Jean-Yves Gerlitz and Dominic Kniveton, 2012. A methodology for assessing patterns of labour migration in mountain communities exposed to water hazards. In Faist, Thomas and Jeanette Schade (Eds.) Disentangling Migration and Climate Change, Chapter 4. Heidelberg/London: Springer International. (Forthcoming)] (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))

#	Ch	From Page	From Line	To Page	To Line	Comment
764	18	33	19	0	0	Section 18.4.7. The chapter team should consider substantially further cross-referencing the key findings and relevant sections of chapters 9 and 13. (Mach, Katharine, IPCC WGII TSU)
765	18	33	19	0	0	Section 18.54.7: It is important that this section cross-references and coordinates with Chapters 9 and 13. In addition, given the widespread usage of "climate sensitivity" as shorthand for "equilibrium climate sensitivity" in a specific physical science sense, I would recommend using "sensitivity to climate change" or another alternative to avoid confusion. (Mastrandrea, Michael, IPCC WGII TSU)
766	18	33	19	35	27	Section 18.4.7 - more cross referencing to Ch. 9, 12 & 13 necessary (Opondo, Maggie, University of Nairobi, Kenya)
767	18	33	22	33	22	Some readers may be a bit confused by this because they will understand "climate sensitivity" to be the sensitivity of the climate to for example, CO2 doubling. In particular, the "equilibrium climate sensitivity" (the eventual warming that would occur if CO2 were doubled and then held constant) is a standard metric of the potential for warming that is extensively used (and abused) in the policy community. Climate sensitivity here refers not to the sensitivity of the climate, but rather, to the sensitivity of a sector to climate change. I don't have a really good suggestion, but it seems to me that "sector sensitivity" [to climate change] would provide a clearer description of what is being discussed. Would it be possible to change the term that is used so that it reflects the thing that is sensitive (e.g., the sector) rather than the agent that produces the sensitivity (climate change in this case). (Zwiers, Francis, Pacific Climate Impacts Consortium)
768	18	33	22	33	23	Wording here could be adjusted to ensure that "climate sensitivity" does not sound like "equilibrium climate sensitivity." (Mach, Katharine, IPCC WGII TSU)
769	18	33	44	33	44	Change to '1990s' and '2000s' (the dates are not possessive). (Burt, Peter, University of Greenwich)
770	18	33	48	33	49	Could add Held et al. PNAS (2005) reference here. (UNITED STATES OF AMERICA)
771	18	33	49	33	50	Does this reflect an assessment of the impact of climate change, or an assessment of the metrics that are used to evaluate changes in poverty, or perhaps just the nature of the question? If the metric indicated that most small-holders and subsistence farmers were already empoverished, then the effects of factors that would exaserbate their condition might not result in a discernable change in the metric. (Zwiers, Francis, Pacific Climate Impacts Consortium)
772	18	34	15	34	17	This first sentence, which seems highly-political in nature, should be considered for deletion. Does the IPCC want to imply that it has a position on indigenous rights? Why only discuss the rights of indigenous people and not the rights of others? The paragraph does not lose its impact if the first sentence is deleted and the rest of the paragraph, which focuses on observed impacts, remains. (UNITED STATES OF AMERICA)
773	18	34	15	34	28	Suggest linking in case study from Chapter 20 to give amore regionally rounded analysis, specifically:Ziervogel, G and Opere (eds) 2010. Climate Change Adaptation in Africa Learning Paper. In Integrating Meteorological and Indigenous-Knowledge based seasonal climate forecasts in the Agricultural Sector. International Development Research Center, Ottawa, Canada (Ramos Castillo, Ameyali, United Nations University - Institute of Advanced Studies)
774	18	34	49	34	49	Capital 'C' required for 'century' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
775	18	35	27	35	27	Delete “western”. The perspective in question is the same as that which prevailed for decades in the former Soviet bloc and now prevails in the explosively growing contributions of colleagues in China, India and elsewhere. (Cogley, J. Graham, Trent University)
776	18	35	29	35	29	I found the box on TEK to be very helpful. However, one thing I'm wondering about is whether you would also be willing to hazzard a discussion on the reliability/homogeneity (in space and time) of TEK. Also, a further question would be whether this source of information is being affected by confounders (such as the loss of the oral traditions that presumably have maintained TEK across generations) that are in addition to the myriad of other confounders that might affect the interpretation of climate impacts data? (Zwiers, Francis, Pacific Climate Impacts Consortium)

#	Ch	From Page	From Line	To Page	To Line	Comment
777	18	35	32	0	0	Section 18.5: As mentioned in my general comments, I would recommend a reformulation of section 18.5. While short synopses with detailed summary tables is a good idea, the tables succeed more than the synopses, which are so abbreviated that they read as overgeneralizing without direct citations or cross-references, nor calibrated uncertainty language (all of which do appear in the tables). In a few cases, the information in tables provides a different impression than the section text. Given this, options include adding citation/cross-reference support to sections 18.5.1-8, or condensing the synopses in these sections further to summaries that explicitly link to the table entries (perhaps even as individual paragraphs in the current 18.5.9). The main information in these sections that is not captured in the tables is on changes in climate, which could be retained in close to its current form. (Mastrandrea, Michael, IPCC WGII TSU)
778	18	35	32	39	45	Statements in regional sections are poorly supported. (UNITED STATES OF AMERICA)
779	18	35	34	35	38	Same comment as for P11 (thematic chapters). If I understand correctly, this paragraph shifts much of the burden of literature review and analysis to the regional chapters minus chapter 30. While this is a reasonable and pragmatic approach, it does place quite some reliance on the quality of the assessment in these other chapters, some of which may not include detection/attribution experts on their author teams. How has this been cross-checked? Furthermore, should reviewers understand to look for details on D/A literature in the core chapters or in this chapter? (Carter, Timothy, Finnish Environment Institute)
780	18	35	35	35	35	Capital 'C' required for 'chapters' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
781	18	35	35	35	35	Small 'o' for 'Ocean'. (Burt, Peter, University of Greenwich)
782	18	35	39	35	39	Delete comma after 'managed'. (Burt, Peter, University of Greenwich)
783	18	35	42	0	0	Section 18.5.1. Clearer cross-reference should be made to tables 18-6 through 18-9. (Mach, Katharine, IPCC WGII TSU)
784	18	35	45	35	45	There is a missing "that" (insert before "continue to exist"). (Zwiers, Francis, Pacific Climate Impacts Consortium)
785	18	35	45	35	46	Suggest "apparently low natural temperature variability" since this is presumably based on some estimate, typically from models. Also this discussion seems to imply that the term detection in line 46 means detection relative to natural variability levels, which is different from the default definition used in the chapter. (UNITED STATES OF AMERICA)
786	18	35	46	35	47	I think the authors should avoid the practice of reporting a confidence range (medium to high and low to high in these cases). The interpretation could be that there is high confidence in some aspects of a statement, and only low or medium confidence in others. Alternatively, it could be that the authors think they can different more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document (medium to high being somewhere between medium and high), or that they simply can't differentiate based on the evidence (and just suggest somewhere between low and high). The message is simply that the assessments should be as informative as possible, and should not leave readers guessing about which aspects of the assessment have high confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
787	18	35	50	36	3	References are missing for these statements. (NETHERLANDS)
788	18	36	3	36	5	It is somewhat ambiguous to use "domain" on both of these lines of text. (Mach, Katharine, IPCC WGII TSU)
789	18	36	5	36	8	What results did the research produce, and what is the ultimate assessment by the chapter? (Zwiers, Francis, Pacific Climate Impacts Consortium)
790	18	36	5	36	8	What has resulted from these research focuses? The tables provide such details, which should be cross-referenced/summarized here. (Mastrandrea, Michael, IPCC WGII TSU)
791	18	36	5	36	9	Has there not been also a research focus on African inland rural systems at the expense of more populous coastal and urban areas? (Bunce, Matthew, Institute of Marine Engineering, Science and Technology)

#	Ch	From Page	From Line	To Page	To Line	Comment
792	18	36	11	0	0	Section 18.5.2. Clearer cross-reference should be made to tables 18-6 through 18-9. Additionally, the timeframe relevant to statements in these paragraphs should be clarified, and further provision of relevant citations and also calibrated uncertainty language should be considered. (Mach, Katharine, IPCC WGII TSU)
793	18	36	15	36	15	Small 's' for 'Southern'. (Burt, Peter, University of Greenwich)
794	18	36	17	36	17	"Everywhere" - even in southern Europe? Advise checking this result. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
795	18	36	17	36	17	"Everywhere" - even in southern Europe? Advise checking this result. (Jones, Richard, Met Office Hadley Centre)
796	18	36	20	36	20	This sentence is too narrow in scope. The authors should change: “substantial loss of Alpine glaciers” --> “substantial loss of Alpine, Scandinavian and Icelandic glaciers”. It is easy to justify adding these regions in. Chapter 4 in the upcoming WGI IPCC report documents this evidence in detail. Figure 4.9 in the report shows the retreat of glaciers world wide, including Iceland and Scandinavia. For Scandinavia one can also point to the study by Andreassen et al (2012) who note that since 2000 most Norwegian glaciers “have experienced mass deficit, although years with positive balances still occur as in 2005 and 2007 for many of the maritime glaciers”. For Iceland the extensive retreat of glaciers is also described in the review article by Bjornsson and Palsson (2008) who report that “Since 1985, the once more warmer climate has steadily led to more widespread retreat, and every non-surging outlet glacier in Iceland has been retreating since 1995”. The relevant references are: Andreassen, L. M.;B. Kjøllmoen, A. Rasmussen, K. Melvold, Ø. Nordli, (2012) Langfjordjøkelen, a rapidly shrinking glacier in northern Norway, Journal of Glaciology, vol. 58, issue 209, pp. 581-593 and Bjornsson H. and Palsson F. (2008) Icelandic Glaciers, JÖKULL No. 58, 2008 p. 365 – 383. (ICELAND)
797	18	36	22	36	22	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
798	18	36	23	36	23	Insert comma after 'Mediterranean'. (Burt, Peter, University of Greenwich)
799	18	36	27	36	27	In general, it would be helpful to include assessments of the chapter's confidence in the evidence presented, and cross-links to the places where the evidence is evaluated. (Zwiers, Francis, Pacific Climate Impacts Consortium)
800	18	36	27	36	27	Section 18.5.3. Clearer cross-reference should be made to tables 18-6 through 18-9. Additionally, the timeframe relevant to statements in these paragraphs should be clarified, and further provision of relevant citations and also calibrated uncertainty language should be prioritized. (Mach, Katharine, IPCC WGII TSU)
801	18	36	29	0	0	In the Asia and Australasia summaries, as with the other summaries, it would be interesting to have sentence stating the overall state or history of research regarding observed responses of climate change. In the Aisia summary there is no reference to the confidence level or certainty of the statements. (Gutknecht, Jessica, Helmholtz Centre for Environmental Research-UFZ)
802	18	36	29	36	32	Change "with a more frequent ....., and contracting increasing and drying trends over coastal and inland China" to "with a more frequent ....., and contracting increasing precipitation in the south and drying trends in the north over eastern China". (Ren, Guoyu, National Climate Center)
803	18	36	31	36	31	"More frequent" would imply more than once a year! Please check and reword accordingly. (Jones, Richard, Met Office Hadley Centre)
804	18	36	31	36	32	What aspect of the Indian monsoon occurs more frequently, but more weakly? On the face of it, suggesting that there has been a change in frequency of an annual phenomenon is confusing. Is there an assessment of the confidence in the estimates of trends that are mentioned (e.g, are the observations up to the job, are trends statistically significant relative to internal variability, etc)? (Zwiers, Francis, Pacific Climate Impacts Consortium)
805	18	36	34	39	2	There are very few references in this section. At least references to the relevant regional chapter sections should be included. (Jones, Richard, Met Office Hadley Centre)

#	Ch	From Page	From Line	To Page	To Line	Comment
806	18	36	36	0	0	The cascading effects of rising temperatures and loss of ice and snow in the Himalayan region are affecting, for example, water availability (amounts, seasonality), biodiversity (endemic species, predator–prey relations),ecosystem boundary shifts (tree-line movements, high-elevation ecosystem changes), and global feedbacks (monsoonal shifts, loss of soil carbon). (Jianchu et al,2009). (Jianchu Xu, R. Edward Grumbine, Arun Shrestha, Mats Eriksson, Xuefei Yang, Yun Wang, And Andreas Wilkes, 2009. The Melting Himalayas: Cascading Effects of Climate Change on Water, Biodiversity, and Livelihoods. Conservation Biology, Volume 23, No. 3, 520–530) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
807	18	36	37	36	39	Replace "Across most.....except from some....In some rivers (e.g. in China)....." with "Across most.....except for some....In some rivers (e.g. in northwestern China).....". (Ren, Guoyu, National Climate Center)
808	18	36	38	0	0	Decreases of 20% in summer runoff in the rivers Hunza and Shyok of Upper Indus Basin of Himalayas were estimated to have resulted from the observed 1°C fall in mean summer temperature since 1961, with even greater reductions in spring months. The observed downward trend in summer temperature and runoff is consistent with the observed thickening and expansion of Karakoram glaciers, in contrast to widespread decay and retreat in the eastern Himalayas.(Fowler and Archer,2006). (H.J. FOWLER and D. R. ARCHER, 2006. Conflicting Signals of Climatic Change in the Upper Indus Basin. Journal of Climate, Vol. 19, 1 Sep 2006) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
809	18	36	42	0	0	Changes in the timberline ecotone vegetation of Nanda Devi National Park (NDNP), Western Himalayas, India studied over a period of 30 years (1980–2010) using Landsat MSS and TM images reported no geographical shift in the upper limit of timberline, while the subalpine forest's canopy has increased substantially (Rupesh et al, 2012). (Rupesh R. Bharti, Bhupendra S. Adhikari and Gopal S. Rawat, 2012. Assessing Vegetation Changes in Timberline Ecotone of Nanda Devi National Park, Uttarakhand. International Journal of Applied Earth Observation and Geoinformation 18: 472–479) (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
810	18	36	42	0	0	The improved process based equilibrium terrestrial biosphere model (BIOME3China)simulations on climate change impacts revealed large reduction in the temperate desert, alpine steppe, desert, and ice/polar desert, a large increase in the cold-temperate conifer forest, temperate shrubland / meadow, and temperate steppe, and a general northwestward shift of all vegetation zones of Tibetan Plateau (Jian 2000). (Jian Ni, 2000. A Simulation of Biomes on the Tibetan Plateau and Their Responses to Global Climate Change. Mountain Research and Development, 20(1):80-89. 2000). (Molden, David, International Centre for Integrated Mountain Development (ICIMOD))
811	18	36	46	0	0	Section 18.5.4. Clearer cross-reference should be made to tables 18-6 through 18-9. (Mach, Katharine, IPCC WGII TSU)
812	18	36	48	36	49	The wording here seems a bit award. A suggestion would be "There is very high confidence that Australia and New Zealand have warmed during the past century, and high confidence that hot extremes have become more frequent, and cold extremes less frequent….". (Zwiers, Francis, Pacific Climate Impacts Consortium)
813	18	37	1	0	0	insert "at" before "several sites" (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
814	18	37	1	37	17	Specific line-of-sight references to supporting chapter sections in Chapter 25 should be provided. (Mach, Katharine, IPCC WGII TSU)
815	18	37	10	37	14	18.5.4. reference/s needed, very important for the numbers (chapter 25, or original publication?) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
816	18	37	10	37	17	The relevant time frames for these statements should be specified. (Mach, Katharine, IPCC WGII TSU)
817	18	37	13	37	14	"tropical cyclones" (Lough, Janice, Australian Institute of Marine Science)
818	18	37	14	37	14	Reference required. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
819	18	37	20	0	0	Section 18.5.5. Clearer cross-reference should be made to tables 18-6 through 18-9. Additionally, the timeframe relevant to statements should be clarified, and further provision of relevant citations and also calibrated uncertainty language should be prioritized. (Mach, Katharine, IPCC WGII TSU)
820	18	37	28	37	29	The statement from WG1 AR5 is "However over the satellite era, increases in the intensity of the strongest storms in the Atlantic appear robust (Elsner et al., 2008; Kossin et al., 2007). To accurately represent this finding, suggest this sentence to read: ""There is robust evidence of an increase in intense tropical storms in the North Atlantic over the satellite era of the past several decades" (Webb, Robert, NOAA OAR ESRL)
821	18	37	28	37	29	The robust evidence of an increase in intense tropical storms in the North Atlantic over the past several decades presumably meets the requirements of this chapter to be a detectable climate change, since climate change includes internal climate variability, which is one of the hypothesized causes of this increase. So you could either identify this as such or explain that tropical cyclone D&A is being treated differently from the default D&A terminology in the chapter. (UNITED STATES OF AMERICA)
822	18	37	28	37	29	Even though this is the North American bit, it would nevertheless be useful to make a short note indicating that this is not the case in other basins. (Zwiers, Francis, Pacific Climate Impacts Consortium)
823	18	37	28	37	29	This is the opposite of what WGI section 2.6.3 says, and must be changed to reflect the discussion there. (Mastrandrea, Michael, IPCC WGII TSU)
824	18	37	31	37	36	Need to provide links back to places where the evidence is presented and evaluated. Key confidence assessments could be repeated here. (Zwiers, Francis, Pacific Climate Impacts Consortium)
825	18	37	34	37	35	Change to read ""Agricultural production is affected by increased temperature amplification of drought impacts in the Southern US and Mexico". That being said, is there evidence in the literature for any of the statements on regional impact of agriculture productivity in the Southern US and Mexico or are these inferred. Assessment statements not supported by peer-review literature do not meet the rigor of the IPCC assessment. Need to include citations documenting impacts for each region or suggest deleting regions that are not substantiated or entire sentence. (Webb, Robert, NOAA OAR ESRL)
826	18	37	35	37	36	Assessment statements not supported by peer-review literature do not meet the rigor of the IPCC assessment. Need to include citations documenting evidence for infrastructural damage due to more frequent extremes. (Webb, Robert, NOAA OAR ESRL)
827	18	37	39	0	0	Section 18.5.6. Clearer cross-reference should be made to tables 18-6 through 18-9. Additionally, the timeframe relevant to statements should be clarified throughout, and further provision of relevant citations should be made. (Mach, Katharine, IPCC WGII TSU)
828	18	37	41	38	6	It would be good if a native English speaker could go over this bit of text (please don't take offense …). Also, I think it is necessary to provide links back to places where the evidence is presented and evaluated. (Zwiers, Francis, Pacific Climate Impacts Consortium)
829	18	37	43	37	43	Either there is text missing, or repace 'in' with 'a'. (Burt, Peter, University of Greenwich)
830	18	37	46	0	0	Section 18.5.4: overall, a good summary for Australasia (Hughes, Lesley, Macquarie University)
831	18	37	48	37	50	References required. (Burt, Peter, University of Greenwich)
832	18	38	9	0	0	Section 18.5.7. Clearer cross-reference should be made to tables 18-6 through 18-9. Additionally, the timeframe relevant to statements should be clarified throughout, and further provision of relevant citations and calibrated uncertainty language should be made. The line-of-sight cross-references or citations supporting each statement must be clear to the reader. (Mach, Katharine, IPCC WGII TSU)
833	18	38	11	38	40	18.5.7. please give references (other sections of ch18, chapter 28, other chapters or original publications) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

#	Ch	From Page	From Line	To Page	To Line	Comment
834	18	38	11	38	40	Need to provide additional links back to places where the evidence is presented and evaluated. Key confidence assessments on detected impacts could be repeated here. (Zwiers, Francis, Pacific Climate Impacts Consortium)
835	18	38	24	38	28	References required. (Burt, Peter, University of Greenwich)
836	18	38	26	38	26	Please use more common/clearer words than "provisioning" and "phenological mismatch". (Jones, Richard, Met Office Hadley Centre)
837	18	38	28	0	0	The Antarctic sea ice extent has not declined overall (page 14 lines 37-38). (Parker, David, Met Office Hadley Centre)
838	18	38	28	38	28	Mention of decrease in Antarctic krill, in turn affected by sea ice loss brings to mind the fact that Antarctic sea ice in general has had a slight upward trend. So some further elaboration seems to be needed. (UNITED STATES OF AMERICA)
839	18	38	30	38	30	Capital 'A' for 'arctic'. (Burt, Peter, University of Greenwich)
840	18	38	43	0	0	Section 18.5.8. Specific citations and line-of-sight cross-references to supporting chapter sections should be made as much as possible in support of all statements in this section. (Mach, Katharine, IPCC WGII TSU)
841	18	38	43	38	49	There are of course possible secondary impacts in terms of diversions of resources, food and consumer goods to countries that can afford to address their own local impacts of climate change with imports at the expense of more remote global markets such as islands with long supply chains and where rising prices mean goods move out of reach of the poor. (Bunce, Matthew, Institute of Marine Engineering, Science and Technology)
842	18	38	45	39	2	18.5.8. please give references (other sections of ch18, other chapters or original publications) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
843	18	38	46	38	46	Change 'Coral reefs' to 'coral reefs'. (Burt, Peter, University of Greenwich)
844	18	39	4	39	8	Probably not "persistant La Nina like conditions" but decadal timescale variability affecting trade winds. See, for example, Merrifield MA (2011) A shift in western tropical Pacific sea level trends during the 1990s. Journal of Climate 24: 4126-4138. Merrifield MA and Maltrud ME (2011) Regional sea level trends due to a Pacific trade wind intensification. Geophysical Research Letters 38, doi:10.1029/2011GL049576. Merrifield MA, Thompson PR and Lander M (2012) Multidecadal sea level anomalies and trends in the western tropical Pacific. Geophysical Research Letters 39, doi:10.1029/2012GL052032. (Lough, Janice, Australian Institute of Marine Science)
845	18	39	7	39	8	The strong and persistent La Nina like conditions seems to be referring to low frequency variations, which if we understand the definition of climate change used in this chapter, would be included under climate change. (UNITED STATES OF AMERICA)
846	18	39	14	39	14	Change 'is' to 'are' to avoid mismatch of singular and plural. (Burt, Peter, University of Greenwich)
847	18	39	21	39	21	Would it be preferable to present a level of confidence here? (Mach, Katharine, IPCC WGII TSU)
848	18	39	33	39	33	Change 'Drought' to 'drought' and 'Wildfire' to 'wildfire'. (Burt, Peter, University of Greenwich)
849	18	39	38	39	38	Change 'Marine' to 'marine', 'Ecosystems' to 'ecosystems' and 'Coastal' to 'coastal'. (Burt, Peter, University of Greenwich)
850	18	39	43	39	43	Change 'Human Systems' to 'human systems'. (Burt, Peter, University of Greenwich)

#	Ch	From Page	From Line	To Page	To Line	Comment
851	18	39	48	0	0	Section 18.6: As mentioned in my general comments, I would recommend further consideration of options for section 18.6, ideally in consultation with Chapter 19. I expected this section to present new information on observed impacts relevant to each reason for concern, and to provide assessment based on this evidence of whether current temperature increase is already associated with a transition away from white (e.g., to yellow) in terms of the RFC color gradient or not. I found the current explanation for each category (sometimes couched as "confirming" a reason for concern, sometimes couched in other terms) somewhat confusing, and have made further specific comments related to the section text where clarification would be useful. The section text should also reference other sections of Chapter 18 to ensure clear line of sight. Again, this section should also be coordinated with Chapter 19 to ensure consistency and a smooth handoff from assessment of changes to date (realized risks) to assessment of future risks. Please specifically consider the described scope of aggregate impacts in 19.6.3.5 compared to that here. Chapter 19's discussion focuses on nonmonetary aggregations, while here the focus is on monetary aggregations. (Mastrandrea, Michael, IPCC WGII TSU)
852	18	39	48	39	48	I suggest that the subtitle be changed to "Synthesis: Detected Major Negative Impacts of Climate Change and Reasons for Concern". The reason is that only some of the impacts from climate change are discussed here. I would also suggest to add a parallel sub-section entitled "Synthesis: Detected Major Negative and Positive Impacts of Climate Change and Their Implications for Adaptation". (Ren, Guoyu, National Climate Center)
853	18	39	48	45	9	Have the authors considered the current section 18.6 appearing at the beginning of the chapter? It synthesises important and policy-relevant results and so could appear earlier with the subsequent sections providing the more detailed evidence for this synthetic material. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
854	18	39	48	45	9	Have the authors considered the current section 18.6 appearing at the beginning of the chapter? It synthesises important and policy-relevant results and so could appear earlier with the subsequent sections providing the more detailed evidence for this synthetic material. (Jones, Richard, Met Office Hadley Centre)
855	18	39	52	40	5	This paragraph discussing the importance of D&A generally in the overall assessment even of projected future impacts, could receive more attention if it were moved up earlier in the chapter, perhaps in the introduction. (UNITED STATES OF AMERICA)
856	18	39	52	40	37	The RFCs are also discussed extensively in Chapter 19; it would be good to establish cross-linkages in this introduction and to ensure that the descriptions of the RFCs and accounts of their history are fully consistent. I wonder if both chapters really need to provide detailed background, as well as an introduction in Chapter 1. Perhaps this would be a good option for a cross-cutting box? (Zwiers, Francis, Pacific Climate Impacts Consortium)
857	18	39	53	39	54	“Observed losses … lend additional plausibility”: this is out of focus. It is certain (not “virtually certain” in calibrated language) that if the temperature goes up more ice will melt. A more useful point to make here is that we are committed to continued loss of glacier ice because of past warming. (See comment at P3 L20.) (Cogley, J. Graham, Trent University)
858	18	40	9	40	10	It may be clearest indicate why this approach was not taken. (Mach, Katharine, IPCC WGII TSU)
859	18	40	10	40	11	The use here of the word "fully" is questionable. (UNITED STATES OF AMERICA)
860	18	40	11	40	22	While the reasons for concern may have been developed in response to requests from countries that the IPCC assess the science with respect to the UNFCCC's commitment to stabilize GHG concentrations to prevent DAI, it should be clearly stated that the five reasons for concern were developed by authors as THEIR idea of what might be useful measures and NOT what the UNFCCC determined as measures for dangerous. This subtle but important distinction could be incorporated into the sentence starting on line 13 as follows: "The RFC concept was developed as a paradigm by authors in IPCC-TAR...." and in the sentence beginning on line 14; "Through development of the RFCs, the authors were providing a construct to respond directly to requests from countries..." (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
861	18	40	18	40	22	Here, it is not clear why this section could not present whether current temperature increase is already associated with a transition away from white (e.g., to yellow) in terms of the RFC color gradient or not, based on the assessment in Chapter 18. (Mastrandrea, Michael, IPCC WGII TSU)
862	18	40	19	40	26	It seems that the assessment here should focus on warming to date within each reason for concern, rather than make assertions about future risks. (Mach, Katharine, IPCC WGII TSU)
863	18	40	26	40	26	Capital 'C' required for 'chapter' (in this context it is a proper noun and is also in keeping with other usage in the document). (Burt, Peter, University of Greenwich)
864	18	40	27	40	29	Should the yellow to red scale used to characterize risks be acknowledged here? (Mach, Katharine, IPCC WGII TSU)
865	18	40	28	40	29	It is not clear what expressing the degree of concern in qualitative terms means exactly. Again, could not this be the RFC color gradient and where we are at current temperatures based on available evidence? (Mastrandrea, Michael, IPCC WGII TSU)
866	18	40	33	40	33	This should be Chapter 19 rather than 1. (Mastrandrea, Michael, IPCC WGII TSU)
867	18	40	40	0	0	Section 18.6.2. All statements made within this section should fully have their traceable account within Chapter 18. This means that the focus should be on warming that has occurred to date and impacts observed to date. Future-oriented assessment of risks should be left to Chapter 19 for this framework. This section should be very carefully coordinated with the chapter 19 author team. (Mach, Katharine, IPCC WGII TSU)
868	18	40	40	45	9	Section 18.6.2: The treatment of Reasons for Concern is not in keeping with the level of scientific rigor displayed in the rest of the chapter. Definitions for three of the five reasons of concern (risks from extreme weather events, aggregate impacts and risks of large-scale discontinuities) have changed from previous IPCC Assessments and notably from the key literature source cited (Smith 2009). As such it appears that the authors are using the same examples of warm water corals and the Arctic to show 'high-confidence' progress on most fronts. This comes across as the authors reaching to show progress, while ignoring the low and medium levels of confidence in attribution for droughts, floods, aggregate impacts as previously defined, and large-scale singularities (thermohaline circulation and Greenland and West Antarctic ice sheets). See relevant topics in Tables 18-11a & b and 18-12. (UNITED STATES OF AMERICA)
869	18	40	40	45	9	Section 18.6.2: This section is not well referenced and overly reliant on citations from the same, small set of authors. This likely stems from the RFCs being a construct by these authors and not broadly representative of a topic found in the literature. But literature on detection and attribution of observed impacts to unique systems, observed impacts of floods, droughts and cyclones, observed changes to large scale singularities must be present in the literature and should be assessed if this section is to be included. (UNITED STATES OF AMERICA)
870	18	40	48	40	48	It would be preferable to indicate specifically which physical systems are meant. (Mach, Katharine, IPCC WGII TSU)
871	18	40	49	40	49	Where "tending" is mentioned, variability should perhaps be more explicitly acknowledged. (Mach, Katharine, IPCC WGII TSU)
872	18	40	50	40	51	It would be helpful to specify which systems are meant. Also, do the reasons for concern here pertain to observed temperature increase to date? (Mach, Katharine, IPCC WGII TSU)
873	18	40	50	40	52	Based on this, does this mean that, e.g., that current temperatures are already associated with a transition to yellow on the color scale? (Mastrandrea, Michael, IPCC WGII TSU)
874	18	41	8	41	8	Capital 'B' for 'Boreal' (as used elsewhere in chapter/document). (Burt, Peter, University of Greenwich)
875	18	41	15	41	18	"Evidence for detection and attribution of shrinkage and recession of glacial comes from all continents". Attributed to what? There is evidence for the influence of aerosols on melting of sea ice, glacial and snow, and a recent paper (in Science or Nature?) attributed the accelerated melting of Arctic sea ice to the direct influence of CO2 itself on crystal structure of ice. What is the contribution from aerosols and CO2? (Ren, Guoyu, National Climate Center)

#	Ch	From Page	From Line	To Page	To Line	Comment
876	18	41	17	41	18	It seems this assertion should pertain only to the portion of this reason for concern for temperature increase observed to date. (Mach, Katharine, IPCC WGII TSU)
877	18	41	17	41	18	Again, it appears that "confirming" the reason for concern could imply a statement about future risks as well as changes to date, but that extends beyond the scope of this chapter. I would suggest clarifying (and constraining) the conclusion presented here to inform the "observed" part of each RFC, linking to what is presented in Chapter 19 (which should build on the information presented here as well). (Mastrandrea, Michael, IPCC WGII TSU)
878	18	41	28	41	30	I would delete this unnecessary quotation and also that at L42-46, perhaps retaining the first sentence of the latter. (Cogley, J. Graham, Trent University)
879	18	41	30	0	0	possible references of the effects of heat waves on phyto- and zooplankton: Huber V, Wagner C, Gerten D, Adrian R. 2012. To bloom or not to bloom: contrasting responses of cyanobacteria to different heat waves explained by critical thresholds of abiotic drivers. Oecologia: 169:245-256. Huber V., R. Adrian, D. Gerten. 2010. A matter of timing: heat wave impact on crustacean zooplankton. Freshwater Biology 55: 1769-1779. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
880	18	41	38	41	46	Care in distinguishing trends in weather and climate extremes versus trends in impacts of weather and climate extremes should be ensured here. (Mach, Katharine, IPCC WGII TSU)
881	18	41	44	41	44	Would "impacts" be more accurate than "responses"? (Mach, Katharine, IPCC WGII TSU)
882	18	41	48	41	48	Continuing on with the narrative in the previous paragraph (lines 38-46) it would also be useful to briefly mention SREX (IPCC, 2012) findings on extremes, and to review the current WG1 AR5 assessments on extremes - some of which are somewhat different from those of the AR4 (notably on tropical cyclones and drought). Mention of drought at some point in this discussion would probably also be useful. (Zwiers, Francis, Pacific Climate Impacts Consortium)
883	18	41	51	41	51	This statement currently reads, 'it is generally accepted that climate change has not been a major driver of that change in risk'. Should these statement read 'it is generally accepted that climate change has not been proven to be a major driver of that change in risk'? (AUSTRALIA)
884	18	42	13	42	14	It seems this assertion should be limited to reasons for concern pertaining to already observed temperature increase. (Mach, Katharine, IPCC WGII TSU)
885	18	42	14	42	14	I think it would be good to replace "significant" with a synonym such as "substantial", unless the intent is to refer to statistical significance, in which case, it would be good to be specific and say "statistically significant". The word significant is used so heavily in statistical contexts that I worry that readers may confound "statistical significance" with other interpretations. (Zwiers, Francis, Pacific Climate Impacts Consortium)
886	18	42	15	42	17	This statement needs unpacking a bit, as coastal impacts were presented as not easily attributable outside the Arctic. (Mastrandrea, Michael, IPCC WGII TSU)
887	18	42	22	42	23	I would delete the repetitive “but …” clause. (Cogley, J. Graham, Trent University)
888	18	42	23	42	24	This assertion should be limited to reasons for concern pertaining to already observed temperature increase. (Mach, Katharine, IPCC WGII TSU)
889	18	42	23	42	24	Again, it appears that "confirming" the reason for concern could imply a statement about future risks as well as changes to date, but that extends beyond the scope of this chapter. I would suggest clarifying (and constraining) the conclusion presented here to inform the "observed" part of each RFC, linking to what is presented in Chapter 19 (which should build on the information presented here as well). (Mastrandrea, Michael, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
890	18	42	26	42	26	Figure 18-5 addresses the issue of detection and attribution of extreme weather events, using the same format as for impacts in Figures 18-3 to 18-7. However, this is really a WG I issue, though I don't find this portrayed similarly in Ch 10 or Ch 14, WG I SOD. Or perhaps discussion of this belongs in Ch 21, so is it covered sufficiently? In any case, how was Figure 18-5a constructed and has there been some interaction with WG I? More broadly, is the left hand figure necessary unless the extremes described there are also analysed for their associated impacts in Figure 18-5b? My sense is that these two figures are too different for it to be meaningful to place them side by side. Furthermore, (a) is an anthropogenic climate change attribution exercise, whereas (b) is a climate extreme attribution exercise, where the climate determinant of a given impact (extreme event of some kind) is not specified. So joint attribution would be well nigh impossible across these two figures - or am I missing something? (Carter, Timothy, Finnish Environment Institute)
891	18	42	47	42	48	The key findings of chapter 1 could be cross-referenced here. (Mach, Katharine, IPCC WGII TSU)
892	18	42	49	42	49	Small Islands' in this context is not a proper noun, so should be 'small islands'. (Burt, Peter, University of Greenwich)
893	18	42	49	42	52	The description of the synthesis doesn't seem very transparent to me. One thing that is obscure for me is that I am not sure what is meant by "middle-to-high range" for detection or for detection and attribution. Also, the subsequent sentence, which indicates that metrics can be combined or decomposed in various ways could lead to some readers having concern that there is room in the assessment, or the presentation of assessment findings, for cherry picking. I'm not sure how to alleviate that - but the current description leaves me vaguely uneasy. (Zwiers, Francis, Pacific Climate Impacts Consortium)
894	18	42	52	42	54	It was recognized many years ago that the impacts of anthropogenic climate change are unevenly distributed among countries and regions, with some suffering and the others benefiting from the change. There are indeed fewer publications on the disparities of impacts. This may represent another bias in studies or publications in the field of climate change science. (Ren, Guoyu, National Climate Center)
895	18	43	7	43	9	It could be helpful to more explicitly indicate the assessment underpinning these trends. (Mach, Katharine, IPCC WGII TSU)
896	18	43	26	43	27	It could be helpful to cross-reference the original chapter here. (Mach, Katharine, IPCC WGII TSU)
897	18	43	33	43	33	The text in line 33 reads as Table 18-2, however the correct numbering is 'Table 18-12'. (INDIA)
898	18	43	40	43	45	These assertions should be limited to reasons for concern pertaining to already observed temperature increase. (Mach, Katharine, IPCC WGII TSU)
899	18	43	44	43	45	Delete “Overall,”. But I cannot work out what if anything the rest of the sentence means. Perhaps “This assessment reinforces concern about globally aggregated impacts of recent climate change, because impacts have been detected across several systems with a variety of metrics.” (The globally aggregated impacts are the sum of the impacts on systems.) (Cogley, J. Graham, Trent University)
900	18	44	8	44	8	Please provide a specific reference to WGI. (Plattner, Gian-Kasper, IPCC WGI TSU)
901	18	44	19	44	19	Can use of "irreversible" here be fully supported? (Mach, Katharine, IPCC WGII TSU)
902	18	44	19	44	19	The relevant executive summary text discusses evidence of early warning signals of large-scale regime shifts, rather than that irreversible regime shifts are already occurring. (Mastrandrea, Michael, IPCC WGII TSU)
903	18	44	21	44	21	Would the phrase "biophysical threshold" more nearly reflect general usage? (Mach, Katharine, IPCC WGII TSU)
904	18	44	31	44	31	"lost at a large scale……." Although there has been loss of some coral reefs and some corals on some reefs due to thermal stress, many reefs have recovered from thermal (and other) stress events. I think a better term would be degradation of reefs. Coral reef communities are changing rather than disapearing. (Lough, Janice, Australian Institute of Marine Science)

#	Ch	From Page	From Line	To Page	To Line	Comment
905	18	44	35	44	36	Given the lack of confidence to-date in attributing extinction to climate change, this statement could be reconsidered. (Mach, Katharine, IPCC WGII TSU)
906	18	44	38	44	39	"irreversible loss of an entire biome" - again, I think the evidence to date is that tropical coral reef communities will change rather than totally disappear. (Lough, Janice, Australian Institute of Marine Science)
907	18	44	43	44	43	Capital 'B' for 'Boreal' (as used elsewhere in chapter/document). (Burt, Peter, University of Greenwich)
908	18	44	43	44	48	Please indicate that the projected die back is still subject to large uncertainities. It is almost impossible to affirm now that the die back has been reched in some portions of Amazon in the present climate. (Marengo, Jose, CCST INPE)
909	18	44	47	44	47	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
910	18	45	4	45	6	For both the description of the TAR and Smith et al versions, it would be useful to be as specific as possible regarding these transitions. Smith et al, states that red shading in the TAR begins at 4 to 5C increase, and revises the transition to red to around a 2.5C increase. (Mastrandrea, Michael, IPCC WGII TSU)
911	18	45	6	45	9	Chapter 19, in its updating of the flaming embers diagram (Figure 19.5), identifies some current risks (yellow regions in the vertical bars that correspond to the time of zero temperature change - approximately 1990). How would the early warning indicators that are discussed here play into the evaluation of present day risks that is presented in Chapter 19? I think there is an opportunity to link the two chapters in an important way here. (Zwiers, Francis, Pacific Climate Impacts Consortium)
912	18	45	9	45	9	Again, it appears that "confirming" the reason for concern could imply a statement about future risks as well as changes to date, but that extends beyond the scope of this chapter. I would suggest clarifying (and constraining) the conclusion presented here to inform the "observed" part of each RFC, linking to what is presented in Chapter 19 (which should build on the information presented here as well). (Mastrandrea, Michael, IPCC WGII TSU)
913	18	45	14	45	14	Delete “rigorous”. Much of the WGII assessment is in fact qualitative, which is OK but does not suffice to justify “rigorous”. (Cogley, J. Graham, Trent University)
914	18	45	15	45	16	It would be helpful to distinguish that assessment here pertains to reasons for concern for observed warming. (Mach, Katharine, IPCC WGII TSU)
915	18	45	34	45	34	Change 'geographic' to 'geographical'. (Burt, Peter, University of Greenwich)
916	18	45	36	45	47	Uncertainty language used here should be harmonized with that within the executive summary. (Mach, Katharine, IPCC WGII TSU)
917	18	45	40	45	40	Insert 'the' before 'exception' (Burt, Peter, University of Greenwich)
918	18	45	41	45	41	Insert 'the' before 'exception' (Burt, Peter, University of Greenwich)
919	18	45	42	45	42	Please use the evidence terms described in the guidance note on uncertainties language. Did you intend to say "medium evidence" rather than "good evidence"? (Zwiers, Francis, Pacific Climate Impacts Consortium)
920	18	45	42	45	43	Good evidence' - this seems very subjective, and instead should be assigned one of the qualifiers for the statements on evidence (i.e. robust?). (AUSTRALIA)
921	18	45	50	46	33	Section 18.7 - Given the complexity of detecting and attributing change in human systems. This section could recommend the use/exploration of innovative qualitative methodology such as life histories, case studies to contribute to the literature. Further as identified in section 18.4.7 traditional ecological knowledge is already being used in detection and attribution and this should be encouraged to beef up the literature in human systems. (Opondo, Maggie, University of Nairobi, Kenya)
922	18	46	2	46	4	Please consider reflecting this finding also in the TS and possibly in SPM.. (NORWAY)

#	Ch	From Page	From Line	To Page	To Line	Comment
923	18	46	7	46	8	But climate variability (particularly low-frequency, multidecadal internal or natural variability) is a component of climate change according to the framework being used in this chapter. So the distinction being mentioned does not make sense. (UNITED STATES OF AMERICA)
924	18	46	10	46	18	This paragraph arbitrarily omits poor monitoring as a cause for weak understanding of climate change impacts on human systems. It runs the risk of reinforcing a defeatist attitude toward the question ("we'll never figure it out") when the opposite is the case. We could understand these things much better if we devoted more effort to monitoring. (Levy, Marc, Columbia University)
925	18	46	25	46	26	I think this half sentence "and precipitation trends … are not as clearly understood as temperature trends" is trying to say too much in too short a space, with the result that the messages are not completely clear. There are three issues that are intertwined here, and they are not all clearly linked to anthropogenic climate change. First, our observations of precipitation are not nearly as complete as those for temperature (and those that are available are perhaps not as reliable either). Second, the signal-to-noise ratio for the response to anthropogenic forcing is weaker in precipitation than in temperature - making detection more difficult. And finally, we have less consensus between models and, I think, less consensus that models represent precipitation well. So we both don't have as much confidence in estimates of precipitation trends from observations, and we are substantially less confident in attributing the contribution to those trends that comes from anthropogenic forcing. The half sentence that is offered here doesn't capture these two aspects particularly well by saying "precipitation change under anthropogenic climate change". One problem with this formulation is that as soon as I see the word "under", I think of a projection of future change, rather than an explanation of historical change. (Zwiers, Francis, Pacific Climate Impacts Consortium)
926	18	46	29	46	29	Please clarify what "special events" means in this context. (Mastrandrea, Michael, IPCC WGII TSU)
927	18	46	35	0	0	Suggest that FAQs 18.1 and 18.3 could be integrated into one FAQ (e.g., How and why are the impacts of climate change detected?) (CANADA)
928	18	46	37	0	0	FAQ 18-1 FAQs need to be accessible to a wider audience. External factors, natural variability may be too technical. Using an example to illustrate the challenge may be more effective. (Chatterjee, Monalisa, IPCC WGII TSU)
929	18	46	37	46	49	In this FAQ, it would be useful to incorporate more of a focus on examples, perhaps one natural, one human, to illustrate the general points. (Mastrandrea, Michael, IPCC WGII TSU)
930	18	46	37	46	49	The FAQ 18.1 overlaps with FAQ 18.2. It should rephrased as "What are the main challenges in dtecting systematic changes ?" and accordingly the lines 45 to 49 transferred into FAQ 18.2, with appropriate redactionnal changes. (Petit, Michel , CGIET rue de Bercy)
931	18	46	45	46	45	The word "between" appears twice and one needs to be deleted. (Sheikh, Muhammad Munir, Global Change Imapct Studies Centre (GCISC))
932	18	46	45	46	45	Delete one 'between'. (Burt, Peter, University of Greenwich)
933	18	46	45	46	49	The second challenge is actually a challenge for attribution, not for detection. Detection happens once natural variability has been eliminated as an explanation. Attribution begins at that point, and may or may not go through the stages of attribution to climatic change and attribution to anthropogenic climatic change. It is confusing to use “attribution” in the sense “attribution to anthropogenic climatic change”. E.g., at L52 say “in a system are due to climate change or to other causes”. (Cogley, J. Graham, Trent University)
934	18	46	49	0	0	FAQ1: Underlying each of these two high-profile challenges is the need to acquire, document, make available and preserve – in perpetuity – long, homogeneous records of supporting multivariate data. You imply this in sections 18.2.2 and 18.7 but it’s worth reiterating here.. (Parker, David, Met Office Hadley Centre)
935	18	46	51	0	0	FAQ 18-2 Authors may wish to use another example that is about detected trend rather than individual events. (Chatterjee, Monalisa, IPCC WGII TSU)

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936	18	46	51	47	3	It would be worth considering merging this FAQ with the previous one, so that the examples mentioned in my previous comment could address both topics. (Mastrandrea, Michael, IPCC WGII TSU)
937	18	46	53	46	54	Here, as at L45-49, detection and attribution seem to be confused. The exclusion of natural variability is part of detection, and attribution is the identification and ranking of the actual drivers. (Cogley, J. Graham, Trent University)
938	18	47	2	47	3	This statement is very definitive in that the flooding was not at all attributable to climate change. It would be more accurate to state that it has not been conclusively proven that this event is attibutable to climate change, but it could have been exacerbated by climate change. (AUSTRALIA)
939	18	47	3	47	3	I suggest inserting a word like "immediately" ahead of "attributable". I think the question is still open, but at the moment, it remains unknown whether there is an underlying signal because of the presence of large natural variations. (Zwiers, Francis, Pacific Climate Impacts Consortium)
940	18	47	5	0	0	FAQ 18-3 Authors may wish to mention the limitation of detection and attribution approach. (Chatterjee, Monalisa, IPCC WGII TSU)
941	18	47	12	47	20	This FAQ is very good. One suggestion however is that it would be better if the use of examples is consistent. E.g. in the question, the examples of one off events are disease outbreak, and the extinction of a species, however in the answer the example is heat wave. (AUSTRALIA)
942	18	47	12	47	20	It would be useful to focus this FAQ further on material discussed in section 18.4.4.2 on attribution of the contribution of climate change to the magnitude of specific events. In addition, I find the last sentence somewhat problematic, as it implies that one should expect to be able to prove that a specific heat wave would not have occurred without climate change if only scientific capabilities were sufficient. But both variability and changes in long-term averages contribute to the magnitude of specific events, so this framing of an either/or does not really make sense. (Mastrandrea, Michael, IPCC WGII TSU)
943	18	47	14	47	14	Is it possible to indicate further why scientists are usually reluctant? (Mach, Katharine, IPCC WGII TSU)
944	18	47	14	47	20	I think it would be useful to add a paragraph describing the event attribution approaches that are increasingly being used to understand individual events. I think the sense of the last sentence (that we have not seen extreme events that would be outside the realm of an unperturbed climate) is correct, but we also have a growing number of studies that demonstrate that anthropogenic influence on the climate has acted to increase the probability of many of the events that have been studied. The current FAQ does not give a good sense of where our capabilities lie, in my view. (Zwiers, Francis, Pacific Climate Impacts Consortium)
945	18	47	18	47	20	This assessment is too gloomy. For example it does not take account of the work of Otto et al. (2012) (which is in the References but is cited only in Table 18-4), nor of the work of Pall et al. (2011) which is cited in more than one section. (Cogley, J. Graham, Trent University)
946	18	47	18	47	20	But isn't it possible in some cases to indicate that a particular heat wave would have been exceedingly unlikely in the absence of climate change? Should this be acknowledged? (Mach, Katharine, IPCC WGII TSU)
947	18	47	20	0	0	FAQ4: However the change in likelihood of an extreme event can now be estimated – “Fractional Attributable Risk” (e.g. Lott, F. C., N. Christidis, and P. A. Stott (2013), Can the 2011 East African drought be attributed to human-induced climate change?, Geophys. Res. Lett., 40, 1177–1181, doi:10.1002/grl.50235.) (Parker, David, Met Office Hadley Centre)
948	18	54	27	0	0	Volume number should be 65. (Parker, David, Met Office Hadley Centre)

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949	18	58	12	0	0	Replace Georgakakis with: Bales, J., D. Raff, C. McNutt, M. Brewer, T. Johnson, and T. Brown, 2012: Water Resources Sector Technical Input Report in Support of the U.S. Global Change Research Program, National Climate Assessment, 2013. N.B. this report is expected to appear as a USGS technical report in ~July 2013. (UNITED STATES OF AMERICA)
950	18	66	34	66	36	This paper Marengo et al (2013) have been accepted. There are some others that are listed in the references on Chapter 21, that could also be referred o this chapter 18 (or cross-referred). (Marengo, Jose, CCST INPE)
951	18	66	48	67	3	References out of alphabetical order (in Scottish surnames 'Mac' and 'Mc' are treated the same, therefore this block should appear on line 1 of page 66). (Burt, Peter, University of Greenwich)
952	18	67	53	0	0	Burkett, .R. and Davidson, M.A. [Eds.]. (2012). Coastal Impacts, Adaptation and Vulnerability: A Technical Input to the 2012 National Climate Assessment. Cooperative Report to the 2013 National Climate Assessment. Washington, DC: Island Press. http://www.islandpress.org/ip/books/book/distributed/C/bo9117766.html (UNITED STATES OF AMERICA)
953	18	80	20	80	20	This reference (Zemp et al.) should better be cited as: WGMS (2008): Global Glacier Changes: Facts and Figures (Zemp, M., Roer, I., Kääb, A., Hoelzle, M., Paul, F. and Haeberli, W. eds.), UNEP, World Glacier Monitoring Service, University of Zurich, Switzerland. (Haeberli, Wilfried, University of Zurich)
954	18	81	0	0	0	as for an additional table of high/low/medium confident lakes responses toward climate change globally: In Adrian et al. 2009 there is a list of response variables towards climate change with high confidence- that they can be used as sentinels of climate change - along with confounding factors, and advantages and disadvantages of using these response variable as a sentinel. Reference: Adrian R, O'Reilly CM, Zagarese H, Baines SB, Hessen DO, Keller W, Livingstone DM, Sommaruga R, Straile D, Van Donk E, Weyhenmeyer GA, Winder M (2009). Lakes as sentinels of current climate change. Limnol. Oceanogr. 54 (6):2283-2297. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)
955	18	81	0	0	0	Impacts of ocean acidification on pelagic marine biota: decreased rate of calcification in pteropods. I believe that it is covered in Ch. 6 and 19. Some references that you may find useful (I am not suggesting that they shoul all be cited): Comeau S., Gorsky G., Jeffree R., Teyssié J.-L. & Gattuso J.-P., 2009. Impact of ocean acidification on a key Arctic pelagic mollusc (Limacina helicina). Biogeosciences 6:1877-1882. Comeau S., Jeffree R., Teyssié J.-L. & Gattuso J.-P., 2010. Response of the Arctic pteropod Limacina helicina to projected future environmental conditions. PLoS ONE 5: e11362. Comeau S., Gattuso J.-P., Nisumaa A.-M. & Orr J., 2011. Impact of aragonite saturation state changes on migratory pteropods. Proceedings of the Royal Society of London. Series B: Biological Sciences 279:732-738. (Gattuso, Jean-Pierre, Centre National de la Recherche Scientifique)

#	Ch	From Page	From Line	To Page	To Line	Comment
956	18	81	0	0	0	In the third row of this table, I think the authors should avoid the practice of reporting a confidence range (low to medium in this case). The interpretation could be that there is medium confidence in some aspects of this statement, and only low confidence in others, or it could be that the authors think they can differentiate more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have medium confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
957	18	81	0	0	0	Table 18-1. Where NPP is discussed in this table, is it confined to ocean net primary production? It would be helpful to clarify this. (Mach, Katharine, IPCC WGII TSU)
958	18	81	0	82	0	I like the level of detailing beneath these two tables that points to the traceable accounts for the statements that are given. (Zwiers, Francis, Pacific Climate Impacts Consortium)
959	18	82	0	0	0	Delete “warm-water” because all coral reefs are in the tropics. The 3-D structures built by deep/cold water corals are not reef (ie not navigational hazards) and are called bioherms or coral communities. (Gattuso, Jean-Pierre, Centre National de la Recherche Scientifique)
960	18	82	0	0	0	In row 6 of this table - would readers understand what is meant by "increments in fish species richness"? Does this mean an increase in the diversity of species present in these zones? If so, why not say that? (Zwiers, Francis, Pacific Climate Impacts Consortium)
961	18	82	0	0	0	Replace the word "on" with "in" in the first line of the caption of Table 18-2 (Observed changes on marine---) (Manzoor, Naeem, Global Change Impact Studies Centre (GCISC))
962	18	83	0	0	0	Figure 18-3: Clarify here whether the detection and attribution of observed climate change effects refers to climate change broadly defined (including internal climate variability) or only to anthropogenic climate change. (UNITED STATES OF AMERICA)
963	18	83	0	0	0	It would be useful to add pointers to the traceable accounts that lead to the assessments that are summarized in this table, as was done in Tables 18-1 and 18-2. (Zwiers, Francis, Pacific Climate Impacts Consortium)
964	18	83	0	0	0	now 30.5.2 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
965	18	83	0	0	0	now 30.5.3 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
966	18	83	0	0	0	now 30.5.4 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
967	18	83	0	0	0	now 30.5.5 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
968	18	83	0	0	0	now 30.5.6 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
969	18	83	0	0	0	pp may increase or decrease, depending on various factors 30.5.1. High latitude spring bloom systems 30.5.2 Eastern boundary upwelling systems (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

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970	18	83	0	0	0	Table 18-3. Within the caption, it would be helpful to clarify why no assessment is given in some cases--because of lack of literature? It would be also preferable to give some supporting citations here in addition to the chapter references, as done in tables 18-1 and 18-2. Where "declining oxygen" is mentioned, are hypoxic zones being referred to? It could be helpful to clarify this. (Mach, Katharine, IPCC WGII TSU)
971	18	83	0	0	0	Table 18-3: Increases in primary productivity in some regions are also discussed in the text. It is not clear why the third entry of this table then focuses only on declining productivity. Please reconcile. (Mastrandrea, Michael, IPCC WGII TSU)
972	18	83	0	0	0	Table 18-3: this is based on 30.5. maybe adopt exact header for regions from the corresponding sections (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
973	18	83	0	0	0	This table has many instances in which a range of confidence assessments is report. I think the authors should avoid the practice of reporting a confidence range (e.g., low to medium). The interpretation could be that there is medium confidence in some aspects of this statement, and only low confidence in others, or it could be that the authors think they can differentiate more finely between levels of confidence than indicated by the 5-level scale that is laid out in the uncertainties guidance document. I very much doubt that the latter is possible, and the former leaves readers guessing about which aspects of the assessment have medium confidence, and which aspects have lower confidence. (Zwiers, Francis, Pacific Climate Impacts Consortium)
974	18	83	0	0	0	what does n/s mean? not specified? please indicate in the table legend (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
975	18	84	0	0	0	Figure 18-4: Can you insert "substantial" before "contribution of anthropogenic emissions"?Without this, couldn't the anthropogenic contribution be just trivial (e.g., like a butterfly flapping its wings)? (UNITED STATES OF AMERICA)
976	18	84	0	0	0	Figure 18-4: The last column in this table should inform the conclusions for the second of the RFCs: risks from extreme weather events as it measures exactly what the RFC addresses. The absence of any significant ability to attribute an anthropogenic signal to anything but very few high temperature events should indicate that there has not been significant progress in detecting that this RFC is observed to be worsening. (UNITED STATES OF AMERICA)
977	18	84	0	0	0	Table 18-4. Is "extreme impact event" the clearest phrase? Would "impacts of extreme weather event" be more accurate? (Mach, Katharine, IPCC WGII TSU)
978	18	84	0	0	0	Table 18-4: statement about floods in Queensland: I'm not that the "low confidence" assessment of an anthropogenic contribution is supportable; for discussion with chapter 25 authors please (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)

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979	18	84	0	84	0	Comment on Table 18-4. Table 18-4 is noted to be partly based on Table 1 in Coumou and Rahmstorf (C&R) 2012 that is a "List of record-breaking meteorological events in the past decade and their impacts". If a multi-week heatwave is not an extreme weather event but rather a climate event within Table 18-4, that might explain why the 2010 western Russian heatwave entry isl isted as low for entry in the column "Confidence in contribution of extreme weather event to observed damage". If this is the case, then I suggest using the C&R 2012 terminology and in Table 18-4 replace 'weather' with 'meteorological' in the column header to read "Confidence in contribution for extreme meteorological event to extreme change ' and then to change the entry in this column to' very high' for the row identified as 2010 & Western Russia. Since every one of the extreme impact events in the table should be listed as very high in the column titled "Confidence in contribution of extreme weather event to observed damage", I wonder if there is any value added information provided by including the column in the table? (Webb, Robert, NOAA OAR ESRL)
980	18	85	0	0	0	In row 7, it is not clear how rainfall affects this sociological behaviour. (Zwiers, Francis, Pacific Climate Impacts Consortium)
981	18	85	0	0	0	In the bottom row, I would be a bit sceptical of the statement that variability has changed since, in general, variability change is substantially more difficult to detect than change in mean conditions. This would be further exaserbated by the spatial extent of the question (small region rather than larger regional, subcontinental or continental scale). Detection and attribution studies on extremes are presently only available on very large scales. (Zwiers, Francis, Pacific Climate Impacts Consortium)
982	18	85	0	85	0	This table would be much more useful if the date of the event could be included. (AUSTRALIA)
983	18	86	0	0	0	Table 18-6: Australasia: I struggle with the confidence rating given to the attribution to climate change. For the widespread reduction in glacier volume in NZ, we have no other explanation at all other than climate. Glaciers don't shrink because they have mood swings, and changes in dust deposition don't even begin to offer an explanation. So the 'low' confidence statement for this strikes me as far too weak; also the 'medium' confidence for the climate cause of the decline in late season snow depth in Australia seems too weak, because there is no other candidate explanation (and the climate one is fully consistent with the observed changes). (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
984	18	86	0	0	0	Table 6: Where are the references of this table? (Haeberli, Wilfried, University of Zurich)
985	18	87	0	87	0	On table 18.6, on c hanges in extreme flows in Amazon river, there should be a reference to Marengo et al (2013) (Marengo, Jose, CCST INPE)
986	18	88	0	0	0	Cell on drought and wildfires in Asia is blank. I am not sure if this is an oversight or if no studies have been carried out for Asia in this area. (INDIA)

#	Ch	From Page	From Line	To Page	To Line	Comment
987	18	88	0	0	0	Table 18-7. Caption needs to clarify which definitions of climate change, detection, and attribution are being used here. Or is this mixed in the table, in which case each entry would need to have this information identified somehow. For Africa, is the "increased drought in the Sahel since 1970" being attributed to anthropogenic forcing, or to climate change broadly defined to include internal climate variability. For North America, is the high confidence in detection of increases of wildfire activity referring to a detection of climate change impact where climate change includes internal variability? This needs to be clarified. (UNITED STATES OF AMERICA)
988	18	88	0	89	0	Table 18.7 - For North America there is only one reference provided and this is only valid for the southwest United States. The study by Gillett et al. 2004 reporting that Canadian fire activity trends are related to human-caused climatic change could be cited here . Also see the paper by Girardin et al. 2013 for a critical examination of complex temporal patterns of fire activity in Canada. Notably, if fire activity trends are studied over a period longer than the 40 years covered by fire statistics, then a trend toward decreasing fire activity may be found and this likely in relation to long-term influences of natural climate variability on fire regimes. Girardin, M.P., Ali, A.A., Carcaillet, C., Gauthier, S., Hély, C., Le Goff, H., Terrier, A., Bergeron, Y. . 2013. Fire in managed forests of eastern Canada: Risks and options, Forest Ecology and Management, Special Issues on Mega Fires Vol 294: 238-249. //Gillett, N.P., Weaver, A.J., Zwiers, F.W., Flannigan, M.D., 2004. Detecting the effect of climate change on Canadian forest fires. Geophysical Research Letters 31, L18211. (CANADA)
989	18	89	0	0	0	In the Australasia element of Table 18.7, consider including the point on increased hydrogical drought referrred to the last column of the drought element of table 25.1 in Chapter 25 (p84) (Whetton, Penny, Commonwealth Scientific and Industrial Research Organization - Marine and Atmospheric Research)
990	18	89	0	0	0	Table 18.7 Re "expansion of some wetlands' The relevant reference is keith et al 2010. Remove the Banfai and Bowman 2007 and Bowman et al 2010 references because these refer to boundaries between savannas and rainforests in Australia, not wetlands. (Hughes, Lesley, Macquarie University)
991	18	89	0	0	0	Table 18-7: Australasia: it might be worthwhile stating that while there has been no change in frequency of droughts, they have become more intense in Australia, in part due to rising temperatures (see Table 25-1) (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
992	18	90	0	0	0	Table 18-8. Caption needs to clarify which definitions of climate change, detection, and attribution are being used here. Or is this mixed in the table, in which case each entry would need to have this information identified somehow. For South/Central America, is the percent contribution of anthropogenically forced climate change to the observed anomalies for coral bleaching estimated? For polar regions, are there any positive impacts of the arctic sea ice loss on marine ecosystems? Why just focus on the negative ones, if there are also positive ones? (UNITED STATES OF AMERICA)
993	18	90	0	0	0	the same holds for an additional table on lakes - which could be summarized - but that would need some work- if separted for the different eight major world regions. We did that somehow in table 2 in Adrian et al. 2009. (Adrian, Rita, Leibniz-Institute of Freshwater Ecology and Inland Fisheries)

#	Ch	From Page	From Line	To Page	To Line	Comment
994	18	90	0	91	0	"Table 18-8. The coastal process was missing in Africa region? As for NE Atlantic, it has been mentioned in the genereal comments. However, where the tropical Asian and Japanses waters and the Japanese Sea refer to are easily confusing? How could we understand Japanese anchovies, sardines shift in Japanese Sea? Please check the paper of TAKASUKA (2006; 2007). The seas might refer to the Kuroshio Extension, Kuroshio-Oyashio transition regions, the East China Sea and so on. I don't think that could be called Japanese Sea. Furthermore, as we know, there is only an East/Japan Sea located in the east of Korea Penisula, between Japan islands and Russia mainland. (CAI, RONGSHUO, Third Institute of Oceanography)
995	18	90	0	91	0	Cells on coastal processes for Europe and Australasia are blank. (INDIA)
996	18	90	0	92	0	ch 24.4.3.2 p21 L 4-12 reads, that " The impact of warming is also evident on sparsely populated Arctic coastlines, where erosion appears to be accelerating". "low confidence" in attribution of climate change to this does not seem appropriate? ch 24 Executive summary reads for Arctic Asia ch 24 p4 L 3-5 " in the Asian Arctic there is high agreement and medium evidence that rising sea-levels will interact with projected changes in permafrost and the length of the ice-free season to cause increased rates of coastal erosion." (this would be high confidence according to calibrated uncertainty language?) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
997	18	90	0	92	0	high or very high in detection? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
998	18	90	0	92	0	if you need an original citation: ch6 cites the following paper for this: Impact of declining intermediate-water oxygen on deepwater fishes in the California Current J. Anthony Koslow1,*, Ralf Goericke1, Ana Lara-Lopez1, William Watson Mar Ecol Prog Ser 436: 207–218, 2011 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
999	18	90	0	92	0	mangrove swamps are an ecosystem as well? they are mentioned in "small islands" as marine ecosystems, should be classified as such in "south and central america" as well. Just mentioning mangrove degradation here is not very specific. clarify: what impact has the degradation of mangroves on coastal areas? vulnerability to erosion? wave protection? flood protection? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1000	18	90	0	92	0	now 28.2.2.1.2 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1001	18	90	0	92	0	now 28.2.2.1.3 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1002	18	90	0	92	0	now 28.2.2.1.4 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1003	18	90	0	92	0	now table 6-7 in 6.2.5.1 (ch6 p22-23) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1004	18	90	0	92	0	only high? chapter text of ch29 p 6-7 rather indicates very high confidence for detection (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1005	18	90	0	92	0	see comment below on table 25-3 (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1006	18	90	0	92	0	TAB 18-8 tab 6-7 says there is high confidence that warming is the driver for shift from sardines to anchovies at interdecadal scale, but medium confidence in the attribution to climate change (fig 6-16)? (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)

#	Ch	From Page	From Line	To Page	To Line	Comment
1007	18	90	0	92	0	table 25-3 indicates medium confidence for attribution to climate change because other environmental factors like fishing etc. may mask climate change (original literature not checked, just took table 25-3 as a basis für this comment) (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1008	18	90	0	92	0	why is confidence not high in detection? see comment below (Menzel, Lena, Alfred Wegener Institute for Polar and Marine Research)
1009	18	91	0	0	0	Note that within the Australasia box, "retreat of seaweeds" is synonymous with "retreat of macroalgae" and only one phrase should be used. (Mach, Katharine, IPCC WGII TSU)
1010	18	91	0	0	0	You may want to consider adding the negative impacts on polar pteropods here (refs above). As pointed out in Ch. 19, it could have devastating impact on fisheries. (Gattuso, Jean-Pierre, Centre National de la Recherche Scientifique)
1011	18	91	0	91	0	Should probably add De'ath et al (2009) reference to declining calcification on GBR: De'ath G, JM Lough & KE Fabricius (2009) Declining coral calcification on the Great Barrier Reef. Science 323: 116-119. (NB a correction to this paper will appear shortly in Science - the correceted recent rate of decline is 11% compared to 14% in orginal paper). (Lough, Janice, Australian Institute of Marine Science)
1012	18	91	0	91	0	The name "Japanese Sea" in Table 18-8 should be corrected using "the western North Pacific", in accordance with the referred literature. (JAPAN)
1013	18	92	0	92	0	Table 18-8: The term "foraminifera shells" in the table should be replaced with a formal academic term "foraminiferal shells". (JAPAN)
1014	18	93	0	0	0	In Table 18.9. Region: Polar Regions: 'Impact on livelihoods of Arctic indigenous peoples' [18.4.5, Box 18-5] is mentioned. This reference indication is however incorrect and should be [18.4.7, Table 18-5] instead of [18.4.5, Box 18-5], since there is no mention of impact on livelihoods of Arctic indigenous peoples in section 18.4.5 (this should be section 18.4.7) and Box 18-5 discusses how indigenous Arctic peoples perceive climate change impacts and does not specifically address the impacts of climate change on their livelihoods (see Table 18-5 for this, at page 85 of chapter 18). (NETHERLANDS)
1015	18	93	0	0	0	Table 18-11a: Caption needs to clarify which definitions of climate change, detection, and attribution are being used here. Or is this mixed in the table, in which case each entry would need to have this information identified somehow. (UNITED STATES OF AMERICA)
1016	18	93	0	0	0	Table 18-9: As commented on the relevant text, section 18.5.6 says high/medium confidence for increase in frequency and extension of dengue in Central and South America. Please reconcile. (Mastrandrea, Michael, IPCC WGII TSU)
1017	18	93	0	0	0	Table 18-9: Australasia: the authors may wish to consider including the increase in hot days (including partial anthropogenic attribution), and the increased mortality and morbidity during heat waves. Note that the trend in heat waves is less clear than for hot days, so care must be taken in the formulation to avoid making too strong a statement here. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)

#	Ch	From Page	From Line	To Page	To Line	Comment
1018	18	93	0	93	0	Table 18-9 - Row 10, column 2 - include other studies indicating the frequency of dengue fever e.g. 'Leary, N. et. al., (2008), A Stitch in Time: General Lesson from Specific Cases, in Leary, N. et. al. (eds.) Climate Change and Adaptation, Earthscan: London and Sterling, VA, pp.1-27.' (Opondo, Maggie, University of Nairobi, Kenya)
1019	18	93	0	93	0	Table 18-9 - Row 2, column 2 - include other studies indicating this trend of increasing incidence of malaria in the Kenyan highlands e.g. 'Wandiga, S., et. al., (2010) Vulnerability to epidemic malaria in the highlands of Lake Victoria basin: the role of climate change/variability, hydrology and socio-economic factors, Climatic Change, Volume 99, Issue 3-4,473-497.' (Opondo, Maggie, University of Nairobi, Kenya)
1020	18	95	0	0	0	In row 3 of Table 18-11b, coastal erosion is of concern in some other regions as well (e.g, in the Gulf of St. Lawrence, Canada). My understanding (which is not very complete) is that the same mechanism is involved in the Gulf of St. Lawrence. The publication list on the Ouranos website (www.ouranos.ca) may point to appropriate literature. (Zwiers, Francis, Pacific Climate Impacts Consortium)
1021	18	95	0	0	0	Table 18-11 a. It would be preferable to specify which types of "hot events" and "cold events" are meant--hot days, warm spells, etc. (Mach, Katharine, IPCC WGII TSU)
1022	18	95	0	0	0	Table 18-11a is highly suggestive. A wide range of readers easily understand the confidence in detection and attribution in the observed changes. (Oda, Junichiro, Research Institute of Innovative Technology for the Earth (RITE))
1023	18	95	0	0	0	Table 18-11a: delete the row with changes in tornadoes or hail. There simply hasn't been a trend detected (double check with WGI chapter 10), so even 'very low' confidence is giving the wrong impression. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
1024	18	95	0	0	0	Table 18-11a: For tropical cyclone activity, the detection confidence level (low) seems to imply that the standard IPCC Ch. 10 definition of detection is being used. If true, this needs to be stated in the caption as well as in the text where this is discussed. Alternatively, if the definition of detection and climate change discussed in the introduction is used, the authors could claim detection of a change in tropical cyclones due to climate change at a high level of confidence. Some examples are discussed in my other comments on this topic. (UNITED STATES OF AMERICA)
1025	18	95	0	0	0	Table 18-11a: The "low" confidence in detection of increases in tropical cyclone activity could be higher if the definition of detection of climate change generally used in the chapter (i.e., including internal variability in climate change) were used here. If that is not what is intended, then the caption of the Table should be modified to explain what is meant by the term "Detection" in the table. (UNITED STATES OF AMERICA)
1026	18	95	0	0	0	Table 18-11b. Given that "damage" is often used in a monetary sense, it could be helpful to use the broader phrase "impacts" within the caption as done in the table heading. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
1027	18	96	0	0	0	Table 12: See remarks on page 3 (permafrost boundary) (NOTE: pasted here for your convenience) With glacier shrinking, numerous lakes have formed and many more are likely to form in the near future (cf. Linsbauer, A., Paul, F. and Haeberli, W. (2012): Modeling glacier thickness distribution and bed topography over entire mountain ranges with GlabTop: Application of a fast and robust approach. Journal of Geophysical Research 117, F03007, doi:10.1029/2011JF002313). Many presently still existing glacier landscapes of cold mountains are, in fact, transforming within decades and for long time periods to come into lake landscapes. This should also be made clear on page 9 (see next comment - pg 9, line 34). (Haeberli, Wilfried, University of Zurich)
1028	18	97	0	0	0	Figure 18-1. Within the description of this graphic, would it be helpful to indicate that these are coupled and overlapping systems that cannot be cleanly divided? Within the graphic itself, would it be worth indicating that working group 1 also studies aspects of natural systems? As a small point, within the table, would it be more accurate to say "shifts in fisheries"? (Mach, Katharine, IPCC WGII TSU)
1029	18	97	0	0	0	I have a few comments on this figure. The general concept, that the systems interact in multiple and complex ways is useful to illustrate and contemplate. Less helpful is the allusion to specific working group "study areas" - I think it is understood implicitly that the two working groups work largely on different aspects of the problem, but there is also a lot of overlap, and I think the complementarity of approaches and interperations is helpful. The overlaps are also broadening, for example, as a consequence of the broad adoption of Earth system models, which include parts of the natural system, and at least inform some aspects of potential changes in the human system (e.g., estimates of emissions that might be compatible with a 2C target). Regarding the drivers and impacts - one could imagine a number of direct impacts of forest fire, of which increased windiness might not be the most obvious (changes in forest hydrology, which is extensively studied, come to mind). A subsequent impact might be changes in water quality downstream of the fire affected area. (Zwiers, Francis, Pacific Climate Impacts Consortium)
1030	18	98	0	0	0	Figure 18-3. As done in chapter 3, the chapter team could consider presenting an accompanying table to introduce some of the detail described within the caption, as a way of making the figure more accessible. (Mach, Katharine, IPCC WGII TSU)
1031	18	98	0	0	0	Figure 18-3: Caption should clearly indicate what is meant by "detection" and "detection and attribution" in the figure, since multiple definitions are used in the chapter. (UNITED STATES OF AMERICA)
1032	18	98	0	0	0	Figure 18-3: Consider clearer ways to present the items appearing in this figure, beyond just a list in the caption. (Mastrandrea, Michael, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
1033	18	98	0	0	0	I think I have commented on Figure 18-2 previously, and I'll try to do so again. In detection and attribution, the objective is to understand change in observations, so in my view, the observations should be positions in the figure in such a way that it is clear that they are of paramount importance. In the left hand diagram - it is the ecological observations of paramount importance. However, those observations sort of sneak in at the side of the figure at the moment, given them much less prominence than the observations of the drivers, which I think sends the wrong message about what it is that we are really trying to understand. (We are trying to understand change in the ecological observations). Similarly on the right, the multi-step approach simultaneously seeks to interpret change the climate and ecological observations, so these observations should be shown to be paramount - but again, they occupy almost a secondary position in the figure, coming into consideration from the sides. (Zwiers, Francis, Pacific Climate Impacts Consortium)
1034	18	98	0	98	0	Figure 18-3, is it for one particular region?. Or is a worldwide vision?. Same comment for Fig 18-4 (Marengo, Jose, CCST INPE)
1035	18	98	0	98	0	Figure 18-3. The figure (and subsequent figures 18-4 to 18-7) is unreasonable to be showing such a strong linear one-to-one relationship since there is a much higher standard for attribution given the influence of confounding factors as discussed in Pamesan et al 2011. Does including the left-most category of 'very low' on the degree of confidence in detection (X) axis really provide value-added information to inform policy makers. I suspect that the lowest left sector in the figure (very low/very low) could be the most densely populated given the fact there is very low confidence in detection and attribution of most observed climate change impact since the detection and attribution remains very difficult or impossible to demonstrate since the signal has yet to emerge from the background noise of natural variability existing within the various components of the earth system and difficult standard to achieve of system understanding that is required for high-quality detection and attribution studies. (Webb, Robert, NOAA OAR ESRL)
1036	18	98	0	100	0	Please explain what both attribution and detection are referred to on the y access. (AUSTRALIA)

#	Ch	From Page	From Line	To Page	To Line	Comment
1037	18	98	0	102	0	Figures 18-3 to 18-7. these tables each have confidence in detection along the x-axis and confidence in detection and attribution along the y-axis. However, this construction is not explained in detail anywhere that I could find in a quick read. My understanding is that it would be possible to undertake a climate attribution study without doing a detection study first, as this would simply involve attributing causal association between a given climatic determinant and the target system or process. So even without a detected trend in the impact, there can still be a relationship between climate and impact. So does the y-axis labelling include both detection and attribution in recognition of this? If so then it would only address attribution cases where a trend in impacts has first been detected with some level of confidence? However, if that is the case is there a minimum level of confidence in detection that would be needed before a statement on attribution would be allowable using the formulation here? I find the detection/attribution term on the vertical scale to be confusing, because it seems to conflate information already present on the x-axis with new information on attribution of climate. Couldn't "detection" be dropped from the vertical, but the caption make it clear that an entry for attribution is conditional on there being a detected trend in the first place? (Carter, Timothy, Finnish Environment Institute)
1038	18	99	0	0	0	Figure 18 - 4: Please explain why you give multiple small letters in a cell, because this just crowds the table. If you want to indicate multiple subsets of a system, giving multiple letters is pointless if it is not displayed how large the absolute number of subsets that could be affected or have been studied is. I suggest to delete the superfluous letters and include a statement in the heading that small letters refer to 1 or more regional subsets of a respective system. (Rock, Joachim, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)
1039	18	99	0	0	0	Figure 18-4: Caption should clearly indicate what is meant by "detection" and "detection and attribution" in the figure, since multiple definitions are used in the chapter. (UNITED STATES OF AMERICA)
1040	18	99	0	0	0	Figure 18-4: I am not sure how much this figure adds beyond the information presented in Table 18-10, as immediately I want to know things like what region each small letter represents. There are other visual ways to represent this information, such as a map-based presentation, that would convey more information more clearly. This could be combined with the information in Figures 18-5 and 18-6. (Mastrandrea, Michael, IPCC WGII TSU)
1041	18	99	0	0	0	It would be useful to add a few words in the caption that give a better sense of what is meant by a "full-scale system", and what is viewed as a "regional subset". I can try to imagine these things, but I would probably imagine something different from what the authors have in mind. (Zwiers, Francis, Pacific Climate Impacts Consortium)
1042	18	99	0	99	0	Figure 18-4, this figure is abit cluttered and not easily legible - perhaps could be redrawn with the key outside of the figure (like in figure 18.6 on p.101) to reduce the clutter and focus on it as part of the visual potrayal/effect thus making it more comprehensible. (Opondo, Maggie, University of Nairobi, Kenya)

#	Ch	From Page	From Line	To Page	To Line	Comment
1043	18	99	0	102	0	Figures 18 - 4 to 18 - 7: Please check this graph. You give three different measures her (excluding regional / global scope) and do not address that confidence in detection and confidence in attribution may not be equal. (Rock, Joachim, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)
1044	18	99	0	102	0	Figures 18-4 to 18-7: Since figures have changed substantially from FOD to SOD, please make sure to maintain consistency with confidence levels given in WGI AR5 Ch10 for the relevant D&A components. (Plattner, Gian-Kasper, IPCC WGI TSU)
1045	18	100	0	0	0	Figure 18-5: Caption should clearly indicate what is meant by "detection" and "detection and attribution" in the figure, since multiple definitions are used in the chapter. Hopefully only one set of definitions applies within the figure. Confidence in detection of a change in tropical cyclones could be high if the definition of detection and climate change is broad and includes climate change driven by low-frequency internal climate variability. (UNITED STATES OF AMERICA)
1046	18	100	0	0	0	Figure 18-5: I cannot find any statement in this chapters that supports an attribution (at the global scale) of an increase in inland floods to increasing GHG concentrations. Either remove or provide the evidence. The current text provides only one attribution study, for England and Wales for the 2000 floods. That is not sufficient. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
1047	18	100	0	0	0	Figure 18-5: Like with the previous figure, I think the table version may be more informative, and a map-based presentation would visually communicate further information. (Mastrandrea, Michael, IPCC WGII TSU)
1048	18	101	0	0	0	Figure 18 - 6, panels a, b: Please explain why you give multiple letters in a cell, because this just crowds the table. If you want to indicate multiple subsets of a system, giving multiple letters is pointless if it is not displayed how large the absolute number of subsets that could be affected or have been studied is. I suggest to delete the superfluous letters and include a statement in the heading that small letters refer to 1 or more regional subsets of a respective system. (Rock, Joachim, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)
1049	18	101	0	0	0	Figure 18-6. Within the description of this figure, it could be helpful to be more explicit about the reference to tables 18-6 through 18-9--do all examples used originate from these tables? (Mach, Katharine, IPCC WGII TSU)
1050	18	101	0	0	0	Figure 18-6: Like with the previous two figures, it would be useful to consider map-based approaches to presenting this information. (Mastrandrea, Michael, IPCC WGII TSU)
1051	18	101	0	0	0	I'm confused by this figure - if a particular type of system is mentioned more than once for a given region, does that mean that the region contains more than one assessed system of that type? Also, I think a traceable account detailing where the various letters come from is required. (Zwiers, Francis, Pacific Climate Impacts Consortium)
1052	18	102	0	0	0	p. 102, Fig. 18-7. Clearly indicate what definition of "climate change" is being referred to in the caption: anthropogenic climate change, or climate change that includes low-frequency internal or natural variability. (UNITED STATES OF AMERICA)