

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
1	56737	23	0	0	0	0	My previous comments (from chapters 5 and 6) should be also considered in this chapter about Europe (JOSEP LLORET, UNIVERSITY OF GIRONA)	Unclear which comments.
2	57426	23	0	0	0	0	This is a well thought out and elaborated document that fully addresses its mission. At the same time, it seems appropriate to take into account in its final version the latest EEA report: 'Adaptation in Europe: Addressing risks and opportunities from climate change in the context of socio-economic developments'. Available at: http://www.eea.europa.eu/publications/adaptation-in-europe (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	Reference has been included.
3	59505	23	0	0	0	0	The chapter provides highly valuable information on observed climate trends and future projections in Europe. There is a strong need to integrate in the chapter such information as: a) transport sector in Europe; b) changes in land use/land cover (see CORINE); c) "environment/climate change" dimension in the new Common Agricultural Policy, the new Common Fisheries Policy, the European communication for low carbon economy by 2050, the 20-20-20 strategy and the road map for a resource efficient Europe. Such information links to the production and consumption patterns in Europe, thus affecting the resilience to climate change impacts. Overall a discussion on the potential of current European strategies to reduce GHG emissions and to avert climate change in Europe is also necessary. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	Mitigation strategies in Europe are beyond the scope of this chapter.
4	59506	23	0	0	0	0	Chapter 23 is soundly structured, well written and thoroughly documented. (Danae Diakoulaki, Chemical Engineering, NTUA, Greece) (GREECE)	No response needed.
5	59507	23	0	0	0	0	There are several overlaps with other chapters. (Danae Diakoulaki, Chemical Engineering, NTUA, Greece) (GREECE)	The regional chapter will overlap with sectoral chapter regarding some content. This is unavoidable.
6	59508	23	0	0	0	0	It appears to me that some parts of this chapter do not go as deep as they should. I am referring to all parts having to do with cities, settlements, land use and spatial planning. The impression I have is that these parts were based on partial and incomplete literature review. In my opinion the best solution would be to remove these parts from chapter 23 so that they appear only in chapter 8 where they are addressed properly. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	We disagree because the regional chapter should address the literature in all key sectors. Some topic areas have fewer publications than other topic areas, but we will try and improve the sections mentioned.
7	59509	23	0	0	0	0	One of the impacts of climate change to water resources would be the increase in temporary rivers. River flow temporariness affects not only the availability of water seasonally but also the ecological status of the river, the way that rivers should be monitored regarding water quality and biology and in general the way rivers should be managed. Many areas in Europe that had low fraction of the river network to be temporary will have increases in temporariness that will be coupled with increases in irrigation needs. This was the subject area of research of the MIRAGE project and the results regarding policy issues have been summarized in the Nikolaidis et al. 2013 manuscript. It would be important to be emphasized that the irrigated land in Europe will increase northward while a significant length of the river network will become temporary, causing water deficits that would need to be managed. 1. Nikolaos P. Nikolaidis, Leeda Demetropoulou, Jochen Froebrich, Claire Jacobs, Fransesc Gallart, Narcis Prat, Antonio LoPorto, Vassilis Papadoulakis, Claudia Campana, Nikolaos Skoulikidis, Thierry Davy, Giovanni Bidoglio, Faycal Bouraoui, Mike Kirby, Marie-George Tournoud, Stefano Polesello, Gonzalo González Barberá, David Cooper, Rosa Gomez, Maria del Mar Sanchez, Anna-Maria De Girolamo, 2013. Towards a sustainable management of Mediterranean river basins - Policy recommendations on management aspects of temporary river basins, Water Policy (In Press). (Nikolaos Nikolaidis, Environmental Engineering, Technical University of Crete, Greece) (GREECE)	We will not include this paper, as these are generic issues related to water management.
8	59510	23	0	0	0	0	This Chapter has a wide scope and its realisation requires considerable effort. It has a comprehensive structure. However, three issues may be addressed more carefully: 1. The health impacts section needs to include data from a few European projects that are not mentioned; 2. For some consequences of climate change there had been projections for time periods, or time points prior to 2013. Have these been realized or not? 3. For the co-benefits, a special section on the air pollution issue is needed. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	1) The health impact section will be updated to include the publications from EU projects that are relevant. 2) We are not aware of climate/health projections that have been made for this period (up to 2013). 3) The co-benefits of air quality for health are discussed in section 23.8.3. However, we will add additional references to this section.

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9	59511	23	0	0	0	0	This chapter should be carefully checked. Citations are inserted in the text in whatever way, consecutive references also, italics are not used when needed and in accordance to other chapters/subchapters, the issue of brackets within brackets is open, space is added between number and % on many occasions, units for temperature are written in various ways, punctuation is missing or added in an inappropriate way (even leading to misunderstandings), etc. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The in text citations are an editorial matter and will be corrected in the final draft.
10	59512	23	0	0	0	0	My major comments regarding this chapter concern adaptation measures for forests, the ability of Natura 2000 network to ensure conservation of species, and the increased pollen concentrations in the air that may affect human health. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	No response needed.
11	59513	23	0	0	0	0	It would be very useful for the reviewer to see the figures and tables of the report at the point of citation. The figures and the tables are presented at the end of draft report. (Athanasios Loukas, Civil Engineering Department, University of Thessaly, Greece) (GREECE)	This is not our decision but the format decided by the TSU.
12	59514	23	0	0	0	0	There is not even a single reference to active solar thermal systems for heating, domestic hot water and solar air-conditioning. Similarly for building integrated photovoltaics.(Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Active solar thermal systems are a mitigation option, and therefore not included in this chapter, unless there is a synergy with adaptation or unintended consequence.
13	60368	23	0	0	0	0	A series of projections are given in this chapter, without specifying the considered time horizon or the scenario. I would suggest to add a general comment in the introduction how to interpret these results. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	We have clarified the text to make clear which scenarios underly the projections, where appropriate.
14	61569	23	0	0	0	0	The chapter has significantly improved compared to the first order draft. It is generally in a good shape. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	No response needed.
15	61570	23	0	0	0	0	We recommend the authors to revise the text on the full EU Adaptation Strategy package, where there is abundant background information on climate change impacts, vulnerabilities and adaptation options, including on many socioeconomic sectors. Information on current adaptation mainstreaming action (e.g. into EU funds) can also be relevant. (http://ec.europa.eu/clima/policies/adaptation/what/documentation_en.htm) (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Comment is unclear. The EU Adaptation Strategy is now correctly referenced in Section 23.1.2. This chapter will review and assess the primary scientific literature on impacts and adaptation.
16	61571	23	0	0	0	0	The text should be revised to substitute all references to forthcoming EU Adaptation Strategy with up-to-date information of the effective adoption (April 2013) and its contents. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The EU Adaptation Strategy is now correctly referenced in Section 23.1.2, but there is no space to discuss the content of the strategy in detail.
17	61572	23	0	0	0	0	The vulnerabilities of complex systems in Europe, such as cities and mountain areas, would deserve specific attention in the report. These, together with coastal areas, tourism, etc, are good examples of complex vulnerability factors and should be dealt with appropriately. Some times the approach continues to be quite simple and unidimensional, hampering a more comprehensive and realistic approach to the actual challenges, tradeoffs, intersectoral linkages, etc. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have organised the chapter to address policy -specific sectors. There is a section on urban planning that is directed at cities. Where there have been studies on inter-sectoral impacts, trade-off and synergies we have cited them but such literature is still extremely limited.
18	61573	23	0	0	0	0	The references "EEA, 2008" and "EEA-JRC-WHO, 2008" refer to the same publication. The correct reference is "EEA-JRC-WHO, 2008", and all references to "EEA, 2008" should be replaced by the correct one. Furthermore, the report referred to in "EEA-JRC-WHO, 2008" has been updated and extended by "EEA, 2012". Whenever appropriate, references to "EEA-JRC-WHO, 2008" should be changed to "EEA, 2012" rather than keeping the outdated reference. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected throughout chapter.
19	64728	23	0	0	0	0	Please add a introduction to the difference between change for Europe based on SRES and RCPs. please add a clear differentiation between results based on SRES and results based on RCPs. (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	This information is in chapter 21 and so it is not necessary to repeat it here.
20	65110	23	0	0	0	0	There is a disparity in the quality of writing in the different sections, with some sections e.g. 23.2.2.2; 23.2.3 for example needing more text to pull the examples/citations together and provide a more coherent explanation of their findings. (Pam Berry, Oxford)	This will be improved by copy editing.

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21	66322	23	0	0	0	0	This is a general comment not limited to chapter 23, but mentioned here because this is the regional chapter I had most time to look at for the review. The treatment of observed impacts (including detection and attribution) is patchy in this chapter, and the responsibility for reporting European observed impacts seems to be unclear. Should these be done comprehensively here or in Chapter 18? Currently, there is a useful Table here (23-6) which attempts to synthesise observed impacts and their attribution to changes in climatic factors. One wonders how much time and effort was possible among the author team to construct this table, how comprehensive the review can have been (rather few references are given), whose expert judgement is used to come up with the conclusions given (does the author team possess such expertise across all these sectors?), and how much dialogue there has been with the other core thematic chapters and particularly with Chapter 18. (Timothy Carter, Finnish Environment Institute)	Chapter 18 has reviewed sector specific material. Chapter 23 aims to provide a synthesis, linking to the sectoral chapters.
22	66375	23	0	0	0	0	Chapter 23 looks well arranged and includes many evaluation that would be important for decision making at national level. In general it demonstrates a deficit of relevant studies out the European Union space that is also the matter of decision making in countries. (Alexei Andreev, BIOTICA Ecological Society)	This comment is unclear - Is reviewer suggesting that we have missed some key pan-European studies - or that we should have some more specific key messages for European Union decision makers?
23	66376	23	0	0	0	0	A visible discrepancy between IPCC sub-regions and EEA-derived European biogeographical regions with regard to Continental sub-region highlights the strong lack of assessments and citations from the Eastern Europe. That creates significant uncertainty for IPCC evaluations especially with regard to agriculture, forestry and biodiversity. The major reasons for that are: 1) climate of the IPCC Continental sub-region is very diverse (from semiarid steppic parts to quite humid forest areas); 2) varying landscape transformation (from the heavily changed southern agricultural zone up to relatively conserved and extended forests and meadows northwards) creates absolutely different backgrounds for ecosystem self-adaptation through shifts of species composition, which may be stagnated or relatively quick in different parts of the subregion, as well as for adaptation in agriculture, forestry and infrastructure in nature. (Alexei Andreev, BIOTICA Ecological Society)	Lack of research about climate change in Eastern Europe is a concern.
24	66381	23	0	0	0	0	[The following message came via wg2-ar5-supportingmaterial@ipcc-wg2.gov: "There is attached file of the article cited in WGII-AR5-SODreview_Andreev_MD.xls submittted on 2013-05-24 (Reviewer Id: 2742): Andreev, A.V., 2011: Factors of probable future changes of (sub)natural ecosystems, linked with climate change. [Trombitsky, I. and Corobov R. (ed.)]. Transboundary cooperation in climate change adaptation of the Dniester River basin. Collection of scientific articles. Kishinev: ECO-Tiras. P. 8-20. [In Russian. Hopefully it may be interesting." -- the article can be found in supporting material page on the WGII author portal] (Alexei Andreev, BIOTICA Ecological Society)	This reference was added if it was appropriate.
25	68235	23	0	0	0	0	Numerous publications in Russian concerning climate change impacts on water resources, agriculture and forest systems are ignored. This contradicts with the guidelines of the IPCC Plenary on the wider use of non-English literature. (RUSSIAN FEDERATION)	Additional references about impacts in Russia have been included.
26	69687	23	0	0	0	0	The authors refer to the EU White paper on adaptation to climate change. They conclude that this is not implemented yet within the EU Rural Development Policy. We acknowledge that statement for this is related to the policy life cycle phase of the Common Agricultural Policy (CAP). Climate change however is acknowledged as an important and major challenge the current reform of the CAP has to address in an appropriate way. We recommend that IPCC focus on the implementation of climate change within the new CAP for the period 2014-2020; In general the IPCC-report underlines the main policy objectives of the reform of the CAP: more targeted direct payments, rewarding the delivery of above-statutory public services, increase the competitive strength, the sustainability and innovation of the European agriculture. However we would appreciate when IPCC-reports could give more evidence base of the impact of these objectives; Climate change and agriculture within the reform of the CAP are addressed by: 1. Greening of direct payments, which will be compulsory for farmers; 2. Rewarding farmers for the delivery of public goods within the first pillar, but in the second pillar as well through agri-environmental measures; 3. Specific (financial) emphasis on adequate agri-environmental climate measures (AECM) in the future European Rural Development Programmes 2014-2020 that have to be implemented by the EU Member States. We recommend that IPCC will report on the achieved environmental impact and performance by agriculture. (NETHERLANDS)	Review suggesting an evaluation of a future policy. This is beyond the scope of this chapter.

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27	74533	23	0	0	0	0	It would be worth emphasizing that the high population density of Europe predisposes the continent to increased vulnerability to the effects of climate change. Less than optimal places have been developed - places that are more susceptible to flooding for example. The landscape has been altered, leaving places more susceptible to extreme erosion, etc. G. P. Marsh pointed this sort of thing out in his seminal classic, "Of Man and Nature". It is not just a matter of climate change. (UNITED STATES OF AMERICA)	Summary statements regarding impacts in urban areas, where risks are concentrated, have been added to 23.9 and Executive Summary.
28	74534	23	0	0	0	0	Please explain what was the rationale used to select the different base periods (e.g, 1850-1899) across the chapter, and why there is not only one consistent base period for all analysis presented. (UNITED STATES OF AMERICA)	Baselines relate to individual published papers hence the lack of consistency.
29	74535	23	0	0	0	0	Since so many people in Europe live in urban setting, and since so many urban settings are vulnerable to flooding and other climate-enhanced perils, the report would benefit from a special section (a Box perhaps?) summarizing urban risks and urban areas that are particularly vulnerable. (UNITED STATES OF AMERICA)	Summary statements regarding impacts in urban areas, where risks are concentrated, have been added to 23.9 and Executive Summary.
30	74536	23	0	0	0	0	The authors should consider an enhanced focus on near term climate change, i.e. 2030s and 2040s. Stakeholders are more likely to react to research that is focused on conditions closer to the present. (UNITED STATES OF AMERICA)	Chapter reports the time periods as specified in individual studies. This information is synthesis in section 23.9 and ES.
31	74537	23	0	0	0	0	The content of the chapter is exceptionally inconsistent in the level of details, in style and nature from one subsection to another. Some subsections are so heavily laden with citations that they are nearly impossible to read, while other sections are written almost exclusively in bullet point format. The current process of displaying (multiple) references within the text creates difficulties when trying to follow the flow of the sentence. To improve consistency and readability, it would be helpful to have some more homogenization of the writing style. The chapter needs to be scientifically rigorous, and not just a litany of what amount to being bullet points. Every paragraph needs a strong topic sentence, and the paragraph itself should be consistent in keeping to that topic, with perhaps a transitional statement at the end. A review and consolidation of format, style and voice would make this chapter substantially more useful to a broader audience. The synthesis subsection ought to be written in a manner in which it can be used as a stand-alone summary of this particular chapter. This piece would then be more useful for communication efforts with policymakers, the general public and individuals with less technical expertise or knowledge than the chapter's authors. Clearly, both the executive summary and the synthesis findings subsections may be modified so that they can be used as stand-alone documents for those needing an abridged version of the chapter. These in particular should be written to certain standard that convey content in a manner that corporate leaders, policymakers, members of the press and the general community will be able to digest. (UNITED STATES OF AMERICA)	Some topics have more relevant papers than others. The chapter will be copy edited and checked by a science writer.
32	74538	23	0	0	0	0	The current document is more easily understood by a technical audience and lacks explanation of technical terms, model acronyms, and other. For example, a concrete definition of SREX is needed in this chapter. It is referenced repeatedly but never really has a starting definition. (UNITED STATES OF AMERICA)	SREX and other common abbreviations will be in the glossary.
33	74539	23	0	0	0	0	The discussion of sectoral impacts consists of a large number of very detailed and focused statements without an apparent higher level context. It could be improved with an overview at a higher level at the beginning followed by sub-topic lead in statements introducing specific impact statements at the sector level (e.g., energy production in Europe will be negatively affected on a regional basis followed by some or all of the specific statements contained). A summary of important impacts which are not expected nor considered would be helpful. (UNITED STATES OF AMERICA)	Some introductory text has been added.
34	74540	23	0	0	0	0	The Introductory paragraphs and Section 23.1 indicate the chapter reviews published evidence of anthropogenic climate change in Europe and adaptation responses and that it summarizes the latest scientific evidence on climate sensitivity, observed impacts and attribution, and the projected impacts and adaptation options. Indeed, there are statements on all these areas. There is much on observed climate change without apparent focus on anthropogenic climate change in other than, for example, statements like "attribution of local warming to anthropogenic climate change is less certain". Discussion of adaptation responses is too brief and misses an opportunity to provide information governments can use to mitigate negative trends and thereby reduce negative societal impacts. (UNITED STATES OF AMERICA)	Detailed information on adaptation responses are covered in other parts of the WG2 volume; adaptation chapters.

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35	74541	23	0	0	0	0	The narrative of this chapter is very focused on identifying the negative impacts of climate change. To balance the perspective, it may be helpful to address also the positive impacts or opportunities that will emerge from those changes. Perhaps the focus on positive impacts is not in the scope of this document, but it should be clearly stated, if not already somewhere else. (UNITED STATES OF AMERICA)	Text on the benefits of climate change is included throughout the chapter. [less cold-related mortality, increased forestry and agriculture production, for example.]
36	74542	23	0	0	0	0	The number of simulations (9 & 20) used to draw conclusions about trends and impacts seems small at first glance, and the number chosen should be explained. (UNITED STATES OF AMERICA)	The figure has been updated to include more simulations
37	74543	23	0	0	0	0	The report seems ready to favor the proposition that virtually all climate effects will be negative. To be sure, many of them will be, but it is not inconceivable that some will be positive. This potentially hurts the credibility of the report and makes it unduly vulnerable to criticism. (UNITED STATES OF AMERICA)	Text on the benefits of climate change is included throughout the chapter. We have ensure the all the literature on impacts is revised (positive and negative). Less cold-related mortality, increased forestry and agriculture production, for example.
38	74544	23	0	0	0	0	The summary statements about negative climate trends and their impact on various sectors are good but little is said about how the data support these statements. The text would have greater impact on readers with some linkage to the data justifying the summary statements. Figures and tables are presented as justification for many of the trend and impact statements without discussion of how data in them support the statements. There is little narrative in the chapter that interprets the tables and figures therein. In the interest of space it is not possible to have a full explanation for each figure. Nonetheless, if the table or figure is relevant enough to be in the chapter, then an adequate caption and substantial content in the narrative are necessary, especially a discussion of specifics in the figures which address why the data show a particular trend or impact. (UNITED STATES OF AMERICA)	There is not sufficient space to detail all the evidence. The captions full describe how the figures were generated, and the journal paper is cited for readers to get further details
39	74545	23	0	0	0	0	There are significant differences between figures drawn from the 9- and 20-simulation studies. Some discussion of key differences and whether or not they affect the authors' overall conclusions would strengthen the document. (UNITED STATES OF AMERICA)	The figure has been updated.
40	74546	23	0	0	0	0	Throughout the document, "confidence" levels are expressed (high confidence, medium confidence and low confidence). It should be made clear what the criteria are for determining which level is assigned. Was this based on a parametric measure, a vote of the the various authors, or some other criteria? Incorporate the figure from the Uncertainty Guidance at the beginning of this chapter. (UNITED STATES OF AMERICA)	See IPCC Guidance. We do not have space to include the Figure from the Uncertainty Guidance - this issue is general to all chapters.
41	74662	23	0	0	0	0	Figure 23-1: There is a reasonably large latitudinal difference or spread (approximately 45N to 70N or 25 degrees latitude) between the regions classified as Alpine. As perhaps a minor point, with global climate change, the changes affecting the global general circulation could impact the northern and southern alpine regions differently. The present classification is presumably based more on temperature and altitude than latitude. Perhaps some explanation could be provided as to whether the general atmospheric circulation in European region is expected to remain approximately the same and that the temperature and precipitation effects due to climate change is comparable in all the alpine sub-regions as depicted in Fig 23-1. To be noted, many of the tables in Ch-23 map changes in accord with this classification. The question is whether this broad brush classification based on present climate and vegetation distribution patterns is adequate or for that matter appropriate? (UNITED STATES OF AMERICA)	The comment is very important we have decided to split the alpine region into three major parts: south, north, east. The calculation of all climate parameters has now be done separately for the three regions. A separate table includes the information for this three regions. Please see supplementary material.
42	76521	23	0	0	0	0	Lack of adaptation strategies regarding wildfires. Examples of ecosystem based approaches to adaptation might include management of fire-prone ecosystems to achieve safer fire regimes while ensuring the maintenance of natural processes and preservation of biodiversity. (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Wildfires and adaptation strategies are discussed in 23.4.4 (forestry)
43	76522	23	0	0	0	0	Impacts of projected change on temperature and precipitation on fuel accumulation and relation to fires are poorly discussed. (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Noted. Discussion of this has now been improved in the main text.
44	76523	23	0	0	0	0	There is no reference to post-fire restoration strategies (conserve biodiversity) or prevention strategies (e.g., the use of prescribed burning to reduce fuel loads) for adaptation. (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Adaptation is addressed in section 23.4.4 on forestry.
45	76524	23	0	0	0	0	Will climate change and fire have impacts on vegetation communities and biodiversity? Is there any spatial (regional) variability on these effects (e.g., negative or positive implications in different regions)? Discuss this point (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	The chapter now includes a more thorough discussion of future wildfire risk.
46	76525	23	0	0	0	0	Any suggestion to deal with fire management under climate change? (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Adaptation is addressed in section 23.4.4 on forestry.

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47	76526	23	0	0	0	0	What will be the effects of climate stresses on biodiversity and ecosystem services? (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	This is now addressed in a new Box 23.2
48	76715	23	0	0	0	0	typo: in all chapter, when two consecutive referecnes are present, each one is inserted between bracket, with a style different than in previous chapters. So change from "(Author 1 et al, YEAR)(Author2 et al., YEAR)" in "(Author 1 et al, YEAR; Author2 et al., YEAR)" (Claudio Cassardo, University of Torino)	This will be fixed by copy editing.
49	76932	23	0	0	0	0	In some aspects the health chapter (11) seems to be more detailed on issues that are relevant for Europe (e.g. heat-waves and health adapation to heat-waves); maybe reference could be made to chapter 11? For example on page 27, line 14 refer to chapter 11, from page 28, line 51 to page 29, line 11 for more detail. (Eva Franziska Matthies, Consultant)	Some heat wave issues are already addressed in detail. Cross ref to chapter 11 will be added.
50	78706	23	0	0	0	0	Add reference: Vardoulakis S., Heavside C. (Eds), 2012. Health Effects of Climate Change in the UK 2012 – Current evidence, recommendations and research gaps. Health Protection Agency. Centre for Radiation, Chemical and Environmental Hazards, UK. (Sotiris Vardoulakis, Health Protection Agency)	Reference will be added to section on health.
51	79025	23	0	0	0	0	Both very balanced, comprehensive and clear (partly table overloaded, but text clear) (Reimund Schwarze, Helmholtz Leipzig)	No action needed.
52	83378	23	0	0	0	0	1) Overall -- The chapter team has developed a robust, comprehensive 2nd-order draft. In the final draft, the chapter team is encouraged to continue its prioritization of compact and rigorous assessment, clear writing, and high specificity. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
53	83379	23	0	0	0	0	2) Coordination across Working Group II -- In developing the final draft of the chapter, the author team should continue to ensure coordinated assessment, both in the chapter text and at the level of key findings. As appropriate, cross-references to the sections of other chapters and/or their assessment findings should be used, ensuring that overlaps are reduced and assessment harmonized. (Katharine Mach, IPCC WGII TSU)	The content has been checked for consistency with other chapters and cross-references included.
54	83380	23	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. (Katharine Mach, IPCC WGII TSU)	The chapter has been harmonised with WG1 findings.
55	83381	23	0	0	0	0	4) 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. (Katharine Mach, IPCC WGII TSU)	Noted.
56	83382	23	0	0	0	0	5) Shortening and tightening the assessment -- The chapter team should continue to condense the assessment as much as possible, aiming for example to reduce the text of the chapter by 10 pages. (Katharine Mach, IPCC WGII TSU)	Noted.
57	83383	23	0	0	0	0	6) Characterization of future risks -- In characterizing the future risks for Europe, to the degree appropriate the chapter team should indicate the extent to which risks (or key risks) can be reduced through mitigation, adaptation, development, etc. That is, how may risks increase as the level of climate change increases, and is it possible to indicate the relative importance of changes in mean conditions, as compared to changes in extreme events, as compared to potential non-linear changes associated with biome shifts or tipping points? And then, how much can these risks be reduced through adaptation or development, in the near-term and long-term? How are factors or stressors that multiply risks relevant in this context? As supported by its assessment of the literature, and potentially building on table 23-4, the author team should consider communicating risks for the era of climate responsibility (the next few decades, for which projected temperatures do not vary substantially across socioeconomic/climate scenarios) and for the era of climate options (the 2nd half of the 21st century and beyond). As might be helpful to the chapter, the framing of table SPM.4 could be considered in characterization of future risks, along with the key and emergent risk typology of chapter 19. (Katharine Mach, IPCC WGII TSU)	Noted.

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58	83384	23	0	0	0	0	7) 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. In addition to nuanced characterization of future risks (see the previous comment), the chapter team is encouraged to consider themes emerging across chapters, indicating for example how extreme events have demonstrated adaptation deficits and vulnerabilities to date and may relate to future risks, how limits to adaptation may be relevant in the context of this chapter, how multidimensional inequality is relevant in the context of climate change, how adaptation experience has been relevant to date, and how interactions among mitigation, adaptation, and sustainable development may occur. (Katharine Mach, IPCC WGII TSU)	Noted.
59	83385	23	0	0	0	0	8) Calibrated Uncertainty Language -- All calibrated uncertainty language used in the chapter, including summary terms for evidence and agreement, levels of confidence, and likelihood term should be italicized. Additionally, wherever possible they should be presented parenthetically at the end of sentences to enhance directness of wording. (Katharine Mach, IPCC WGII TSU)	Noted.
60	84787	23	0	0	0	0	GENERAL COMMENTS: I congratulate the author team for all their work on an interesting and informative SOD. When considering the suite of review comments, please look for opportunities to continue to hone and focus the text in revision even further. Please see my detailed comments for suggestions related to specificity of ES findings and traceable accounts, refining figures and tables, and specific clarifications. In addition, where likelihood terms are used ("likely," "very likely," etc.), it is also not always clear whether they are intended as calibrated language or not--please carefully check this and avoid casual usage. (Michael Mastrandrea, IPCC WGII TSU)	Noted
61	84788	23	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 23, this includes presentation of observed impacts and vulnerabilities in section A.i, adaptation experience in section A.ii, sectoral and regional risks in section C.i, and interactions between adaptation and mitigation in section D.ii, as well as related figures and tables. 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 23 and other chapters at LAM4? (Michael Mastrandrea, IPCC WGII TSU)	Noted.
62	85232	23	0	0	0	0	Yet another Chapter that is unable to notice that there has been no increase in temperature for 15 years and therefore all the "projections" are wrong. Since the record you use has an upwards bias the globe is actually cooling and this is seen with the persistent cold winters which you seem incapable of recognizing despite the bad effects which are much worse than the claimed warming. Also there is no evidence that the sea level is rising if you judge it from recent more reliable measurements (Vincent Gray, Climate Consultant)	Observed temperature trends are discussed in chapter 21 and in the Working Group I report, and this chapter refers to these statements. The same is true for observed trends in sea level rise.
63	56997	23	1	1	1	1	The title "Europe" is hanging. Let the title capture the spirit of the underlying text in the entire document. In other words, the title always prepares the reader what he expects in the text of the document (KENYA)	The title is pre-decided and cannot be changed.
64	59515	23	2	10	2	10	Does not seem right to place "cultural heritage and landscapes" under "health and social welfare". Unclear association. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The impact of cultural heritage is included primarily as a social impact.
65	83386	23	2	50	0	0	Format of the Executive Summary -- The chapter team is strongly encouraged to structure the executive summary so that each paragraph presents a key finding in bold text with calibrated uncertainty language followed by non-bold supporting text. Additionally, all calibrated uncertainty language used should be italicized for clarity and placed within parentheses for directness of wording wherever possible. (Katharine Mach, IPCC WGII TSU)	Done.
66	83387	23	2	50	0	0	Key Regional Risks in the Executive Summary -- In tightening and focusing the executive summary, the chapter team should consider its presentation of key risks and projected outcomes as a guide for prioritizing material while condensing and reducing overlap. Even more than already done, it would be great if the author team could emphasize the key risks for the region, with physical hazards, exposure, and vulnerability as determinants of the risks. How do the risks change as the level of climate change increases? What is the potential for risk reduction through adaptation? How do risks differ in the near-term (which can be considered an era of climate responsibility) and in the long-term (which can be considered an era of climate options)? (Katharine Mach, IPCC WGII TSU)	Done.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
67	84789	23	2	50	0	0	Executive Summary: Calibrated uncertainty language is needed throughout the executive summary and must be added in the final draft of the chapter. Please integrate overlapping material into a shorter set of paragraphs formatted with bold findings supported by nonbold additional information, retaining the careful use of calibrated uncertainty language and line of sight to chapter sections already employed. To the extent possible as supported by the literature, please emphasize what risks are projected to emerge over different time horizons (e.g., mid-century vs. end-of-century), as well as the potential or lack of potential for mitigation and adaptation to reduce them. Section 23.10.1 provides useful information that overlaps with the executive summary as well. Please consider how these presentations interact. (Michael Mastrandrea, IPCC WGII TSU)	Noted.
68	58920	23	2	50	5	43	The drastic changes in high mountain landscapes - glacier landscapes to be replaced by rock/debris/lake landscapes with long-lasting disequilibria in vegetation, erosion/sedimentation and slope stability, causing strong effects on (seasonal) water supply, hydropower, tourism, hazard prevention and landscape protection - should be mentioned. The absence of any mentioning of the highly sensitive high mountain ranges in the executive summary is astonishing - did I overlook something? (Wilfried Haerberli, University of Zurich)	A summary sentence on impacts in mountains has been added to executive summary and section on key vulnerabilities.
69	63765	23	2	52	5	43	Why is there, in contrast to the other chapters, no bold highlighting of key information in this executive summary? Please highlight the key findings in executive summary (as in other chapters). (GERMANY)	Bold has been added.
70	59516	23	3	1	3	5	sea rise is missing here. It appears latter and explained even later which is a sign of bad structure. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	A summary sentence on impacts of sea level rise has been added to executive summary and section on key vulnerabilities.
71	76516	23	3	1	3	5	and fires? (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Done.
72	83388	23	3	1	3	13	The sentences on lines 1-2 and 12-13 are overlapping and could be condensed. (Katharine Mach, IPCC WGII TSU)	Done.
73	63766	23	3	2	3	2	Meteorological droughts (medium confidence) and heavy precipitation events (high confidence) in Europe are not considered in the TS (e.g. under specific regional examples (p.8, l.50) or in Table TS.1.(p.86) (GERMANY)	REFER to TS
74	69688	23	3	2	3	2	ExSum: "meteorological drought (medium confidence)", section 23.2.2.3 does not provide information on meteorological drought, source of this information is unclear (NETHERLANDS)	Correct cross ref is section 23.2.3
75	69689	23	3	2	3	2	ExSum: "meteorological drought (medium confidence)", section 23.2.2.3 does not provide information on meteorological drought, so why "medium confidence"? (NETHERLANDS)	Correct cross ref is section 23.2.3
76	59517	23	3	3	3	3	"[high confidence]". These expressions make the text unreadable. The same effect could be achieved by using consistent statements of plain text such as for example "and most probably heavy precipitation events". A number of similar instances exist in this chapter. I would also say that statements supported by weak evidence should not make it to the text at all. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Noted but we are following IPCC guidance.
77	61574	23	3	4	3	5	The reference to wind can be deleted. In page 9 (lines 41-42), the report indicates projected wind speeds are uncertain due to shortcomings in wind simulation. Other indices that are better simulated (snow cover, aridity, humidity?, tropical nights...) could be worthy instead of wind (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Disagree. We like to give information about wind too. See reference to extreme wind speeds in 23.2.2.3
78	61991	23	3	5	3	5	Is there any evidence of a change in the distribution of wind directions? (Paolo Ciavola, University of Ferrara)	There is little robust evidence on this.
79	59518	23	3	7	0	7	Climate change cannot affect composition of animals and plant species; it can affect composition of animal and plant communities. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been corrected.
80	83389	23	3	7	3	7	The word "composition" could be perhaps clarified. Composition of species could potentially be interpreted as a physiological trait rather than an ecological outcome. (Katharine Mach, IPCC WGII TSU)	Correct.
81	83390	23	3	8	3	8	Is it possible to specify the most relevant crop types here? (Katharine Mach, IPCC WGII TSU)	Crops changed to cereal.
82	69690	23	3	9	3	9	ExSum: "health, particularly in Southern Europe": Section 23.5.1 only discusses potential climate change impacts in the future, not observed climate change impacts in the past (NETHERLANDS)	Some text has been added on evidence for observed effects. Also discussed in section 23.9.
83	83391	23	3	9	3	9	It would be preferable to specify which kinds of health impacts have already been observed. (Katharine Mach, IPCC WGII TSU)	Corrected.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
84	70222	23	3	9	3	10	This statement should be revised. As explained elsewhere, recent studies show a different pattern: non-significant trend in the number of fires since 1986 in Mediterranean Europe, and significant decrease in the last decade. Also a significant decrease in area burnt over the whole period. Jesús San-Miguel-Ayanz , Marcos Rodrigues , Sandra Santos de Oliveira, Claudia Kemper Pacheco , Francisco Moreira , Beatriz Duguy and Andrea Camia (2012). Land Cover Change and Fire Regime in the European Mediterranean Region. Chapter 2 in F. Moreira et al. (eds.), Post-Fire Management and Restoration of Southern European 21 Forests, Managing Forest Ecosystems 24, Elsevier. DOI 10.1007/978-94-007-2208-8_2 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This has been updated. Discussion in 23.4.4 forestry section.
85	69691	23	3	11	3	11	ExSum: "European cultural heritage", section 23.5.4 only discusses potential climate change impacts in the future, not observed climate change impacts in the past (NETHERLANDS)	Agreed. Comment has been removed.
86	63767	23	3	11	3	12	Table 23.3 which is referenced here does only partly show information on observed vulnerability. Following the table caption it shows future adaptation costs. It is not clear what is meant here. Please adjust the reference or the figure caption. (GERMANY)	Correct ref is for table on observed effects.
87	69692	23	3	12	3	12	Reference to Table 23.3 not correct, should be Table 23.5? (NETHERLANDS)	Correct ref is for table on observed effects.
88	61575	23	3	12	23	15	This statement is a projection, not an observed impact. It can be linked to paragraph starting in line 21 (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Agreed. Text has been revised.
89	69693	23	3	13	3	15	"with adverse implications for ... labour productivity, and ...": adverse effects of heat waves on labour productivity is nowhere mentioned in Ch.23, remove statement? (NETHERLANDS)	Text on labour productivity will be added to sections on health and on manufacturing.
90	69694	23	3	13	3	15	"with adverse implications for ... ", not only adverse effects, suggest to change to "with mostly adverse implications for ..." (NETHERLANDS)	agreed.
91	69695	23	3	13	3	15	"with adverse implications for ... built environment.", not in all regions of Europe, suggest to change to "with mostly adverse implications for ... built environment in most regions of Europe." (NETHERLANDS)	Agreed.
92	69696	23	3	13	3	15	"with adverse implications for ... built environment (Table 23.4).", also include reference to sections 23.3.2, 23.3.3, 23.3.4, 23.3.6, 23.4.1, 23.4.2, 23.4.3, 23.5.1 (NETHERLANDS)	Done.
93	59519	23	3	17	0	19	Remove the whole text in brackets. Services written there are found again in the last sentence of the paragraph. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been corrected.
94	69697	23	3	17	3	17	Give an example of sector: such as infrastructure, food production etc otherwise it looks like the statement is related to table 23.2 on ecosystem services (NETHERLANDS)	This sentence has been deleted.
95	83392	23	3	17	3	18	The logic of the start of the sentence could be improved. It asserts that all ecosystem services will be degraded, but the parenthetical listing only provides a subset of the categories of ecosystem services. Given the subsequent sentence, the parenthetical list could be deleted. (Katharine Mach, IPCC WGII TSU)	The paragraph on Ecosystem Services has been clarified.
96	58475	23	3	17	3	19	Line 19 is a repetition. Put in right order line 17-18 with references of the table (Martin Pecheux, Institut des Foraminifères Symbiotiques)	This has been corrected.
97	61576	23	3	17	3	19	It is not clear why "Provisioning, Regulating and Cultural" is mentioned twice. If the *order* of services in the second reference reflects their relative degree of affectedness, this should be stated explicitly. Ecosystem services are also mentioned in page 5, line 19 (some ecosystem service affected, low confidence). Check consistency. It would be useful to have some examples of the kinds of ecosystem services identified (e.g. what is meant by cultural ecosystem services?) (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Error. Repetition deleted. Examples will be included.
98	63768	23	3	17	3	19	Please insert this para in the TS (p.9, l.52). Ratio: to consider the increasing role of ecosystem services in particular with regard to ecosystem based adaptation. (GERMANY)	REFER to TS
99	65111	23	3	17	3	19	While this can be derived from the table it needs more supporting text in the relevant section (Pam Berry, Oxford)	Agreed. Ecosystem services is now discussed in a box.
100	76716	23	3	17	3	19	this sentence is a repetition of what said few rows before (Claudio Cassardo, University of Torino)	This has been corrected.
101	79065	23	3	17	3	19	The last sentence can be deleted, the services are already given in the prior sentence in just another order. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	This has been corrected.
102	69698	23	3	19	3	19	This sentence is not necessary and just repeat the previous one. It does not bring any new information. (NETHERLANDS)	This has been corrected.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
103	83393	23	3	21	3	27	As much as possible, it would be preferable to indicate how these projected risks vary with the level of climate change and with timeframe (near-term versus long-term). (Katharine Mach, IPCC WGII TSU)	This has been addressed as far as space allows.
104	69699	23	3	25	3	25	there is more evidence of risks in Northern Europe in several sectors than in the previous assessment AR4 (NETHERLANDS)	Agreed. This has been added to Executive Summary.
105	61577	23	3	29	3	30	Where is the text referring to adaptation limits? There is only a Table (page 88, see below) without clear entry point in the report. Some description of these limits would be needed in the report. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Supporting text on limits to adaptation has been added to section 23.7.
106	74547	23	3	32	3	33	Please make this sentence more clear (UNITED STATES OF AMERICA)	This has now been clarified (there are very few studies that address impacts >4 degc/century.
107	69700	23	3	33	3	33	Which studies made an assessment of Climate change on crop yields above 4deg ? (NETHERLANDS)	This has now been clarified (there are very few studies that address impacts >4 degc/century.
108	59520	23	3	33	3	46	The paragraph is not well written. It basically covers flooding (which is not related to the heading - Sectoral Impacts) and then the last sentence jumps to "overheating in domestic housing". (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Sentence on housing has been moved to paragraph on energy.
109	74548	23	3	37	3	37	SREX is not in the Bibliography and should be. (UNITED STATES OF AMERICA)	Will reference according to IPCC style
110	83394	23	3	39	3	39	If "likely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. (Katharine Mach, IPCC WGII TSU)	This has been changed to: "climate change is projected..."
111	59521	23	3	40	0	40	Please reverse the order of text in brackets: (people affected and monetary losses). (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. This has been reversed
112	67812	23	3	41	3	42	it could be made clearer that the projected damages of flooding refer to assessments based on climate projections driven by lower emissions than the current trajectory (same page line 31). (Tanja Wolf, WHO Regional Office for Europe)	This is not correct: the projections include also emissions according to the current trajectory (e.g. SRES A2). The statement also makes clear that most of the damages can be prevented, but possibly not all.
113	61992	23	3	42	3	42	No mention of role of warning systems in mitigating impact, it would be important to refer to work done on storm impacts in FP7. Please refer to: Ciavola, P., Ferreira, O., Haerens, P., Van Koningsveld, M., Armaroli, C., 2011a. Storm impacts along European coastlines. Part 2: lessons learned from the MICORE project. Environmental Science & Policy 14 (7), 924–933. Ciavola, P., Ferreira, O., Haerens, P., Van Koningsveld, M., Armaroli, C., Lequeux, Q., 2011b. Storm impacts along European coastlines. Part 1: The joint effort of the MICORE and ConHaz Projects. Environmental Science & Policy 14 (7), 912–923. (Paolo Ciavola, University of Ferrara)	These have been added to Section 23.7.3.
114	67813	23	3	42	3	43	the problem of overheating in domestic housing appears slightly misplaced in this paragraph dealing mainly with flooding. Has it been considered to limit statements in the executive summary to those with high confidence? This way the executive summary seems rather long and wordy. (Tanja Wolf, WHO Regional Office for Europe)	Sentence housing has been moved to paragraph on energy.
115	69701	23	3	42	3	43	ExSum Ch.23: "Climate change will increase problems associated with overheating in domestic housing (medium confidence) (section 23.3.2)", confidence level should be "low" (see section 23.3.2: "exactly why and how dwellings currently overheat is uncertain") (NETHERLANDS)	The frequency of overheating is likely to increase with climate change, even if current prevalence of overheating cannot well described.
116	59522	23	3	45	3	46	it is a contradiction not to mention here that sea rise will probably have some affect on coastal areas and hence summer tourism. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Summary reflects the content of the chapter- not much evidence regarding tourism and sea level rise.
117	61578	23	3	45	3	46	The sentence is difficult to understand due to the combination of two (strong) caveats by "and". Furthermore, the limited knowledge base on the effects of climate change on general tourism (essentially a set of related studies based on the CVI) does not permit such a statement. The limits of the available knowledge base need to be made more explicit here. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Sentence has been revised.
118	83395	23	3	46	3	47	Where the chapter team says "after 2050," is this an outcome projected for high levels of climate change or across scenarios after 2050? (Katharine Mach, IPCC WGII TSU)	After 2050 means after 2050.
119	61579	23	3	48	3	48	"Will" should be replaced by "can" when a statement refers to human choices (as it does here). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Text has been revised.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
120	59523	23	3	52	3	52	I don't see how accidents will be reduced in south Europe where intense weather events will become more frequent. Explaining more in the text would be valuable to the reader. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The sentence refers to severe accidents, not to total accidents. Severe accidents will be reduced to due reduced speed as a result of bad weather.
121	61580	23	3	52	3	52	The evidence presented for this statement is very weak. Page 14, lines 30-35 presents a different phrasing, and links reduction in severity to an eventual increased precipitation, which is not the general trends projected. The weight of severe accidents caused by extreme events in overall figures should also be considered. Are these figures relevant at EU level? Are the findings presented useful for the whole Europe, or for a specific region/country, etc.? Presenting this as a general trends does not seem to be very sound. It's possible that climate change may increase accidents in summer - more people travelling to the coast, tired (too much sun), increased alcohol consumption. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The estimates of Nokkala et al. (2012) in page 14 refer to the entire Europe. This ref, which estimates a reduction of severe accidents in road transport, is complemented by other references mentioned in the same para in page 14, which also conclude that the number of severe (not total) accidents will decrease. Thus, evidence in not very weak.
122	83396	23	3	52	3	53	Where the chapter team says "after 2050," are these projected outcomes for high levels of climate change or across scenarios after 2050? (Katharine Mach, IPCC WGII TSU)	After 2050 means after 2050.
123	63769	23	3	53	3	53	Given that there is no study comparing all inland water ways in Europe I do not see why the Rhine should be mentioned as "particularly" affected. Suggestion: replace "particularly the Rhine" by "on some rivers" or skip this part of the sentence. (GERMANY)	Text revised.
124	83397	23	4	5	4	6	Where the chapter team says "after 2050," is this an outcome projected for high level of climate change or across scenarios after 2050? (Katharine Mach, IPCC WGII TSU)	After 2050 means after 2050.
125	76717	23	4	6	4	6	"small impact": positive or negative? (Claudio Cassardo, University of Torino)	Text revised in order to clarify and also to make a distinction between seasonal expected impact.
126	69702	23	4	6	4	7	ExSum Ch.23: "Climate change will inhibit thermal power production during summer", word "inhibit" is too strong, should be "decrease", Ch.23 p.15 line 28-30 mentions a "6-19% decrease of the summer average usable capacity of power plants" and "lower figures have also been estimated" (NETHERLANDS)	agreed. Text changed.
127	76718	23	4	8	4	8	"space heating demand": will it mean that there will be need to heat a lower amount of space because climate will be warmer? (Claudio Cassardo, University of Torino)	Yes
128	61581	23	4	8	4	10	The change in climatically determined "cooling demand" should seperately mroe clearly from the change in "cooling service supply", which also considers socio-economic factors such as the prevalence of air conditioning. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Agreed- but these factors are often not separated in the reported results.
129	59524	23	4	11	4	11	As mentioned later temperature rise reduces energy demand during the winter. This a positive (in economic terms) impact worth mentioning. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	This is indeed mentioned in the text.
130	61582	23	4	11	4	11	"Will" should be replaced by "can" when a statement refers to human choices (as it does here). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	All adaptation options depend on human choices. In addition, there is no doubt that the specific adaptation measures mentioned here, which are already adopted to a significant extent in some countries/ regions, lead to reduced energy demand.
131	59525	23	4	12	4	13	If possible, include a more recent reference on estimates for urbanisation in Europe. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	comment unclear?
132	69703	23	4	14	4	14	"Climate change will change the distribution and seasonal pattern of some human infections", distribution ok, but changes in seasonal patterns are not reported in section 23.5.1. (NETHERLANDS)	Text on seasonality has been added to health section.
133	59526	23	4	15	0	0	Please add the following phrase: The incidence and prevalence of pollen-related allergy diseases will increase (low confidence) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Disagree. There is currently not enough evidence to support this statement regarding incidence or prevalence, although the seasonality of symptoms (exacerbations) is likely to change.
134	61583	23	4	15	4	16	Make clear whether this sentence refers to "introduction" to Europe or to a European sub-region or locality. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Introduction is relevant to the whole region, it does not imply a region-wide distribution.
135	83398	23	4	16	4	16	If "unlikely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. (Katharine Mach, IPCC WGII TSU)	Done.
136	69704	23	4	16	4	17	"Climate change and sea level rise will damage European cultural heritage", effects of sea level rise not mentioned in section 23.5.4. (NETHERLANDS)	A comment has been added in the relevant section.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
137	69705	23	4	16	4	17	"... Including buildings, local industries, landscapes, and iconic places such as Venice", effects on local industries not mentioned in section 23.5.4. (NETHERLANDS)	Local industries refers to artisanal production. e.g cork and wine making - which are mentioned.
138	69706	23	4	16	4	17	"... Including buildings, local industries, landscapes, and iconic places such as Venice": Section 23.5.4 states that Venice previously was vulnerable to flooding, but that adaptation measures have now been taken and that the frequency of storm surges may decrease, so that now the climate change impact on Venice is estimated to be smaller, suggest to skip the reference to Venice from ExSum. (NETHERLANDS)	Ref to Venice now removed.
139	59527	23	4	16	4	18	It is strange that in this summary of all impacts of sea rise the one on cultural heritage is selected. This sounds country specific to me. A number of significant impacts could be mentioned (threat on critical infrastructure, population and its migration, cities etc). (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Summary sentence now included in Exec Sum and Key Vulnerabilities section.
140	69707	23	4	18	4	18	Reference to Table 23-5 not correct, should be Table 23-4? (NETHERLANDS)	Correct ref is now Table on limits to adaptation.
141	69708	23	4	21	4	22	CO2 fertilization may be affected by stomata closure. So we would say [low confidence] (NETHERLANDS)	This has been addressed as far as space allows.
142	83399	23	4	25	4	25	It would be preferable to also present a summary term for agreement along with the summary term for evidence given here. (Katharine Mach, IPCC WGII TSU)	Done.
143	83400	23	4	25	4	29	As much as possible, it would be preferable to indicate how these projected risks vary with the level of climate change and with timeframe (near-term versus long-term). (Katharine Mach, IPCC WGII TSU)	Done.
144	69709	23	4	27	4	28	ExSum Ch.23: "but decrease cereal yields in Southern Europe", in Ch.23 p.18 line 30 speaks of yield loss in general, not only cereals (NETHERLANDS)	This has been corrected.
145	69710	23	4	28	4	28	in table 23-4 climate change not only affect the spread of pest and disease in northern europe but in the whole europe (NETHERLANDS)	Sentence removed.
146	76719	23	4	31	4	31	typo: "234.2" --> "23.4.2" (Claudio Cassardo, University of Torino)	corrected.
147	83401	23	4	34	4	36	As much as possible, it would be preferable to indicate how these projected risks vary with the level of climate change and with timeframe (near-term versus long-term). (Katharine Mach, IPCC WGII TSU)	Done
148	69711	23	4	36	4	36	since the subject of this paragraph concerns wine yards, We would add specific reference to Box 23-1 ("Implications of Climate Change Impacts for European Wine and Vineyards") (NETHERLANDS)	Agreed.
149	61584	23	4	39	4	43	Make clear whether this sentence refers to whole of Europe or to specific regions only. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Done
150	61585	23	4	42	4	43	This statement is not duly supported by the text in Chapter 23. Being water one of the main concerns in Europe, and given its nature as a limited, cross-sectoral, transboundary resource, a more comprehensive and integrated approach to the evaluation of effects of climate change on this resource and its management would be needed. Linking water resources solely to agriculture (page 21) seems quite insufficient. The integrated water management proposed does not derive from the information contained in the chapter. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Statement on water has been revised.
151	83402	23	4	45	4	45	The use of "sea" here feels a bit odd to me. "Ocean" or "marine" may be preferable. (Katharine Mach, IPCC WGII TSU)	Corrected.
152	74549	23	4	45	4	51	This section seems inconsistent with section 23.4.6, and dwells on what will "not" occur, versus need to manage (UNITED STATES OF AMERICA)	This statement has been revised.
153	64573	23	4	46	4	46	Exec Sum: ch6 p 30 L 44 gives "medium evidence" that "temperature-mediated changes affect the body size of marine organisms". The confidence statements should be balanced and a confidence level given in both chapters. (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	This statement has been revised.
154	61586	23	4	46	4	47	It is not clear what is known (and what not) for regions other than the Bay of Biscay. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This statement has been revised.
155	83403	23	4	46	4	47	This statement is perhaps not as clear as it could be, given that "not decrease" is cumbersome for the reader to understand. (Katharine Mach, IPCC WGII TSU)	agreed.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
156	61587	23	4	46	4	48	These seem to be very optimistic statements, based on limited literature. The statement on fishing fleets, derived from only 1 article, clashes with recognized impacts on fish resources in the same article. This estimated decrease in turnover in the article is estimated to be 6-17%: it is subjective stating that this is not a decrease. The article on fishing fleets in the Baltic concludes the opposite to what is stated here. Statement in pages 41 (lines 49-51) and 42 (37-41) could contradict these summary statements. The amount of impacts observed (nutrients, fish populations, migration) challenge this synthesis overview as well. For positive effects of climate change on fishing, see example in El Hierro island (Canthidermis suflamen, Decapterus macarellus) (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The assessment on fisheries has been updated to reflect the chapter text.
157	64574	23	4	48	4	48	??? but fishing fleets which target selected species may have to move with the species. This statement seems contradictory within this chapter and with chapter 6. e.g. ch 23 p25 L 25-26 "Fishing fleets which presently target marine species (e.g. cod, herring, sprat, plaice, sole) in the Baltic may have to relocate to more marine areas or switch to other species which tolerate decreasing salinities" (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	The assessment on fisheries has been updated to reflect the chapter text.
158	66255	23	4	48	4	48	I question the general validity of this statement, even if restricted to Europe: "Climate Change will not entail relocation of fishing fleets (high confidence)". The same statement is repeated in other chapters, but not in 23.4.6, which is referred to. (Geir Ottersen, Institute of Marine Research)	The confidence has been revised and linked to the main text.
159	63770	23	4	50	0	0	Please check identity of terms 'cyanobacterial blooms' as mentioned here, with 'algal blooms' as mentioned in the TS (p.40, I.5) (GERMANY)	corrected.
160	64575	23	4	50	4	50	ch6 p 46 L 36-37 sees low confidence "limited evidence and low confidence on how harmful algal blooms and the prevalence of pathogens will respond to climate change." (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	We will ensure consistency with chapter 6. Changed to low confidence.
161	69712	23	5	1	5	1	"assuming future emissions reductions": Section 23.6.1 mentions " assuming no change in future emissions" (Ch.23 p.30 lines 9-10) (NETHERLANDS)	Text revised.
162	69713	23	5	1	5	2	"due to higher temperatures": Section 23.6.3 mentions more effects than only temperature, e.g. low flow/drought, nutrient releases caused by precipitation events. Suggest to change to "due to higher temperatures and changing precipitation patterns" (NETHERLANDS)	Text revised.
163	74550	23	5	1	5	3	Please clarify how drought & flooding affect soil erosion & surface water quality in Section 23.4.3&23.6.3 (UNITED STATES OF AMERICA)	These sections have been revised in the main text to make mechanisms to make them more clear.
164	70223	23	5	2	5	3	There are some evidences, discussed in section 23.6.2. This statement may erroneously suggest that there will be no effects (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Text has been revised, with refs included in section.
165	69714	23	5	3	5	3	"... Climate change on soil erosion, salinisation or soil fertility": effects on salinisation not mentioned in Section 23.6.2. (NETHERLANDS)	Text has been revised, with refs included in section.
166	69715	23	5	4	5	4	"... Increased forest productivity in northern Europe"; Section 23.6.2 only mentions potential productivity increase in northern Europe in the future, not observed productivity increase in Northern Europe in the past (NETHERLANDS)	This has been corrected.
167	58921	23	5	5	0	0	The term "climate warming" is popular but not scientifically sound. Climate is defined as a medium-term average of meteorological conditions and as such can change but not warm, cool, improve or deteriorate. This is far more fundamental than just a semantic detail: the climate problem is not simply a temperature case but relates to the increasing energy content within the complex climate system (temperature is just one consequence and indicator of this). IPCC should be serious about the use of vague and potentially misleading terminologies. I therefore strongly recommend to replace the term "climate warming" by a precise and correct expression throughout all IPCC ARs. (Wilfried Haeberli, University of Zurich)	Agreed. Text revised and phrase removed.
168	70224	23	5	5	5	8	This statement should be revised. As explained elsewhere, recent studies show a different pattern: non-significant trend in the number of fires since 1986 in Mediterranean Europe, and significant decrease in the last decade. Also a significant decrease in area burnt over the whole period. Jesús San-Miguel-Ayanz , Marcos Rodrigues , Sandra Santos de Oliveira, Claudia Kemper Pacheco , Francisco Moreira , Beatriz Duguay and Andrea Camia (2012). Land Cover Change and Fire Regime in the European Mediterranean Region. Chapter 2 in F. Moreira et al. (eds.), Post-Fire Management and Restoration of Southern European 21 Forests, Managing Forest Ecosystems 24, Elsevier. DOI 10.1007/978-94-007-2208-8_2 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	See comments below.
169	83404	23	5	6	5	10	As much as possible, it would be preferable to indicate how these projected risks vary with the level of climate change and with timeframe (near-term versus long-term). (Katharine Mach, IPCC WGII TSU)	Noted.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
170	74551	23	5	7	5	7	It may be helpful to refer the reader to the Introduction or to figure 23-1 for explanation of sub-regions. These have not been introduced yet at this point. (UNITED STATES OF AMERICA)	Space too limited for Exec Summ. It is described in main chapter text.
171	69716	23	5	8	5	8	"and from storms (low confidence)": Section 23.4.4 mentions impacts of storms only in Central Europe (Ch.23 p.23 lines 18-25), change to "and from storms in Central Europe (low confidence)"? (NETHERLANDS)	The text has been changed.
172	59528	23	5	9	0	10	a general trend of what? Please be more specific in describing this trend. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been revised.
173	61588	23	5	10	5	12	This sentence is very vague. Formulate more concretely. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been revised.
174	59529	23	5	15	0	17	Meaning unclear. Please improve. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been revised.
175	69717	23	5	20	5	20	specify invasive species in which ecosystem (terrestrial, marine or freshwater ??) (NETHERLANDS)	Sentence has been revised.
176	59530	23	5	21	0	22	'movement' of coastal wetlands could be better described as displacement (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been revised.
177	65112	23	5	22	5	23	That conservation policies have not considered the impacts of climate change is blatantly incorrect, one only has to look the the EU biodiversity targets and some Member State policy documents e.g. UK (Pam Berry, Oxford)	text has been revised.
178	59532	23	5	23	0	25	There is some conflict in what is written in this phrase. The Natura 2000 network covers the large majority of protected (for biodiversity) areas in Europe. So, it is not clear how biodiversity is affected in unprotected areas more than in protected ones, when the Natura 2000 sites fail to do so. It should be described which are these other protected areas that are not included in the Natura 2000 network and which conserve biodiversity more successfully under climate change. I suggest it be replaced by the following: "Biodiversity is affected in unprotected areas more than in protected ones; however, it is not still clear whether the Natura 2000 network can retain climate suitability for all groups of species more effectively than areas outside it." (the reasons for this are given below). (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Text revised to - Climate change threatens the effectiveness of European conservation areas [low confidence] [23.6.4], and stresses the need for habitat connectivity [23.6.4]. Given the limited evidence on this topic.
179	59531	23	5	23	5	25	The fact that protected areas do not protect is a serious statement. EU member states struggle for years to pass legislation A great number of private properties are devalued because they are within NATURA zones. Is it appropriate to make this statement based on "low confidence"? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Text revised to - Climate change threatens the effectiveness of European conservation areas [low confidence] [23.6.4], and stresses the need for habitat connectivity [23.6.4]. Given the limited evidence on this topic.
180	61589	23	5	23	5	25	This statement , out of the context of its article, is misleading and should be removed. Readers might not understand the difference between protected areas, Natura 2000 and unprotected areas (the 3 are different). Also, the analysis carried out in the article only considers climate suitability at 2 temporal moments, but the surface area covered by Natura 2000 and the high-range altitude factor (mentioned in the article) would in principle allow for migration and other adaptive responses from species to climate change. the fact that protected areas are placed mostly in mountain areas has the effect of isolating species and of condemning species isolated there to extinction if they are unable to migrate. Obviously, if you select areas randomly, you will get most probably a better representation of the full geography (and climate variability) than when you select with some criterion. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Text revised to - Climate change threatens the effectiveness of European conservation areas [low confidence] [23.6.4], and stresses the need for habitat connectivity [23.6.4]. Given the limited evidence on this topic.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
181	63771	23	5	23	5	25	Citation: "Biodiversity is affected in unprotected areas more than in protected areas, but Natura 2000 areas retain climate suitability for species no better and sometimes less effectively than unprotected areas." Comment: 1) This sentence is an incorrect citation of the summary of the original paper from Araujo 2011: whereas in the original paper the sentence is formulated as a statement about the future ("Protected areas ARE EXPECTED to retain climatic suitability for species better than unprotected areas, but Natura 2000 retain climate suitability for species no better and sometimes less effectively than unprotected areas.") because the paper deals with projections until 2080, the given sentence in the TS is a statement about the presence "Biodiversity IS AFFECTED...". 2) In the original paper of Araujo the analysis differentiates between three categories: protected areas, unprotected areas and Natura 2000. This is not explicitly mentioned in the TS nor chapter 23 and may lead to confusion. 3) One key finding is based on data of plants ("in fact, the Natura 2000 is less effective in retaining suitable climate for plant species than sets of randomly selected unprotected areas") but data of birds show different results ("For half of the remaining combinations of taxonomic groups and scenarios, the Natura 2000 provides no better buffer against climate change than areas outside the network, with the exception of birds"). 4) In Araujo's paper some explanations are given for differences in changes of climate suitability between protected areas and Natura 2000: "Differences in changes of climate suitability between protected areas and Natura 2000 are partly related with topography. Most protected areas are in mountains or rugged environments. The Natura 2000 also prioritizes farmlands and these are located in lower and flatter lands. Because proportional range losses arising from climate change are usually more pronounced in flatlands than in rugged terrains, the Natura 2000 is more vulnerable to climate change." Suggestion: Since the given sentence in the TS is a coarse reduction of findings and explanations of the original paper and may lead to misinterpretations, we propose to delete the sentence here and to replace it with the following original quotation from Araujo's paper: Protected areas are expected to retain climate suitability for species better than unprotected areas. (GERMANY)	Text revised to - Climate change threatens the effectiveness of European conservation areas [low confidence] [23.6.4], and stresses the need for habitat connectivity [23.6.4]. Given the limited evidence on this topic.
182	74552	23	5	27	5	43	The executive summary closes well and adaptation is a strong component of this chapter. (UNITED STATES OF AMERICA)	Thank you.
183	83405	23	5	28	5	28	The phrase "for other world regions" is a bit ambiguous--capacity to adapt will be higher in Europe as compared to all other world regions or as compared to some other world regions? (Katharine Mach, IPCC WGII TSU)	The meaning of the sentence is clear.
184	61590	23	5	30	5	32	This sentence (and the underlying text) should include the findings of the EEA Report No 3/2013 "Adaptation in Europe" published in April 2013 and may include examples from the CIRCLE-2 "Adaptation Inspiration Book" published in March 2013. Both documents should be cited in the underlying text. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	the aim of the chapter is to review the primary studies rather than review documents.
185	59533	23	5	33	5	34	In this and other parts of the chapter the message should be more positive in my view i.e. adaptation should definitely be part of planning as planning is the key to step forward in a proactive fashion. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Agreed, but this statement refers to the fact that little adaptation is being observed in rural development and spatial planning.
186	59534	23	5	36	5	37	I am not sure the logic behind this statement is correct. We are not interesting in merely the costs of adapting buildings. We also need to know what the savings are. If I spend 10.000 euros to adapt my apartment and gain the same amount of money within 10 yeas due to reduced energy consumption it then becomes a financing problem. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Agreed, but this refers to avoided costs from impacts, if adaptation is implemented. In all cases, this is a net loss.
187	69718	23	5	37	5	37	did not find enough reference to justify "high confidence" within the cited par. 23.3.2. Please add more references or change the confidence level (NETHERLANDS)	Changed to medium conference.
188	67814	23	5	39	3	40	This statement needs linkage to the limits of adaptation mentioned on page 3 line 29. (sections 23.5 and 23.8) (Tanja Wolf, WHO Regional Office for Europe)	Agreed. Text revised.
189	79021	23	5	39	5	43	Would like to see mentioning of "maladaptation" risk here, because currently reads: There are potential synergies (of A+M), but also conflicts ("unintended consequences") of mitigation. But there also "unintend consequences" of adaptation (also in the built environment and energy). So just add "There are unintended consequences of mitigation policies and adaptation policies in the built environment ...". Examples are plenty! Unfortunately UFZ studies (MACIS, BASE, SynKon) not yet reviewed papers! (Reimund Schwarze, Helmholtz Leipzig)	Agreed. Unintended consequences of adaptation is also included. This is also discussed more clearly in chapter 16.
190	59535	23	5	42	5	43	This statement for unintended consequences needs explaining. Providing complete meanings is part of good scientific writing. One example could be sufficient here. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Text has been revised.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
191	63772	23	5	49	5	49	Remove "anthropogenic" unless there is a clear attribution of the observed climate impacts on the sectors to the anthropogenic contribution. (GERMANY)	We do discuss the anthropogenic component of the observed effects and hence this statement can remain unaltered.
192	59536	23	6	1	0	2	It would be better if we knew right from the beginning which are the other island states of Europe that are discussed in the Small Island Chapter 29. For instance, where is Cyprus discussed? We are told that Malta is discussed there, but there is no information on this other European island state. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Only Cyprus and Malta are mentioned in chapter 29.
193	64717	23	6	4	0	0	Southern, Northern (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	text has been revised.
194	59537	23	6	4	0	4	Please do not forget to separate the two words ' Southern Northern' with a comma (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	text has been revised.
195	76720	23	6	4	6	4	typo: "Southern Northern" --> "Southern, Northern" (Claudio Cassardo, University of Torino)	text has been revised.
196	84790	23	6	16	6	17	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. Vulnerability is also relevant here and could be used as well. (Michael Mastrandrea, IPCC WGII TSU)	text has been revised.
197	83406	23	6	17	6	17	It might be preferable to clarify that "climate sensitivity" does not mean "equilibrium climate sensitivity" here, instead referring to vulnerability and sensitivity (I assume). (Katharine Mach, IPCC WGII TSU)	text has been revised.
198	64719	23	6	27	6	31	Is the statement, that most of the research is based on EU funding, true? In Germany also the Federal Ministry for Research .. and the Bundesländer spending a lot of money for climate impact research. I think the same is true for many other countries. (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	Agree. Text has been revised to include national govt support.
199	59538	23	6	36	0	37	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Text has been revised and will be copyedited.
200	61591	23	6	50	6	50	The correct name of the "EU Adaptation Platform is: European Climate Adaptation Platform (Climate-ADAPT). This name should be used here and throughout the chapter. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected.
201	57427	23	6	51	0	0	To change '...is due in March 2013' to Reference on this publication (see comment above) (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	This has been corrected.
202	59539	23	6	51	0	0	Update or provide a reference for "The EU adaptation strategy is due in March 2013" since the date has been passed. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	This has been corrected.
203	61592	23	6	51	0	0	The sentence could be rephrased to refer to the newly adopted EU Strategy on adaptation to climate change, available from: http://ec.europa.eu/clima/policies/adaptation/what/documentation_en.htm . European Commission, 2013: COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. An EU Strategy on adaptation to climate change. COM(2013) 216 final. European Commission, Brussels. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been correct and citation added.
204	70189	23	6	51	6	51	The European Commission adopted an EU strategy on adaptation on 16 April 2013 http://ec.europa.eu/clima/policies/adaptation/index_en.htm (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This has been correct and citation added.
205	79022	23	6	52	6	52	EU Adaptation Strategy is out: EEA Report 3/2013, ISSN 1725-9177 (Reimund Schwarze, Helmholtz Leipzig)	This has been correct and citation added.
206	79023	23	6	54	6	54	Statement of Ian Clark at GPDRR13: Focus of New EU Adaptation Strategy is Cross-Sectoral, Integration into Policies, Climate-Proofing. Also Data Sharing (EEA, CLIMATEADAPT). Currently: Only Voluntary Commitments of Member States to set up and implement NAS. But EU "keeps full legislative options" if MS do not act to implement and monitor efforts on adaptation. (Reimund Schwarze, Helmholtz Leipzig)	This detail is beyond the scope of the chapter.
207	64720	23	7	10	0	0	which WG? AR4 12.4.1 (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	OK. WG2. This has been corrected.
208	64721	23	7	11	0	0	which WG? AR4 12.4 (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	OK. WG2. This has been corrected.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
209	59540	23	7	12	7	13	Need a more recent reference than 2006 to support "Urbanisation is projected to increase all over Europe (Reginster and Rounsevell, 2006)". (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Text has been revised with references, but this reference is still appropriate.
210	74553	23	7	21	7	21	Section 23.2 describes current and future climate trends, starting with a summary of non-climate trends. How is this term defined? In other words, what is considered non-climate? Do the areas addressed cover the range of non-climate trends? A short discussion would provide an improved context for the statements made (UNITED STATES OF AMERICA)	The section provides several examples of what are considered here to be non-climate trends, which are manifest in non-climate variables for the past and future projections. Future projections do not however exclude interactions with climate drivers.
211	74554	23	7	23	8	32	Section 23.2.1 Non-climate trends will be hard to project over the next 50 or 100 years—e.g., migration, land use, economic growth (stated as presently stalled), impacts on ecological properties of agro productivity, and others. Detailed socio-economic scenarios are mentioned only for Netherlands and UK and Scotland. Probabilistic socioeconomic futures are mentioned to have been developed for agro and land use changes at global scale and Europe, but also mentioned is a lack of evidence for the use of probabilistic evaluation or scenarios for decision making. Moreover, future trends in non-climatic parameters (sectors) can themselves be influenced by climate trends. That is, the two may not be linearly separable? The section is well written and available information concisely summarized. However, it is not quite clear if some of these (such) caveats are explicitly or adequately reflected in the final conclusions? (UNITED STATES OF AMERICA)	Yes agreed. Non-climate trends into the future will be affected by interactions with climate drivers. The section states that scenario studies address this issue.
212	61593	23	7	25	7	26	It is not clear whether the reference is to "social welfare" (how defined?) or "economic welfare", and for which period. Economic welfare did not increase across all of Europe since publication of the AR4. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The text has been edited to refer to 'social welfare'.
213	59541	23	7	25	7	33	I am surprised to see population under "non-climate trends". Migration can definitely be caused by climate change. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Population itself is not a climate variable. It will probably be affected by climate variables, but that is not the point of this section. Other sections of the chapter address the effects of climate variables on various socio-economic trends, including population.
214	67815	23	7	25	7	33	wordy paragraph, needs sharpening. I am used to having a "topic sentence" as a start of a paragraph; restructuring of some of the content of the chapter accordingly would help the reader (Tanja Wolf, WHO Regional Office for Europe)	The paragraph has been edited.
215	59542	23	7	26	7	26	Obviously welfare has not been improving in all countries. Population has not been increasing everywhere either. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The text has been edited to make this point.
216	69719	23	7	31	7	31	a reference seems missing after economic policy (NETHERLANDS)	The sentence has been deleted.
217	83407	23	7	33	7	33	Casual usage of "likely" should be avoided. (Katharine Mach, IPCC WGII TSU)	The text has been edited.
218	59543	23	7	35	7	35	Economic growth has become negative in some instances. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Not if the whole period since AR4 is considered. There has been negative growth for some periods of this time.
219	59546	23	7	41	0	0	Sentence is incomplete.(Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	The sentence has been edited.
220	59549	23	7	41	0	0	The sentence is not complete. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	The sentence has been edited.
221	59548	23	7	41	0	41	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The sentence has been edited.
222	59544	23	7	41	7	41	This is an overstatement. Agriculture is the most dominant land use in terms of coverage on the ground. One could say that dominant is what is most important in economic terms (not acreage). (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The point has been rephrased to make reference to the area of agricultural land use.
223	74555	23	7	41	7	41	Reference Easterling's paper on fibre here; it appears in the Bibliography. (UNITED STATES OF AMERICA)	The suggested reference has been included.
224	76721	23	7	41	7	41	typo: "use and. Europe" --> "use. Europe" (Claudio Cassardo, University of Torino)	The full stop will be removed.
225	59547	23	7	41	7	42	"...Agriculture is the most dominant..." Perhaps a reference is needed. (Dimitris Damigos, Mining and Metallurgical Engineering, NTUA, Greece) (GREECE)	The point has been rephrased to make reference to the area of agricultural land use.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
226	59545	23	7	41	7	53	Are the trends described here non-climatic as the heading suggests? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Yes, this is mostly about the past, and the scenarios future projections show agricultural areas to be most affected by non-climate drivers.
227	74556	23	7	41	7	53	If possible, provide the % of European area occupied by agriculture (as reported for forested areas). (UNITED STATES OF AMERICA)	This has been added.
228	83408	23	7	42	7	42	It may be clearest to specify which war is meant. (Katharine Mach, IPCC WGII TSU)	This had been added.
229	83409	23	7	49	7	49	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	The text has been edited.
230	59550	23	8	1	8	1	The trend is also very important. Some specific indication of deforestation/forestation? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	This point is not clear
231	76722	23	8	1	8	6	the recent winter in Greece has shown that, when economy is recessing so deeply than a relevant part of the population is facing difficulties in finding the money for surviving, and thus is unable to use the standard heating systems, will use (and abuse) also wood from public forested areas. If economy in the current century will be not good for a remarkable portion of EU citizens, I am wondering whether this could cause a relevant anthropogenic threat for the forests. This is just a reflection, and I am not sure that already some papers have studied this case in detail, but I am curious to know if such kind of feedback has ever been studied. (Claudio Cassardo, University of Torino)	As far as we are aware there is no literature to support this hypothesis.
232	83410	23	8	4	8	4	If "very likely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. Casual usage of the reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	The text has been edited.
233	69720	23	8	5	8	5	a reference seems missing after "forest growth" (NETHERLANDS)	Noted.
234	59551	23	8	6	8	6	The point is missed here. Will forest area be more or less in the future? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The word "expand" has been replaced with "increase".
235	70225	23	8	8	8	10	This statement should be revised. As explained elsewhere, recent studies show a different pattern: non-significant trend in the number of fires since 1986 in Mediterranean Europe, and significant decrease in the last decade. Also a significant decrease in area burnt over the whole period. Jesús San-Miguel-Ayanz , Marcos Rodrigues , Sandra Santos de Oliveira, Claudia Kemper Pacheco , Francisco Moreira , Beatriz Duguay and Andrea Camia (2012). Land Cover Change and Fire Regime in the European Mediterranean Region. Chapter 2 in F. Moreira et al. (eds.), Post-Fire Management and Restoration of Southern European 21 Forests, Managing Forest Ecosystems 24, Elsevier. DOI 10.1007/978-94-007-2208-8_2 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The sentence has been edited to remove this statement and to re-focus the point on desertification rather than fires.
236	59554	23	8	12	0	0	Significant research has been made in terms of recognising urban sprawl patterns in Europe and estimating respective trends. Discussion on the issue should be provided. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	We have limited space for such a discussion, which is mostly on the periphery of the core climate change debate
237	59552	23	8	12	8	12	The statement on urban sprawl levels needs explaining. Moderate compared to what and based on what evidence? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The use of "moderate" will be qualified relative to other parts of the world
238	59553	23	8	12	8	13	Urbanization would be projected to increase if economy has growing. But it is not. This statement is probably based on old data? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The economy is not the only factor affecting urban growth.
239	70190	23	8	12	8	19	Socio-economic conditions have substantially changed in Europe since 2006, particularly in Northern Mediterranean countries. The trend towards increasing urbanisation has curbed, and counterurbanisation fluxes may increase in the near future. E.g., Kasimis, C. (2010). Socio-demographic imbalances in rural Europe and international mobility to rural areas: the case of Greece. Sociological Review 2: 57-75. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Agreed, this point is made in relation to the discussion of per-urbanisation.
240	74557	23	8	12	8	19	If possible, provide the % of European area occupied by urban class (as reported for forested areas). (UNITED STATES OF AMERICA)	Getting a reliable figure for urban areas is difficult since the figure is very small and the built environment is highly fragmented and hence difficult to classify.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
241	76723	23	8	12	8	19	another reflection here. "Europe has relatively moderate urban sprawl": this is because the population in general and the urban population in particular, is stable or even slightly declining somewhere. Despite this fact, the "moderate urban sprawl" is a systematic process that is continuing to convert the best "primary" soil types (for agricultural purposes) in space for buildings or industrial plants, or anyway in non-agricultural or forestal use. (Claudio Cassardo, University of Torino)	This sentence has been deleted.
242	59555	23	8	13	0	0	Interesting information on Housing is provided in Synnefa A., A. Dandou, M. Santamouris and M. Tombrou, 2007: On the use of cool materials as a heat island mitigation strategy, Journal of Applied Meteorology and Climatology, 47, 2846-2856. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	This section is not about climate mitigation.
243	83411	23	8	15	8	15	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Text has been edited.
244	59556	23	8	15	8	16	Why periurbanization is a recent trend? Was it not one of the fundamental trends always? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Compared with the long history of urbanisation processes, peri-urbanisation is relatively recent driven by changes in transport infrastructure. The text has however been edited.
245	59557	23	8	16	8	16	In some countries residences go to periurban areas for their rural character. In other countries they go mostly for their coastal character. Rural is country specific. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Rural is meant to indicate 'non-urban', which could also be coastal.
246	67816	23	8	18	7	19	"other environmental trends" are not the topic of this paragraph on urban sprawl. Move elsewhere. (Tanja Wolf, WHO Regional Office for Europe)	The text has been moved/edited.
247	70226	23	8	18	8	18	The term 'outdoor' is probably not needed here (JORDI CORTINA, UNIVERSITY OF ALICANTE)	It is used to be precise in making a difference with 'indoor' air quality.
248	69721	23	8	19	8	19	contradiction in trends - specify location (NETHERLANDS)	This is not a contradiction.
249	67817	23	8	21	8	32	not clear to me what the message of this paragraph is. Is it about methods to assess future impacts? Could be made clearer but would better fit into 23.2.2 as "many of these scenario studies also account for future climate change". (Tanja Wolf, WHO Regional Office for Europe)	The text has been edited to improve clarity.
250	60427	23	8	23	0	0	Spangenberg et al. 2011 does not seem to be on biodiversity. (David Parker, Met Office Hadley Centre)	The Spangenberg reference in the reference list was incorrect, but has been corrected.
251	59558	23	8	29	8	32	I don't see any European specific study (not global) based on European datasets (CORINE, Urban Atlas, Urban Audit). If this is the case is this not alerting for the availability of datasets in Europe or their quality? Any recommendations in the text? How are we going to assess policy if we lack the data? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	This only refers to 'probabilistic' global studies - non-probabilistic European studies are listed earlier - and has nothing to do with data availability, just the available literature.
252	60428	23	8	31	0	0	Bryson et al. 2010 reference missing. (David Parker, Met Office Hadley Centre)	The reference has been added.
253	74558	23	8	35	11	15	The word inconsistent is used in several instances in 23.2.2. It does not appear to be the correct word for what the authors are trying to say. (UNITED STATES OF AMERICA)	The wording has been changed.
254	80430	23	8	35	11	15	Section 23.2.2: This section has to be updated to ensure consistency and cross-referencing with relevant WGI AR5 chapters and the Annex I: Atlas of global and regional climate projections, as well as SREX Chapter 3. Currently, there is not a single reference to the WGI in section 23.2.2.1 (Obs). Please provide more thorough, consistent and precise cross-references to SREX and WGI AR5 in section 23.2.2.2. and 23.2.2.3. (Gian-Kasper Plattner, IPCC WGI TSU)	The reference to WG1 sections and SREX will be added.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
255	59559	23	8	39	9	7	The climate has already been changed in Greece in the past 50 years and there has been a very sharp tipping point around the year 1988. Temperatures have increased, especially the low temperatures together with the variability in precipitation. We have observed decreases in flow both in Crete (ie Koliaris River Basin) and pelopponisos (Evrotas River Basin). Below there is a list of references on the subject. Since these climate change impacts in Greece have been documented, it will be interesting to be analyzed in order to ground truth future impacts. 1. Nikolaidis, N.P, F. Bouraoui. and G. Bidoglio, 2013. Hydrologic and geochemical modeling of a karstic Mediterranean watershed, Journal of Hydrology, 477, 129-138. 2. Koutroulis A. G., Tsanis I.K. and D. Jacob, "Impact of climate change on water resources status: a case study for Crete Island", Greece Journal of Hydrology, 479,146-158, 2013. 3. Vrochidou A., Tsanis I.K., "The impact of climate change on hydro-meteorological droughts at a basin scale", Journal of Hydrology, 476, 290-301, 2013. 4. Koutroulis A. G., Grillakis., Tsanis I.K., V. Kotroni and K. Lagouvardos, "Lightning activity, rainfall and flash flooding. Occasional or interrelated events? A case study in the island of Crete, Natural Hazards and Earth System Sciences, 12(4), 881-891, 2012. 5. Vrochidou A., Tsanis I.K., "Assessing precipitation distribution impacts on droughts on the island of Crete", Natural Hazards and Earth System Sciences, 12, 1159-1171, 2012. Tsanis, I.K., Koutroulis A.G., Daliakopoulos, I.N. and Jacob, D., "Severe Climate-Induced Water Shortage and Extremes in Crete", Climatic Change, 106, 4, 667-677, June 2011. 6. Koutroulis A.G., Vrochidou A., Tsanis I.K., "Spatial and temporal characteristics of droughts for the island of Crete", Journal of Hydrometeorology, 12, 2 206-226, 2011. 7. Koutroulis, A.G., Tsanis I.K., Daliakopoulos, I.N., "Seasonality of floods and their hydro-meteorological characteristics in the island of Crete", Journal of Hydrology, Special issue on Flash Floods, 394, Issues 1-2, 90-100, 2010. 8. Gamvroudis C., N.P. Nikolaidis, O. Tzoraki, V. Papadoulakis and N. Karalemas, 2013. Sediment Transport Modeling of a Large Ephemeral River basin, J. of Hydrology (In Review). 9. Tzoraki, O, Cooper, D., Kjeldsen, Th., Nikolaidis, N. P., Gamvroudis, Ch. Froebrich, J. Querner, E., Gallart, F. and Karalemas, N. 2013. Flood Generation and Classification of a semi-arid Intermittent Flow Watershed: Evrotas river, International Journal of River Basin Management, 11:1, 77-92. (Nikolaos Nikolaidis, Environmental Engineering, Technical University of Crete, Greece) (GREECE)	One reference (Tsanis et al 2011) is included in the part about Riverflows and Drought (23.2.3)
256	60429	23	8	41	0	0	Haylock et al. 2008 do not present trends; it is true that annual trends have been greater in northern than southern Europe (WGI Chapter 2 Figure 2.22) (David Parker, Met Office Hadley Centre)	Trends come from EEA report, the reference has been corrected.
257	69722	23	8	42	8	42	is there any additional reference (journal) to EEA 2012 (NETHERLANDS)	The appropriate references are cited after the EEA reference : Brohan, Smith and Hansen
258	64722	23	8	47	0	0	the closing) is missing (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	This has been corrected.
259	83412	23	8	47	8	50	For these examples and trends, it would be helpful to specify the relevant time frame. (Katharine Mach, IPCC WGII TSU)	This has been corrected (since 1950)
260	59560	23	8	47	8	53	In terms of cities and people temperature alone does not provide a complete picture. It is thermal comfort that is important (temperature + humidity + wind). 40 degrees are tolerable with a light breeze and low humidity whereas 30 degrees are intolerable with 0 wind and high humidity. The same problem appears in other occasions in the text. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Humidity does affect thermal comfort but this is not a major determinant of the outcomes of most interest- either heat-related mortality or energy consumption.
261	76724	23	8	48	8	48	Galli et al. (2010) founded that "The results show that, in general, the number of cold breaks is decreasing over the Alps, due to the temperature increment. However, there are certain zones where the behaviour is more complicated". Ref.: Water 2010, 2, 363-380; doi:10.3390/w203036 M. Galli, S. M. Oh, C Cassardo, S. K. Park (2010) The Occurrence of Cold Spells in the Alps Related to Climate. Water (2010), 2, 363-380; doi:10.3390/w2030363 (Claudio Cassardo, University of Torino)	This remark is coherent with the text. The space limitation does not allow a long discussion.
262	61594	23	8	48	8	49	The reference "EEA, 2011" should be replaced by "EEA, 2012". (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected.
263	64723	23	8	49	8	50	even if it is still not fully understood, what is with the possible link between the ice cover changes and the cold winter. Jaiser et al (2012): Impact of sea ice cover changes on the Northern Hemisphere atmospheric winter circulation. Tellus A 2012, 64, 11595, DOI: 10.3402/tellusa.v64i0.11595. Please add at least a cite. (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	Relevant point. WG1 section 2.8 on changes in atmospheric patterns and variability will be cited.
264	66323	23	8	52	8	53	There is a terrific figure to illustrate this very point in the Barriopedro et al. (2011) Science paper (Figure 3) that would be a superb and striking addition to this chapter and possibly even the SPM (unless it has already been used in WG I). (Timothy Carter, Finnish Environment Institute)	We do not have space for additional figures.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
265	57428	23	8	53	0	0	I propose to add: A second record hot summer that affected most of southern and southeastern Europe was observed in 2007 (Busuioc et al, 2007; Corobov et al., 2010; Founda & Giannakopoulos, 2009). Accordingly, to add in References: Busuioc A, Dumitrescu A, Soare E, Orzan A (2007) Summer anomalies in 2007 in the context of extremely hot and dry summers in Romania. Roman J Meteorol, 9:1-17. Corobov R., S. Sheridan, A. Overcenko, N. Terinte, 2010: Air temperature trends and extremes in Chisinau (Moldova) as evidences of climate change. Climate Research 42:247-256. (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	Not included, as space was limited.
266	61595	23	9	1	9	2	This is one of the examples in which the reference to "EEA, 2008" (more correctly: "EEA-JRC-WHO, 2008") should be replaced by "EEA, 2012" (see comment above). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected.
267	76725	23	9	3	9	3	"high variability": interannual, or spatial? (Claudio Cassardo, University of Torino)	Both, the two are correlated.
268	59561	23	9	4	0	5	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been corrected.
269	59562	23	9	5	9	5	Max or average windspeeds? This could be important to assess the impact on windmill energy production capacity. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Average. This has been clarified in the text.
270	76726	23	9	5	9	5	typo: remove "(" (Claudio Cassardo, University of Torino)	This has been corrected.
271	61596	23	9	5	9	7	Could also cite paper by P. Bett et al. (2013) Adv. Sci. Res., 10, 51-58, who analysed the Twentieth Century Reanalysis data and found no trend in wind speeds over Europe. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been referenced.
272	76727	23	9	7	9	7	"problematic anemometer data": why "problematic"? What means? It is a general consideration on all anemometer data, or only in the case of Europe (and in this case, why)? (Claudio Cassardo, University of Torino)	The word problematic is explained in the SREX. It is not specific to Europe.
273	59563	23	9	9	9	9	increasing by how much? Quantitative information is missing. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Quantitative information varies regionally and can not be included due to space limitation
274	76728	23	9	10	9	10	decreases --> decreased (Claudio Cassardo, University of Torino)	This has been corrected.
275	76729	23	9	10	9	11	this point is clear; however, it could be interesting to give the estimate of the "real" sea level rise by "detrending" the sea level with the vertical crustal motion... (Claudio Cassardo, University of Torino)	The detrended sea level rise is discussed in WG1.
276	61597	23	9	11	9	13	This statement is correct only for some (northern) regions of the Baltic coast, *not* for the whole Baltic. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected in the text.
277	61993	23	9	13	9	13	Mention here as well the importance of Early Warning Systems in the Disaster Reduction Cycle as accordin to UN-ISDR guidelines (Paolo Ciavola, University of Ferrara)	Comment is misplaced or not relevant for this section on observed changes.
278	67818	23	9	13	9	13	already on p 5 line 49 I got stuck with the term "anthropogenic" climate change. I think it's not of added value to highlight this attribute. Probably a big part of climate change is man-made and we all know this, why wasting words on this? For the impacts it doesn't matter and this attribute just gives skeptists an avoidable entry point. (Tanja Wolf, WHO Regional Office for Europe)	The sentence has been rephrased and the unclear word anthropogenic removed.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
279	66324	23	9	17	10	2	I am transferring a comment from the FOD that was completely ignored by Chapter 2 (methods) and I think might merit some attention here, as the work was first demonstrated during the ENSEMBLES project. Here's the comment - a couple of the references are already in this chapter, but others could be added for appropriate sectors. I mention it here because the probabilistic climate component could be addressed here and really doesn't have to be RCP-based! Some of the figures produced may also be of interest (e.g. see Figs 3 and 5 in Fronzek et al. 2011). *** A number of authors have recently tried to extend methods of applying probabilistic climate information into various sectoral impact studies in a series of papers out of the EU ENSEMBLES project: Børgesen, C.D. and J.E. Olesen, 2011: A probabilistic assessment of climate change impacts on yield and nitrogen leaching from winter wheat in Denmark. <i>Natural Hazards and Earth System Science</i> , 11, 2541-2553. doi:10.5194/nhess-11-2541-2011; Ferrise, R., M. Moriondo and M. Bindi, 2011: Probabilistic assessments of climate change impacts on durum wheat in the Mediterranean region. <i>Natural Hazards and Earth System Science</i> , 11, 1293-1302. doi:10.5194/nhess-11-1293-2011; Wetterhall, F., L.P. Graham, J. Andréasson, J. Rosberg and W. Yang, 2011: Using ensemble climate projections to assess probabilistic hydrological change in the Nordic region. <i>Natural Hazards and Earth System Science</i> , 11, 2295-2306. doi:10.5194/nhess-11-2295-2011; Weiß, M., 2011: Future water availability in selected European catchments: a probabilistic assessment of seasonal flows under the IPCC A1B emission scenario using response surfaces. <i>Natural Hazards and Earth System Science</i> , 11, 2163-2171. doi:10.5194/nhess-11-2163-2011. The methods presented are similar to those advocated by Roger Jones over a decade ago, but now with rather more robust climate projections than were available to Roger (at least, more comprehensive in their analysis of all available evidence). All papers use the probabilistic climate projections developed for Europe by Harris, G.R., M. Collins, D.M.H. Sexton, J.M. Murphy and B.B.B. Booth, 2010: Probabilistic projections for 21st century European climate. <i>Natural Hazards and Earth System Science</i> , 10, 2009-2020. doi:10.5194/nhess-10-2009-2010. A further paper also attempts to combine probabilistic climate projections with estimates of impact model uncertainties: Fronzek, S., T.R. Carter and M. Luoto, 2011: Evaluating sources of uncertainty in modelling the impact of probabilistic climate change on sub-arctic tundra. <i>Natural Hazards and Earth System Science</i> , 11, 2981-2995. doi:10.5194/nhess-11-2981-2011, which is a follow-up paper to an earlier exploration of applying probabilistic climate information from a different (non-ENSEMBLES) source: Fronzek, S. and T.R. Carter, 2007: Assessing uncertainties in climate change impacts on resource potential for Europe based on projections from RCMs and GCMs. <i>Climatic Change</i> , 81 (Suppl. 1), 357-371. One motivation for addressing impact model uncertainties is the poor representation of uncertainty analysis in model-based studies, where uncertainties in projections are commonly a function of climate uncertainties alone, when in fact there are strong arguments for employing equivalent rigour to model testing and analysis for impact models (e.g. by exploring structural and parameter uncertainties through multi-model ensembles and uncertainty analysis) as has become the norm for climate models. An example of this reasoning for crop models is found in: Rötter, R.P., Carter, T.R., Olesen, J.E. and Porter, J.R. 2011. Crop-climate models need an overhaul. <i>Nature Climate Change</i> 1: 175-177. (Timothy Carter, Finnish Environment Institute)	This goes beyond this scope of 23.2.2.2 The methodological part should go in Ch21. Interesting references could go to impact section of this chapter.
279.2	66324	23	9	17	10	2	use the probabilistic climate projections developed for Europe by Harris, G.R., M. Collins, D.M.H. Sexton, J.M. Murphy and B.B.B. Booth, 2010: Probabilistic projections for 21st century European climate. <i>Natural Hazards and Earth System Science</i> , 10, 2009-2020. doi:10.5194/nhess-10-2009-2010. A further paper also attempts to combine probabilistic climate projections with estimates of impact model uncertainties: Fronzek, S., T.R. Carter and M. Luoto, 2011: Evaluating sources of uncertainty in modelling the impact of probabilistic climate change on sub-arctic tundra. <i>Natural Hazards and Earth System Science</i> , 11, 2981-2995. doi:10.5194/nhess-11-2981-2011, which is a follow-up paper to an earlier exploration of applying probabilistic climate information from a different (non-ENSEMBLES) source: Fronzek, S. and T.R. Carter, 2007: Assessing uncertainties in climate change impacts on resource potential for Europe based on projections from RCMs and GCMs. <i>Climatic Change</i> , 81 (Suppl. 1), 357-371. One motivation for addressing impact model uncertainties is the poor representation of uncertainty analysis in model-based studies, where uncertainties in projections are commonly a function of climate uncertainties alone, when in fact there are strong arguments for employing equivalent rigour to model testing and analysis for impact models (e.g. by exploring structural and parameter uncertainties through multi-model ensembles and uncertainty analysis) as has become the norm for climate models. An example of this reasoning for crop models is found in: Rötter, R.P., Carter, T.R., Olesen, J.E. and Porter, J.R. 2011. Crop-climate models need an overhaul. <i>Nature Climate Change</i> 1: 175-177. (Timothy Carter, Finnish Environment Institute)	
280	74559	23	9	17	11	15	The authors should make a concerted effort to revisit the literature and update projections based on published results from CMIP5. In its current state, much of the text relies on older model runs. If new results are not available, the authors should clearly state that these findings are from the CMIP3 model runs. (UNITED STATES OF AMERICA)	The references to WG1 are WG2 chapters include both CMIP3 and particularly CMIP5.
281	59564	23	9	24	9	24	While Europe is fortunate to have climate data it is unfortunate because it does not have good quality land use data to measure the impact. Anyone who has worked with Urban Atlas, Urban Audit and CORINE can justify this. A mention in the text could be made to identify the problem and identify the construction of reliable land use time series datasets as a significant component of adaptation. As it is now the text makes no mention of the problem and the discussion is done as if we had the right datasets. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	This is an important discussion, but goes beyond the scope of this chapter and cannot be picked up due to space limitation.
282	83413	23	9	28	9	28	Would it be clearer to say "average global temperature increase" instead of "climate warming"? (Katharine Mach, IPCC WGII TSU)	Thank you. We have changed the text.
283	64724	23	9	29	9	30	the year for the cite van der Linden... is missing (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	This has been corrected. 2009
284	76933	23	9	30	9	30	year of publication? (Eva Franziska Matthies, Consultant)	This has been corrected. 2009
285	74560	23	9	30	9	32	A visual spatial representation of the distribution of warming and cooling over Europe would be helpful to illustrate the statement. (UNITED STATES OF AMERICA)	Thank you for your comment. The requested Figures are presented in Chapter 21.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
286	60430	23	9	32	0	0	Schmidli et al. 2007 deal with precipitation, not temperature. (David Parker, Met Office Hadley Centre)	Thank you. This has been corrected.
287	59565	23	9	34	0	36	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been corrected.
288	76730	23	9	35	9	35	change "zone in between has less clear sign of change" with "zone in which the sign of change is less clear" (Claudio Cassardo, University of Torino)	The sentence has been rephrased.
289	63773	23	9	36	9	38	Please clarify timing. Is this change projected for the next decades or at the end of the 21st century? (GERMANY)	Thank you. The time frame has been included.
290	74561	23	9	36	9	38	The text refers to the increase in winter precipitation with more rain than snow and a decrease of long term mean snow pack. Make the link to the implications of such changes (for water availability in the Spring which relies on melting of the snow pack). (UNITED STATES OF AMERICA)	This does not belong to this part of the chapter (-> water)
291	76731	23	9	37	9	38	the three phenomena indicated in this sentence occur all in Southern Sweden? In this case, it may be better to translate "up to Southern Sweden" at the end of the sentence. (Claudio Cassardo, University of Torino)	Thank you. We have changed the text.
292	60369	23	9	38	9	39	This sentence seems not correct as Kunz et al. (2009) found that both hail damage days and convective instability increased during 1974-2003 in a state in southwest Germany and Mohr and Kunz (2012) found that convective parameters relevant for hail events exhibit a significant positive trend towards a higher convective potential in Germany and Europe. References: Kunz, M., J. Sander, and C. Kottmeier, 2009: Recent trends of thunderstorm and hailstorm frequency and their relation to atmospheric characteristics in southwest Germany. International Journal of Climatology, 29(15), 2283-2297. S. Mohr, M. Kunz, Recent trends and variabilities of convective parameters relevant for hail events in Germany and Europe, Atmospheric Research, Volume 123, 1 April 2013, Pages 211-228, ISSN 0169-8095, 10.1016/j.atmosres.2012.05.016. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	Very few, very local studies on hail occurrence exist. Kunz et al 2009 is very local and looks only at the past while Mohr and Kunz 2012 are talking about convective potential and not hail occurrences. This topic is picked up in the chapter2 of WG1. Climate models are too coarse to simulate hail and reasonable well and observational evidence is limited due to the very local nature of the phenomenon.
293	57701	23	9	39	9	40	"Changes in circulation patterns are inconsistent, except in northern Europe". Please describe this non-inconsistent change briefly. (Jouni Räisänen, University of Helsinki)	Agreed. The text has been amended.
294	64725	23	9	39	9	41	are you talking about circulation pattern or about storm tracks (Ulbrich et al)? Please differentiate. What about blocking? In the context of please vote me : Kreienkamp et al (2010): Stationarity of atmospheric waves and blocking over Europe—based on a reanalysis dataset and two climate scenarios. Theor Appl Climatol. DOI 10.1007/s00704-010-0261-3 ; for the problem of the connection between circulations patterns and impacts please look at Spekat et al (2010): An impact-oriented classification method for atmospheric patterns. Physics and Chemistry of the Earth 35 (2010) 352–359. doi:10.1016/j.pce.2010.03.042 (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	Thank you. We have changed the text and added one reference about blocking. Changes in circulation pattern are considered including storm tracks.
295	60431	23	9	40	0	0	Beck et al. 2007 analysed past, not future, climate. They showed that regional climate is affected by changes of both frequency and characteristics of large-scale circulation types. (David Parker, Met Office Hadley Centre)	Thank you. We have changed it in the text.
296	59566	23	9	44	0	47	It would be better if there was information on the direction (and intensity) of changes. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Thank you, well taken, please read the reference due to space limitations we are not able to go into more details.
297	61598	23	9	44	9	45	It is not clear whether the term "better" refers to a comparison with other regions or with earlier assessments. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thank you. We have changed it in the text.
298	69723	23	9	44	9	45	add a reference to statement (NETHERLANDS)	Dell'Aquila is the reference for the whole sentence.
299	61994	23	9	46	9	47	Are any of these changes expected in the Mediterranean as well? (Paolo Ciavola, University of Ferrara)	Yes, it's about the changes in the Mediterranean Region.
300	76732	23	9	49	9	49	typo: compred --> compared (Claudio Cassardo, University of Torino)	This has been corrected.
301	64726	23	9	49	9	50	Can the second digit be used? Please reduce the digits to 1 like from 0,29 to 0,55 towards 0,3 to 0,6 (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	Sea level rise is measured in metres. It is cited from Chapter 5 Table 5-1
302	60432	23	9	50	9	51	These projections are general to WG1 Chapter 7 and not cited specifically in 13.7 which is about extremes of sea levels and waves. (David Parker, Met Office Hadley Centre)	This has been corrected in the text.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
303	64727	23	9	51	9	52	Please give more information about the low confidence in projected regional changes. If not: is it useful to have a chapter 23 at all? All findings in this chapter are based on those low confidence. (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	The low confidence and methodology issues are discussed in WG1. Due to space limitation, it is not possible to discuss this point in detail. There is an indication of a specific European study at the end of the paragraph.
304	61599	23	9	52	10	2	A similar estimate has been made for the UK under the Thames Estuary 2100 project. See Ch.7 of the UKCP09 report "Marine and Coastal projections", available at: http://ukclimateprojections.defra.gov.uk/22544 (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	OK, a reference to this study has been added.
305	74569	23	10	0	5	0	Table 23-1, A: It is not clear why some parameters (e.g., T) are estimated using 9 regional model simulations while other parameters (e.g., P) are estimated from 20 regional model simulations--taken from EU-ENSEMBLES project for SRES A1B scenario. (UNITED STATES OF AMERICA)	The table is moved to supplementary material. For A1B there are only 9 models from ENSEMBLES which have data of Tmax therefore the different number of models. We described it in the text about methods in the supplement.
306	74570	23	10	0	5	0	Table 23-1, B: Likewise, not clear why some parameters (e.g., T) are estimated using 7 regional model simulations while others (e.g., P) are estimated using 8 regional model simulations—taken from EURO-CORDEX project for the RCP 4.5 emissions scenario. (UNITED STATES OF AMERICA)	This will be changed because the figures will be updated
307	74571	23	10	0	5	0	Table 23-1: There are significant differences, as expected, between parameter values in Table 23-1A compared to Table 23-1B. Expected because Table 23-1A refers to SRES A1B scenarios (AR4 models) and Table 23-1B refers to RCP 4.5 scenarios (AR5 models). The purpose of this Table or the manner in which it is presented is not quite clear. In Ch-1, Fig 1.5 (Pg. 36), the radiative forcing (RF) and T-Change for A1B are both substantially higher/larger than RCP 4.5 in, for example, year 2100. The SRES scenario most comparable to RCP4.5 appears to be SRES-B1 and not SRES-A1B. Likewise the RCP scenario comparable to SRES A1B is one that could probably be approximated by RCP 6.5 (not shown). It could be useful to show Table 23-1 parameters for comparable AR4/SRES and AR5/RCP to illustrate possible difference or improvements in AR5 over AR4. The opening paragraph in Section 23.2.2.3 (Pg. 10, Lines 7-10) does not explain the reason for Table-23-1, A and B--i.e., the reason for this particular mix of SRES/AR4 and RCP/AR5 scenarios and/or why AR4 and AR5 model results are treated in a seamless, interchangeable manner? An external reader, possibly uninformed of internal IPCC procedures, would expect more results with improved precision in AR5. And, if both AR4 and AR5 results are presented together, one could expect a comparison for the same boundary conditions (e.g., scenarios) to illustrate change from previous understanding, if any. There could be a logical and simple explanation which presently eludes the casual reader. (UNITED STATES OF AMERICA)	Agreed. Therefore the table is moved to the supplementary material. Comparison of AR4 and AR5 results is given in WG1 and Wg2 Chapter 21.
308	76733	23	10	1	10	1	"between 0.55 and 1.15 m" and "by 0.40 to 1.05": these number refer to which emission scenario? (Claudio Cassardo, University of Torino)	It is derived from A1FI, and it is for 2100. The text will be corrected.
309	74562	23	10	1	10	2	Where the text reports that sea level rise could rise globally between 0.55 and 1.15m, is that spread the result of different emission scenarios or the spread of results from different models, or both combined? Please clarify. (UNITED STATES OF AMERICA)	It is derived from A1FI, and it is for 2100. The text will be corrected.
310	74563	23	10	5	11	15	This section could benefit from a more direct definition of climate extremes variables, such as the one provided by the recommendations by the Climate Variability and Predictability (CLIVAR) Expert Team on Climate Change Detection and Indices. There is a good example of this in table 1 of the following reference: Duliere, V, Y Zhang, E.P. Salathe, Extreme Precipitation and Temperature over the U.S. Pacific Northwest: A Comparison between Observations, Reanalysis Data, and Regional Models. Journal of Climate, 24, 1950-1964. DOI: 10.1175/2010JCLI3224.1 (UNITED STATES OF AMERICA)	The definition is given in the supplement, for more information the reference is Jacob et al 2013.

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311	74564	23	10	10	35	43	Figure 23-2: Also see (Legend for Fig. 23-2 A & B on Pg. 92, 93: Projected changes in number of heat waves): Some explanation would be useful to clarify why SRES/AR4 is being compared to or presented as an equal example as RCP4.5/AR5? More explanation is perhaps warranted in presenting and drawing conclusions from a mix of results from AR4 (SRES-A1B, and regional EU-ENSEMBLES) and AR5 (RCP-4.5, and regional EURO-CORDEX. Despite stated statistical significance, to the lay reader 66% of the models agreeing in the sign of change also means that 36% of the models did not agree even in the sign of the change, aside from scalar magnitude. And, this, for a temperature related parameter—temperature generally being considerably more spatially homogeneous than for example precipitation and derivatives such as surface water balance that is connected to soil moisture, runoff, evapotranspiration. Perhaps more explanation as to why 66% is to be considered a high number would be useful? Differences between Fig 23.2-A and Fig. 23.2-B are quite dramatic—perhaps explained by the choice of scenarios used (RCP-4.5 and SRES-A1B). They both refer to changes between mean (2071-2100) and mean (1971-2000). Not so obvious is why the changes shown in Fig. 23.2-A in northern Alpine regions (Norway) have disappeared in Fig. 23.2-B? (UNITED STATES OF AMERICA)	Thank you for your comments. The Figure A1B is moved in the Supplementary Material. Now Figures of RCP4.5 and 8.5 are presented here. Some explanation about comparing SRES Scenario and RCPs are given in the paper Jacob et al 2013. The Agreement of models is consistent with the likelihood language from IPCC (uncertainty guidance).
312	58476	23	10	14	1	14	Table 23.1 Indicate what RCP correspond to scenario A1B. Where are the footnotes (1) (2), etc.? (Martin Pecheux, Institut des Foraminifères Symbiotiques)	No RCP correspond to A1B. These numbers are the indices numbers of the http://etccdi.pacificclimate.org/list_27_indices.shtml which we used in the table.
313	76734	23	10	16	10	17	"The likely range ... median": please do not repeat twice this sentence (Claudio Cassardo, University of Torino)	Thank you. We have changed it in the text.
314	61600	23	10	21	10	27	Paper by Clark, R. T., et al. (2010), Do global warming targets limit heatwave risk? Geophys. Res. Lett., 37, L17703, doi:10.1029/2010GL043898 shows that for a warming of 2.0 +/- 0.5 deg.C can still get large variation in projected changes in heat waves and hot days. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Yes, that's true, but many studies support the statement which covers low and high scenarios.
315	61601	23	10	21	10	27	Discussion of the results shown in Figure 23-2 is far too brief. Why are the heatwave projections so different? Are the CO2 levels in these two scenarios very different?. How do the results compare with earlier studies, e.g., Meehl/Tebaldi, Science, 2004? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Because of space limitation, we refer to the paper Jacob et al 2013 for heat wave projections. Differences in radiative Forcing is explained in Chapter 1.
316	74565	23	10	21	10	27	The text is too abbreviated to provide a full explanation even if it attempts to connect with the heat waves for 2003 and 2006/2007. Perhaps more explanation would clarify the conclusions as implied? (UNITED STATES OF AMERICA)	Because of space limitation, we refer to the paper Jacob et al 2013.
317	83414	23	10	23	10	25	For the described large differences, how much of the difference is due to the emissions scenario versus the modeling group/project? (Katharine Mach, IPCC WGII TSU)	Interesting question, some more information is given in the paper; Jacob et al 2013. The scenario difference is given in the figures (RCP4.5 and 8.5). The modelling group can not be attributed.
318	76735	23	10	24	10	24	add "(MJJAS)" after season (Claudio Cassardo, University of Torino)	Thank you. We have changed it.
319	74566	23	10	25	10	27	It would be beneficial to include attribution studies on the Russian heat wave of 2010. (e.g. Dole et al; Rahmtorf and Coumou; Otto et al. 2012 is a good example: Otto, F. E. L., N. Massey, G. J. van Oldenborgh, R. G. Jones, and M. R. Allen (2012), Reconciling two approaches to attribution of the 2010 Russian heat wave, Geophys. Res. Lett., 39, L04702, doi:10.1029/2011GL050422. (UNITED STATES OF AMERICA)	We included Otto et al 2012 to the observed climate trends (23.2.2.1).
320	76736	23	10	25	10	27	Beniston (2009) has quantified the result. And the reader of this report could have an idea of this result without reading the Beniston's paper? (Claudio Cassardo, University of Torino)	Thank you for your comment. We are not able to go into more detail because of space limitations.
321	60433	23	10	27	0	0	replace beniston 2009 citation by Beniston, M. (2007), Entering into the "greenhouse century": Recent record temperatures in Switzerland are comparable to the upper temperature quantiles in a greenhouse climate, Geophys. Res. Lett., 34, L16710, doi:10.1029/2007GL030144. (David Parker, Met Office Hadley Centre)	Thank you. We have changed it in the text.
322	74567	23	10	29	10	32	The text states that projected changes in Fig. 23-3 are inconsistent in Southern Europe (all seasons). Looking at Fig. 23-3, it not clear as to what this means or how this conclusion is obtained? (UNITED STATES OF AMERICA)	Thank you. The text has been changed.
323	60370	23	10	31	10	32	Figure 23-3 mixes information from different scenarios (SRES and RCP) and a different set of climate models (Ensembles and Cordex). Please discuss the influence of both of these changes on the results. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	This cannot be done due to space limitations. For further details please see Jacob et al 2013.

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324	74568	23	10	45	0	53	Figure 23-2: See also (Legend for Fig. 23-3 A & B on Pg. 94, 95: Projected seasonal changes of heavy precipitation): Comments: Eastern part? Eastern is not a classified region as per Fig. 23-1, and thus it is not clear from Fig. 23-3 as to what regions lack regional climate model projections. As regards 66%, see comment SC-5 but note that precipitation is a variable that has a larger uncertainty than temperature. The changes, as presented, are derived from 20 regional model simulations (A1B) from EU-ENSEMBLES, and from 7 regional model simulations (RCP4.5) from EURO-CORDEX. How does one compare the resulting change from such differences in the set of models used? Does the analysis assume that model numbers and differences do not matter? Moreover, for heat waves 9 and 7 regional models are used for the same set of scenarios. The question arises as to whether the heat wave analysis (temperature related) is "internally" consistent with the precipitation analysis given that a different set of (and numbers of) regional models are used. Perhaps there is a simple explanation that needs to be added to the text somewhere? (UNITED STATES OF AMERICA)	The figure caption has been changed to more precisely describe the eastern part of Turkey: eastern parts of Black sea, Eastern Anatolia and southeast Anatolia. Results for 20 models A1B simulations has been moved to the supplement. Only RCP4.5 and 8.5 are displayed which only differ by one simulation. The analysis of all three parameter has been done with the same set of parameters.
325	77475	23	10	46	10	53	For a review on sub-daily rainfall extremes, see Willems et al. (2013): • 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 and : • Arnbjerg-Nielsen, K., Willems, P., Olsson, J., Beecham, S., Pathirana, A., Bülow Gregersen, I., Madsen, H., Nguyen, V-T-V. (2012). 'Impacts of climate change on rainfall extremes and urban drainage systems: a review', Water Science and Technology, doi: 10.2166/wst.2013.251 (Patrick Willems, KU Leuven)	Thank you for the information, due to space limitation we are not considering sub-daily information.
326	77473	23	11	0	0	0	Next to the observed and projected trends on river flows (Section 23.2.3) it is worth mentioning the impacts on pluvial floods (e.g. sewer floods in cities) given this becomes an important problem for the future. See review by Willems et al. (2012): • 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 (Patrick Willems, KU Leuven)	sentence on pluvial floods has been added.
327	74572	23	11	1	11	7	Define "small" in small tendency toward increased extreme. Also, this full paragraph may benefit from some re-writing as it is hard to take away a message from it. (UNITED STATES OF AMERICA)	Text has been rewritten. Different references talk about changes less than 5% or more than 10%. We are using small related to changes less than 5%. Due to space limitations we are not listing all numbers in the text.
328	74573	23	11	8	11	8	What is an extreme sea level event? Storm surge on top of an el nino event? (UNITED STATES OF AMERICA)	Yes, « Extreme sea level » take account all the processes (storm surge, tides, wave,)
329	59567	23	11	10	11	10	the quantification of extreme sea level events (in meters) would be useful (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Noted.
330	57451	23	11	12	0	0	British Isles' should be replaced by either 'UK' or 'Britain' (Alison Donnelly, Trinity College Dublin)	This has been corrected.
331	59568	23	11	13	0	15	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been corrected.
332	67819	23	11	16	11	16	Would it be possible to add a reference on the (potential) plausibility of increase in extreme events due to energy fluxes (latent heat, water vapour)? (Tanja Wolf, WHO Regional Office for Europe)	Thank you for the comment. Due to space limitation we do not have the possibility to add something at that issue. It is mentioned in Chapter 21.3.3.1.2.2
333	58922	23	11	18	12	15	Again astonishing: the strong effect of vanishing glaciers on streamflow and seasonal water supply seems to be missing. Huss (2011) and Haerberli et al. (2013) provide important overview information and up-to-date references: Huss, M. (2011): Present and future contribution of glacier storage change to runoff from macroscale drainage basins in Europe. Water Resources Research 47 W07511, doi:10.1029/2010WR010299. Haerberli, W., Paul, F. and Zemp, M (2013): Vanishing glaciers in the European Alps. Fate of Mountain Glaciers in the Anthropocene; Pontifical Academy of Sciences, Scripta Varia 118, 2013 www.pas.va/content/dam/accademia/pdf/sv118/sv118-haerberli-paul-zemp.pdf (Wilfried Haerberli, University of Zurich)	We will add a statement on glaciers, and consider these two references.
334	80431	23	11	18	12	15	Please provide more thorough, consistent and precise cross-references to WGI AR5 and SREX (Gian-Kasper Plattner, IPCC WGI TSU)	We will improve these references to SREX, and include more to WG1 AR5

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335	61998	23	11	20	0	0	Section 23.2.3 is poorly organised. Ideally, there should be identifiable paragraphs for both observed and projected changes. Droughts may deserve a subsection on their own as they cover not only hydrological droughts, but are also closely linked with meteorological and agricultural (edaphic) droughts. The current version of the paragraph makes it all confusing (Jean-Philippe Vidal, Irstea)	There is a clear distinction between observed and projected river discharges. We will improve the drought paragraph, and indicate which droughts they concern - generally meteorological.
336	70552	23	11	20	11	21	Add increased temperature instead of or in addition to melting glaciers. The increased temperature affects evapotranspiration, snow accumulation and snow melt and the glaciers. (Hege Hisdal, Norwegian Water Resources and Energy Directorate)	We believe changes in glacier mass balances captures this all.
337	61999	23	11	20	11	34	The period when observed trends have been recorded should always be specified, as upward and downward trends may be observed over different periods, as shown by Giuntoli et al. (2013) in France and Hannaford et al. (2013) over different European regions, because of decadal oscillations in some climate characteristics. The list of detected trends in this paragraph must therefore be accompanied by the corresponding studied period in order to avoid potentially large misinterpretations. - Giuntoli, I., Renard, B., Vidal, J.-P., and Bard, A. (2013) Low flows in France and their relationship to large-scale climate indices. Journal of Hydrology, 482, 105-118. doi: 10.1016/j.jhydrol.2012.12.038 - Hannaford, J., Buys, G., Stahl, K., and Tallaksen, L. M. (2013) The influence of decadal-scale variability on trends in long European streamflow records. Hydrology and Earth System Sciences Discussions, 10, 1859-1896. doi:10.5194/hessd-10-1859-2013 (Jean-Philippe Vidal, Irstea)	We will consider this remark, and indicate that these statements hold generally for the past 30-50 years. Climate variability is already discussed in the previous paragraph.
338	74574	23	11	22	11	23	Explain why the large uncertainties in establishing flood trends in Europe. Is this due to the lack of standardized methods? How can it be improved? (UNITED STATES OF AMERICA)	Sentence is not correct, this is now corrected - it should read: "In general, few changes in flood trends in Europe can be attributed to changes in climate, this is partly due to the lack of sufficiently long records"
339	76737	23	11	24	11	24	"1948-1988" and "1968-2008": why comparing two periods with 20 years of overlapping? (Claudio Cassardo, University of Torino)	This is how results were analysed in the papers, and these periods were chosen.
340	60434	23	11	27	0	0	Change "Northwestern" to "Northeastern". (David Parker, Met Office Hadley Centre)	This has been corrected.
341	76738	23	11	28	11	29	typo: "(Switzerland (Schmocker" --> "(Switzerland: Schmocker". Later, "Germany (Bormann" --> "Germany; Bormann" (Claudio Cassardo, University of Torino)	This will be corrected in typesetting.
342	70553	23	11	29	11	29	Here a reference to Wilson et al. (2010) could be added after Germany, i.e.: The Nordic countries (Wilson et al. (2010) (Hege Hisdal, Norwegian Water Resources and Energy Directorate)	Agreed. This will be added.
343	67820	23	11	31	11	31	what is river "training"?? (Tanja Wolf, WHO Regional Office for Europe)	This will be replaced by "regulation".
344	59569	23	11	32	0	34	The phrase needs improvement grammatically; also, its meaning is not very clear (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. This will be reworded.
345	67821	23	11	33	11	33	again, I suggest to leave the argument of attribution to anthropogenic forcing out. (Tanja Wolf, WHO Regional Office for Europe)	Disagree. As in previous comment #278 this addition of anthropogenic is quite important.
346	57868	23	11	36	0	0	The following article may be suitable for this paragraph since the results from the 20-km and 60-km mesh AGCMs are used in AR5 WG I. for the regional climate projections: Nakaegawa, T., A. Kitoh, M. Hosaka. 2013: Discharge of major global rivers in the late 21st century climate projected with the high horizontal resolution MRI-AGCMs -overview-. Hydrological Processes. 27. DOI: 10.1002/hyp.9831 (Toshiyuki Nakaegawa, Meteorological Research Institute)	Not clear how this reference is relevant to European projections.
347	63774	23	11	36	11	45	Please clarify timing. Is this change projected for the next decades or at the end of the 21st century? (GERMANY)	Agreed. In the next sentence we indicate "by the end of the century"
348	70554	23	11	36	11	45	It is important to remember that changing flood magnitudes in a future climate to a large extent will depend on the dominating flood generating processes (snowmelt or rain) in present day climate and in a future climate. This is illustrated in a detailed study for Norway (Lawrence and Hisdal, 2011) Ref: Lawrence, D., Hisdal, H. (2011). Hydrological projections for floods in Norway under a future climate. NVE Report no. 2011-5, 47 pp - to be found at: http://webby.nve.no/publikasjoner/report/2011/report2011_05.pdf (Hege Hisdal, Norwegian Water Resources and Energy Directorate)	Agreed. We will include this point and add the reference.
349	74575	23	11	36	11	45	(Effect of future climate change on the hydrology of river basins and river flow etc.): Does this text match the changes anticipated in Precipitation? Not clear at first glance. Perhaps, more explanatory text is needed. (UNITED STATES OF AMERICA)	Yes, this broadly matches expectations from precipitation projections, but also flood generating processes including winter rainfall, snowmelt and changes in glacier mass balances.

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350	77474	23	11	36	11	45	Examples for river flow impact studies for Belgium and the river Scheldt basin are (they show peak flow increases in winter but decreases in summer): • Vansteenkiste, Th., Tavakoli, M., Ntegeka, V., Willems, P., De Smedt, F., Batelaan, O. (2013), 'Climate change impact on river flows and catchment hydrology: a comparison of two spatially distributed models', Hydrological Processes; doi: 10.1002/hyp.9480 • Dams, J., Salvadore, E., Van Daele, T., Ntegeka, V., Willems, P., Batelaan, O. (2012). 'Spatio-temporal impact of climate change on the groundwater system', Hydrology and Earth System Sciences, 16(5), 1517-1531 • Poelmans, L., Van Rompaey, A., Ntegeka, V., Willems, P. (2011), 'The relative impact of climate change and urban expansion on river flows: a case study in central Belgium', Hydrological Processes, 25(18), 2846-2858 (Patrick Willems, KU Leuven)	Thanks, these will be considered.
351	62000	23	11	36	44	45	Substantial declines in low flows are also projected over the whole of France by the 2050s (Chazot et al., 2013). - Chazot, S., Chauveau, M., Perrin, C., Bourgin, P.-Y., Sauquet, E., Vidal, J.-P., Rouchy, N., Martin, E., David, J., Norotte, T., Maugis, P., and de Lacaze, X. (2013) What impacts of climate change on surface hydrology in France by 2070? Houille Blanche-revue Internationale De L Eau, accepted (Jean-Philippe Vidal, Irstea)	Thanks, these will be included.
352	60371	23	11	39	11	43	The following reference is also relevant in this context: Görgen, Klaus: Assessment of climate change impacts on discharge in the Rhine River Basin: Results of the RheinBlick2050 project. Lelystad : CHR, 2010. - ISBN 978-90-70980-35-1 " for the use of a weather generator to optimize inputs for hydrological models. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	Thanks, we will include this study.
353	63775	23	11	39	11	45	Consider adding the report I-23 of the CHR for this paragraph. It contains information on changes in high, mean and low flow for the Rhine River based on a 20 member ensembles of discharge projections. Citation: Görgen, K., Beersma, J., Brahmer, G., Buiteveld, H., Carambia, M., de Keizer, O., Krahe, P., Nilson, E., Lammersen, R., Perrin, C. and Volken, D. (2010) Assessment of Climate Change Impacts on Discharge in the Rhine River Basin: Results of the RheinBlick2050 Project, CHR report, I-23, 229 pp., Lelystad, ISBN 978-90-70980-35-1. Available online: http://www.chr-khr.org/files/CHR_I-23.pdf . Suggestion: add in line 45: Ensemble projections based on 20 climate model runs have been carried out for the Rhine river by Görgen et al. (2010). For the middle of the 21st century they show moderate changes (+/-10%) in mean and low flow during the hydrological summer half year and increasing flows during the winter (0% to 20%) at relevant gauges in the catchment. For the end of the 21st century the majority of projections points towards decreasing mean and low flows during the summer (-10% to -25%), while winter flows continue to rise. (GERMANY)	Thanks, we will include this study.
354	57869	23	11	41	0	0	Another projectionfor the Rhine River can be found in Nakaegawa et al. (2013): Nakaegawa, T., A. Kitoh, M. Hosaka. 2013: Discharge of major global rivers in the late 21st century climate projected with the high horizontal resolution MRI-AGCMs -overview-. Hydrological Processes. 27. DOI: 10.1002/hyp.9831 (Toshiyuki Nakaegawa, Meteorological Research Institute)	Thanks, but we already have sufficient regional and national studies on the Rhine.
355	63776	23	11	42	11	42	Krahe et al. (2009) does not contain specific information on Rhine extreme discharges. Cf. comment on chapter 23 page 11 lines 39 to 45 (GERMANY)	We will consider to replace the Krahe et al. reference with the suggested reference from comments #352 and 353
356	57870	23	11	43	0	0	Another projectionfor the Danube River can be found in Nakaegawa et al. (2013): Nakaegawa, T., A. Kitoh, M. Hosaka. 2013: Discharge of major global rivers in the late 21st century climate projected with the high horizontal resolution MRI-AGCMs -overview-. Hydrological Processes. 27. DOI: 10.1002/hyp.9831 (Toshiyuki Nakaegawa, Meteorological Research Institute)	Thanks, but we already have sufficient regional and national studies on the Danube
357	62001	23	11	47	12	2	A method for assessing the different types of droughts (meteorological, agricultural and hydrological) in a consistent way through the hydrological cycle using standardized indices has been proposed by Vidal et al. (2010). - Vidal, J.-P., Martin, E., Franchistéguy, L., Habets, F., Soubeyroux, J.-M., Blanchard, M., and Baillon, M. (2010) Multilevel and multiscale drought reanalysis over France with the Safran-Isba-Modcou hydrometeorological suite. Hydrology and Earth System Sciences, 14(3), 459-478. doi: 10.5194/hess-14-459-2010 (Jean-Philippe Vidal, Irstea)	Thanks, but we have no space to discuss papers on drought methods.
358	62002	23	11	51	11	54	The region affected by changes in droughts can be extended up to the UK, as Vidal and Wade (2009) found a (dramatic) increase in short droughts in the southern part of England. - Vidal, J.-P. and Wade, S. D. (2009) A multimodel assessment of future climatological droughts in the United Kingdom. International Journal of Climatology, 29(14), 2056-2071. doi: 10.1002/joc.1843 (Jean-Philippe Vidal, Irstea)	Agreed. The sentence will be modified to reflect this.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
359	62003	23	11	51	11	54	Vidal et al. (2012) also found a dramatic increase in spatio-temporal characteristics (duration, affected area, total magnitude) of droughts in France over the 21st century. - Vidal, J.-P., Martin, E., Kitova, N., Najac, J., and Soubeyroux, J.-M. (2012) Evolution of spatio-temporal drought characteristics: validation, projections and effect of adaptation scenarios. Hydrology and Earth System Sciences, 16(8), 2935-2955. doi: 10.5194/hess-16-2935-2012 (Jean-Philippe Vidal, Irstea)	Thanks, this will be considered.
360	59570	23	11	53	11	53	After Tsanis et al., 2011 you can add Koutroulis et al., 2010 (7. Koutroulis A.G., Vrochidou A., Tsanis I.K., "Spatial and temporal characteristics of droughts for the island of Crete", Journal of Hydrometeorology, 2010, doi: 10.1175/2010JHM1252.1) as a reference. (Aristeidis Koutroulis, Water Resources Management & Coastal Engineering Laboratory, Technical University of Crete, Greece) (GREECE)	Thanks, this will be considered.
361	74576	23	12	1	12	2	While this is conceptually plausible, it might be useful to show projected changes (model derived) in soil moisture and evapotranspiration. To be noted, these are 2nd or 3rd order parameters that are subject to considerably larger uncertainties than for example 1st order parameters such as temperature. (UNITED STATES OF AMERICA)	Such changes are relevant, but given limited space we cannot include this here, would be relevant for sectoral chapter on water resources (WG2 Chapter 3).
362	59571	23	12	4	0	6	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been amended.
363	67822	23	12	4	12	4	"dry spells" needs explanations. In what is dry spell different from drought. An opportunity to shed light on the complexity mentioned in the beginng of the paragraph. (Tanja Wolf, WHO Regional Office for Europe)	Dry spells are meteorological only whereas drought have different definitions for different sectors e.g. (meteorological drought, hydrological, agricultural). Dry spells are also mentioned in Wg1 ch 2.6.2.3. Text can not be modified due to space limitation.
364	62004	23	12	4	12	6	It should be noted here that the length of dry spells is a poor indicator of meteorological droughts, and an even poorer indicator of hydrological droughts. It would be therefore much more appropriate to include here a figure from the FP6 EU WATCH project (www.eu-watch.org) showing multi-GCM and multi hydrological model changes in low flow indices. (Jean-Philippe Vidal, Irstea)	Dry spells are chosen corresponding to SREX and WG1 Ch2. There are important for more than one sector.
365	83415	23	12	4	12	6	For the described differences across scenarios, how much of the difference is due to the emission scenario versus the modeling group/project? (Katharine Mach, IPCC WGII TSU)	Interesting question, some more information is given in the paper; Jacob et al 2013. The scenario difference is given in the figures (RCP4.5 and 8.5). The modelling group can not be attributed.
366	76739	23	12	5	12	5	typo: "scenariothe" --> "scenario the" (Claudio Cassardo, University of Torino)	This has been amended.
367	67825	23	12	18	15	3	in 23.3 the subsections settlements and housing are not really separate. I suggest to merge them and subgroup by phenomenon (related to temperature or precipitation) and explain the general pathways beforehand. Even the section on transport would benefit from being integrated this way. (Tanja Wolf, WHO Regional Office for Europe)	We feel the distinction between the three sub-headings is important to guide the reader through the different topics.
368	74577	23	12	18	17	27	Do the seven areas covered in 23.3 represent the complete range of Production Systems and Physical Infrastructure? (UNITED STATES OF AMERICA)	Yes.
369	69724	23	12	22	12	29	specify references (NETHERLANDS)	This is an introductory paragraph, references follow in sub-sections.
370	83416	23	12	26	12	26	If "likely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. Casual usage of the reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	This is casual use, and has been modified.
371	59572	23	12	27	12	27	The message is wrong here. It is not a mater of upgrading flood deferences. It is a mater of adopting as soon as possible a (no-cost) policy to refrain from placing anything or at least critical infrastructure between the contours of 0 and 1 meters elevation if that is the expected rise. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	This statement is now modified, as we state in ES that upgrading can ameliorate projected impacts.
372	65822	23	12	33	12	44	Also neede to consider new cost numbers from Brown et al.: Mitigation or adaptation? Impacts of sea-level rise in the EU in the 21st century. Submitted to Climatic Change (Sally Brown, University of Southampton)	Unfortunately, this paper was not accepted in time for AR5.
373	59573	23	12	36	12	36	I would be interested to know the definition of "exposed" here. Is it the zone between 0 and 1 meters of elevation or a wider zone? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Exposed implies at risk from flooding, this is dependant on location, and flood return periods.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
374	74578	23	12	36	12	36	There should be more specific reference to port facilities and infrastructure in this section. (UNITED STATES OF AMERICA)	Agreed. This is now included in the first sentence.
375	70676	23	12	37	12	37	A reference here may be as follows: Melchiorre and Frattini, 2012. These authors reported that: "The uncertainties in the predicted extreme precipitation events, soil parameters, and antecedent precipitation conditions do not allow any accurate estimation of changes in stability conditions for shallow landslides." Melchiorre, C., Frattini, P., 2012, Modelling probability of rainfall-induced shallow landslides in a changing climate, Otta, Central Norway, Climatic Change, 113 (2), pp. 413-436. (Marco Borga, University of Padova)	This comment refers to Page 13, the reference will be included in the section, after the line on complex responses.
376	59574	23	12	37	12	38	The authors could consider citing the work of Krestenitis et al. (2011) about storm surge events in north-eastern Mediterranean. (Citation: Krestenitis, Y.N., Androulidakis, Y.S., Kontos, Y.N. and Georgakopoulos, G. (2011). Coastal inundation in the north-eastern Mediterranean coastal zone due to storm surge events, Journal of Coastal Conservation, 15(3): 353–368). (Dimitris Damigos, Mining and Metallurgical Engineering, NTUA, Greece) (GREECE)	Thanks, but we focus on changes in storm surge events.
377	74579	23	12	39	12	40	(Without adaptation, number of people affected...projected to increase.....under SRES B2 and A2 scenarios....): Comment: Appears to be no internal consistency in the scenarios used in the references studies scattered throughout the report. Perhaps it does not matter. But it raises a point of curiosity as regards IPCC protocol? (UNITED STATES OF AMERICA)	This is due to the choices made in those studies; we report where relevant which scenarios were used.
378	58477	23	12	41	12	42	Supress this sentence. Of course continental and alpine are not subject to coastal flood. (Martin Pecheux, Institut des Foraminifères Symbiotiques)	Disagree; also eastern and central Europe have coastlines (Baltic, Adriatic seas) , but these are less affected.
379	83417	23	12	42	12	42	Where the upper bound of 17 billion is given here, it would be preferable to give the full range in terms of a lower and upper bound to the estimate. (Katharine Mach, IPCC WGII TSU)	Agreed. We will also report lower estimate.
380	59575	23	12	43	12	43	How "highest" is defined here? Is it in absolute terms or e.g. as a % of the countries GDP for example. I am surprised to see that countries with extensive coastline are not part of the most affected. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	These are absolute damage costs; this is now reported.
381	61602	23	12	43	12	43	The term "with wider costs being higher" is not clear. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Agreed. We will rephrase to include the impacts in landlocked countries.
382	61603	23	12	43	12	44	Clarify whether "The highest damage costs" refer to absolute costs or to costs per person or to costs as a percentage of GDP. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	These are absolute damage costs; this is now reported.
383	74580	23	12	50	12	58	(\$ impact calculations for a 1 meter sea level rise in Turkey and increasing flood risk on the Baltic coast): The \$ numbers and the # of people affected are large (3 million people and \$12 billion capital value at risk, and adaptation costs of \$20 billion—in the Turkey example. Comment: Impact cost and adaptation cost will both depend on the rate of change in sea level in the case of Turkey. While these are interesting findings, have these studies considered rate of change as opposed to a step function change. Not clear from the text. (UNITED STATES OF AMERICA)	These studies have not considered such effects.
384	83418	23	12	51	12	52	If this study provided ranges in addition to best estimates for the projected outcomes, it would be preferable to indicate them. (Katharine Mach, IPCC WGII TSU)	No ranges are provided in this study.
385	74581	23	12	52	12	52	The reference Karaca and Nicholls does not have a year of publication. (UNITED STATES OF AMERICA)	This will be amended.
386	70673	23	13	2	13	2	The distinction reported in the title between River and Pluvial is not completely relevant, given the content of the Section. Pluvial flooding occurs as a consequence of direct rainfall on urban areas that exceeds the capacity of urban drainage systems. It can cause severe damage and disruption to buildings, urban infrastructure systems and people. It is of course relevant to the flooding problem, but it seems to me a case of flash flooding, which is a broader type of flooding mechanism. I would suggest to modify the title as follows: "River and flash flooding". (Marco Borga, University of Padova)	We maintain the current heading. Pluvial is generally used for flash floods (catchments) as well as urban floods.
387	67823	23	13	4	13	47	"well documented" observed increase in increased trends in flood disasters and damages is not congruent to "large uncertainties" as stated on p 11 line 23?? Perhaps on page 11 you better say "differences across Europe" as the spatial patterns are then detailed. (Tanja Wolf, WHO Regional Office for Europe)	As the second sentence (line 5) on Page 13 reads; the cause is not climate change. This therefore is consistent with the statement on Page 11.
388	83419	23	13	13	13	15	For this projection, it would be preferable to specify the relevant climate/socioeconomic scenario as well as the relevance of different drivers and assumptions (for example, trends in exposure versus trends in flooding). (Katharine Mach, IPCC WGII TSU)	SRES scenarios are now included.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
389	74582	23	13	14	14	22	Section 23.3.2 summarizes housing and is focused on the impact of temperature change. Increased intensity and frequency of extreme weather (e.g., coastal storms with strong winds, extreme rains, etc) have an impact on buildings and building codes. And, there are other examples of extreme weather having an impact on urbanized environment (e.g., urban areas and air pollution). (UNITED STATES OF AMERICA)	Air quality is addressed in a later section. We do mention flood/water damage to dwellings as well as subsidence- but the literature is very limited with respect to climate change effects, rather than weather damage per se.
390	77476	23	13	19	0	0	This is not true. Several studies exist on the impacts of intense rainfall on pluvial flooding (overview is given in Willems et al., 2012); see previous comment. (Patrick Willems, KU Leuven)	Most studies focus on river flooding. Here we mean urban and local floods. The sentence is now modified in this way. We will consider study by Willems.
391	74583	23	13	19	13	22	The combined studies under the Intergrated Flood Management sytem sponsored by the Global Water Partnership and the WMO contains many examples of adapation drawn from hydrometeorological services around the world. (UNITED STATES OF AMERICA)	We will consider these studies, if we can find appropriate references.
392	78347	23	13	20	0	0	another study which evaluates future damages from inundation in response to an increase in intense rainfall is Dumas, Patrice, Stéphane Hallegatte, Pere Quintana-Seguí, et Eric Martin. 2013. « The influence of climate change on flood risks in France -- first estimates and uncertainty analysis ». Natural Hazards and Earth System Sciences (march): 809- 821. (Vincent Viguié, CIREC)	Thanks, but this paragraph relates to river flood risk, and this paper by Dumas et al. 2013 does not hold important messages for French flood risk, apart from uncertainties in the modelling framework.
393	70674	23	13	21	13	21	A sentence may be added here to underline the different impacts of land use/land cover change and projected changes in precipitation regime on different types of floods. "Marchi et al. (2010) showed that extreme flash floods in Europe are characterized by reduced runoff to rainfall volume ratios. They hypothesized that flash floods may be more sensitive to land use/land cover changes than to modification in the rainfall intensities, particularly in Central Europe." Marchi L., M. Borga, E. Preciso and E. Gaume, 2010, Characterisation of selected extreme flash floods in Europe and implications for flood risk management. J. of Hydrology, 394 (1–2), 118–133. doi:10.1016/j.jhydrol.2010.07.017. (Marco Borga, University of Padova)	Thanks, we reviewed this paper but noticed it does not support such a specific statement.
394	58478	23	13	25	13	25	Better Landslides as title than mass movement, which can be many thing. (Martin Pecheux, Institut des Foraminifères Symbiotiques)	Agreed. We will reword to landslides.
395	70675	23	13	25	13	41	The text report that very few studies are available on observed trends or future projections in the frequency of landslides. Actually, a number of studies were reported in the period 2010-2013. A few of these are listed below: Coe, J.A. and Godt, J.W., 2012, Review of approaches for assessing the impact of climate change on landslide hazards, In Eberhardt, E., Froese, C., Turner, A.K., and Leroueil, S., eds., Landslides and Engineered Slopes, Protecting Society Through Improved Understanding: Proceedings of the 11th International and 2nd North American Symposium on Landslides and Engineered Slopes, Banff, Canada, 3-8 June, Taylor & Francis Group, London, v. 1, p. 371-377. http://landslides.usgs.gov/docs/coe/CoeGodt2012.pdf Coe, J.A., 2012, Regional moisture balance control of landslide motion: Implications for landslide forecasting in a changing climate. Geology, 40 (4), pp. 323-326. Dijkstra, T.A., Dixon, N., 2010, Climate change and slope stability in the UK: Challenges and approaches, Quarterly Journal of Engineering Geology and Hydrogeology, 43 (4), pp. 371-385. Jomelli, V., Brunstein, D., Déqué, M., Vrac, M., Grancher, D., 2009, Impacts of future climatic change (2070-2099) on the potential occurrence of debris flows: A case study in the Massif des Ecrins (French Alps), Climatic Change, 97 (1), pp. 171-191. Melchiorre, C., Frattini, P., 2012, Modelling probability of rainfall-induced shallow landslides in a changing climate, Otta, Central Norway, Climatic Change, 113 (2), pp. 413-436. Saez, J.L., Corona, C., Stoffel, M., Berger, F., 2013, Climate change increases frequency of shallow spring landslides in the French Alps, Geology, 41 (5), pp. 619-622. Stoffel, M., Huggel, C., 2012, Effects of climate change on mass movements in mountain environments, Progress in Physical Geography, 36 (3), pp. 421-439. (Marco Borga, University of Padova)	Thanks, some of these papers will be included.
396	74584	23	13	25	13	41	Section 23.3.1 describes climate change impact on settlements but is limited to impacts of flooding and heavy-precipitation-derivative impacts. There are other forms of extreme weather (eg, frequency and intensity of tornadoes, tropical cyclones, winter storms) which will impact growing populations. If data do not support such statements, text would be strengthened with statements to that effect. (UNITED STATES OF AMERICA)	Agreed. We will put windstorms under a separate heading, now covered under 23.3.7. There is no information on other extremes, such as tornadoes or thunderstorms.
397	61604	23	13	27	13	34	Healthy forests can reduce the frequency of shallow landslides. See report by Bruijnzeel, L.A., 1990 Hydrology of Moist Tropical Forests and Effects of Conversion: A State of Knowledge Review. Humid Tropics Programme, UNESCO International Hydrological Programme, UNESCO, Paris (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Reference not relevant at this point, as the chapter covers Europe, not tropics.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
398	58923	23	13	28	13	32	The combined effect concerning the formation of new lakes in deglaciating high mountains and the decreasing stability of steep mountain flanks due to glacial debuitressing and permafrost warming/degradation causes a systematically increasing probability of large and far reaching floods from impact waves triggered by rock/ice avalanches into new lakes (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) (Wilfried Haeberli, University of Zurich)	Thanks, this will be considered.
399	59576	23	13	32	0	34	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. This has been corrected.
400	59577	23	13	34	0	35	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. This has been corrected.
401	67824	23	13	34	13	34	Apennines (not Apenines) if you mean the mountains in Italy (Tanja Wolf, WHO Regional Office for Europe)	Agreed. This has been corrected.
402	83420	23	13	34	13	34	"medium confidence" should be italicized. Directness of wording would be maximized if it were placed parenthetically at the end of the sentence. (Katharine Mach, IPCC WGII TSU)	Agreed. We will put between brackets.
403	69725	23	13	46	13	46	missing reference (NETHERLANDS)	Ref has been added.
404	74585	23	13	46	13	54	This section's content might be better placed under the energy section. Housing adaptation should include concepts such as housing design incorporating southern exposure of walls and windows, shading, interior courtyards, roofing design to fit the climate zones and natural hazards, etc. (UNITED STATES OF AMERICA)	Text has been revised and shortened. Adaptation options for housing are mentioned, but not in detail.
405	59578	23	13	50	13	50	it is not only temperature (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	see comment #260 above
406	59579	23	13	51	13	52	Not clear. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Text has been clarified.
407	57922	23	13	52	13	54	In the chapter 8, page 22 lines 31-32 is stated that it is still unclear whether the climate change will magnify UHI effects. Additionally the study of Lemonsu et al(2011) on the climate change in the region of Paris showed a strikingly different change in the energy demand. The evolution of the Parisian urban climate under a changing climate showed a 30% decrease of heating degree days and a strong increase in summer time cooling degree days. However, in terms of accumulated degree days, the increase of the demand for cooling for Paris remained smaller than the decrease of the demand in heating. Citation: Lemonsu et al, 2013, in Climatic Change (2013) 116:679–692: Evolution of the Parisian urban climate under a global changing climate. This may be due to the different climate or different assumptions in the modeling setup, nevertheless this contradiction should be discussed or at least mentioned. (Kristina Trusilova, Deutscher Wetterdienst)	Agreed. Text revised to reflect different responses in other cities.
408	83421	23	13	53	13	53	Instead of presenting the values "up to," the full range of projected outcomes should be presented, including lower and upper bounds. (Katharine Mach, IPCC WGII TSU)	Noted.
409	76740	23	13	53	13	54	these percentages are not referred to the baseline, thus the variations are difficultly to manage (Claudio Cassardo, University of Torino)	noted.
410	59580	23	14	4	14	5	The priorities should be solar shading and then thermal mass. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Adaptation options- it is not able to discuss this level of detail.
411	83422	23	14	5	14	5	Where evidence is described here, the chapter team could consider presenting a summary term for evidence (and also a summary term for agreement) from the uncertainties guidance for authors. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
412	59581	23	14	8	14	12	The entire paragraph is not well merged in the context of the section on Housing. Difficult to see the relevance.(Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	This will be improved by editing.
413	83423	23	14	9	14	9	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
414	67826	23	14	12	14	12	again Corti et al 2009 as reference? (Tanja Wolf, WHO Regional Office for Europe)	added.
415	70195	23	14	12	14	12	The last sentence may not be needed. If countries were adapted they would not suffer the consequences of soil subsidence. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This will be improved by editing.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
416	83424	23	14	14	14	14	"limited evidence" should be italicized. Also, directness of wording would be maximized if it were placed parenthetically at the end the sentence. (Katharine Mach, IPCC WGII TSU)	This has been amended.
417	63777	23	14	14	14	22	There exist a couple of other articles on that topic using very different approaches (e.g., urban land surface scheme in a regional climate model, e.g., Trusilova K, Jung M, Churkina G, Karstens U, Heimann M, and Claussen M (2008) Urbanization Impacts on the Climate in Europe: Numerical Experiments by the PSU/NCAR Mesoscale Model (MM5). Journal of Applied Meteorology and Climatology, 47 (5): 1442-1455; Früh B, Becker P, Deutschländer T, Hessel J-D, Koßmann M, Mieskes I, Namyslo J, Roos M, Sievers U, Steigerwald T, Turau H, Wienert U (2011) Estimation of Climate-Change Impacts on the Urban Heat Loading Using an Urban Climate Model and Regional Climate Projections. Journal Applied Meteorology and Climatology 50: 167-184) which should also be discussed and referred to. (GERMANY)	Agreed.
418	57923	23	14	19	14	21	The expectation of urban heat island to increase in the future, supported by the work of Wilby (2008), cannot be applied universally to the whole of Europe and the case of London alone should not be used as a typical example here. The UHI as the difference between the urban and the rural temperatures does not have to increase with the ongoing climate change. For example the study of Lemonsu et al (2013) indicated a systematic increase of 2-meter air temperature in the area of Paris, however, during summer, the warming trend was found to be more pronounced in the surrounding countryside than in Paris and suburbs due to the soil dryness. As a result, a substantial decrease of the strong urban heat islands was noted at nighttime, and numerous events with negative urban heat islands appear at daytime (Citation: Lemonsu et al, 2013, in Climatic Change (2013) 116:679–692: Evolution of the Parisian urban climate under a global changing climate). (Kristina Trusilova, Deutscher Wetterdienst)	Agreed. Text has been modified to indicate different effects in different cities.
419	61605	23	14	20	14	22	Modelling study by Boherstengel et al. (2011) Simulations of the London urban heat island. Quarterly Journal of the Royal Meteorological Society, 137, pp.1625-1640 shows that significant greening (>20%) could be needed before the UHI is reduced. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Noted.
420	67827	23	14	21	14	22	reference for last sentence? Again Wilby 2008? However, as mentioned above, I don't see why this statement on urban heat island is in "housing" rather than "settlement" (Tanja Wolf, WHO Regional Office for Europe)	The subheading has been changed to the built environment to include both indoor and outdoor temperatures.
421	57924	23	14	22	14	22	Here it is important to note that the UHI strongly depends on the climate type and the projected climate trend for the particular area. Therefore more studies on the UHI in European cities in different climates have to be discussed or at least mentioned. I suggest to read and include the results of the study on the UHI of Madrid by Salamanca et al (2011) and the study on the UHI of Frankfurt am Main by Früh et al (2011). Citation 1: Salamanca et al (2011) in Int. J. Climatol., DOI: 10.1002/joc.3398: A numerical study of the Urban Heat Island over Madrid during the DESIREX (2008) campaign with WRF and an evaluation of simple mitigation strategies. Citation 2: Früh et al. (2011) in J. Appl. Meteorol. Clim. 50: 167 - 184: Estimation of Climate-Change Impacts on the Urban Heat Load Using an Urban Climate Model and Regional Climate Projections. (Kristina Trusilova, Deutscher Wetterdienst)	Agreed. Text has been revised.
422	74586	23	14	25	15	3	Section 23.3.3 (Transport) is rather short, yet the implications of climate change on transportation and transportation infrastructure are numerous and significant. For example, highways are part of the physical infrastructure, and climate-change induced swings in temperature extremes will impact highways. Extreme weather impacts air, sea and land transportation from both safety and economic perspectives: air traffic delays in the US alone are estimated at \$40B per year and approximately two thirds are caused by adverse weather increases in adverse weather combined with the growing airline industry will almost certainly increase that number and the congestion in air traffic over Europe will result in similar, if not greater, economic (and safety) impacts (UNITED STATES OF AMERICA)	The section on transport covers 4 sub-sectors, namely road, inland waterways, long range ocean transport and air, therefore inevitably each subsection cannot be too long due to space limitations. The issue of air traffic delays is mentioned in page 15, line 3. No peer-reviewed literature was found on CC impacts on highways; we would appreciate the suggestion by the reviewer of any recent (after AR4) relevant peer-reviewed references on this topic.
423	59582	23	14	30	0	32	Such a direct link between lower traffic speed and loss of welfare is quite doubtful; it should not feature as of universal validity. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Thank you. 'will' will be replaced by 'may' in order to leave room for other cases where lower traffic speed may not cause welfare losses.
424	60853	23	14	30	14	35	On Road transport: This is interesting, Future snow and ice will decrease, however this will lessens a country's and an individual's capacity to cope with such conditions and hence may cause an increase in road collisions. Witness the failure of UK drivers and the transport system to cope with infrequent and minor snow falls compared with that of Norway, whose drivers and transport infrastructure copes with adverse conditions. (David Viner, Private)	No response is needed.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
425	61606	23	14	34	14	35	Clarify whether this large reduction in accidents is due to climate change only or also due to other (e.g. Socio-economic and technical) developments. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	It is the combined result of modified climate and expected developments in vehicle technology and emergency systems. This will be clarified in the text.
426	83425	23	14	35	14	35	Is 2020-2070 really the timeframe used in the underlying study? (Katharine Mach, IPCC WGII TSU)	As the authors' estimates are for 2040-2070 while for the previous period they rely on others' findings (namely the CODIA and eCALL research projects), the text will be modified accordingly ('.....by 63-70% in 2040-2070.....').
427	61607	23	14	37	14	41	Climate effects on UK rail studied in paper by Palin et al. (2013) Future projections of temperature-related climate change impacts on the railway network of Great Britain, Climatic Change, under review. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The manuscript mentioned is under review, therefore it cannot be cited in the text.
428	60372	23	14	43	14	46	The following reference is also relevant in this context: Görden, Klaus: Assessment of climate change impacts on discharge in the Rhine River Basin: Results of the RheinBlick2050 project. Lelystad : CHR, 2010. - ISBN 978-90-70980-35-1 " for the use of a weather generator to optimize inputs for hydrological models. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	This is not a peer-reviewed paper.
429	63778	23	14	43	14	46	This text focuses on climate futures which are connected with adverse effects for inland navigation. The ensemble of discharge projections that is now available for the Rivers Rhine (and Danube) contains several members showing different directions of change. In addition, the effect of reduced river icing is not mentioned. Consider adding reference to report 1.4 of the EU-funded project ECCONET: Nilson, E., Lingemann, I., Klein, B., Krahe, P. (2012): Impact of Hydrological Change on Navigation Conditions. ECCONET report 1.4. Available online: http://www.ecconet.eu/deliverables/ECCONET_D1.4_final.pdf (GERMANY)	1) We would appreciate the suggestion of peer-reviewed references estimating impacts on inland transport on the basis of the new available ensemble of discharge projections in Rhine and Danube. 2) On the impacts of river icing: No peer-reviewed references have been found so far. We would appreciate the suggestion of any available peer-reviewed references on this issue. 3) Regarding the suggested reference to the specific report, this is not a peer-reviewed paper.
430	59587	23	15	0	0	0	The section 23.3.4 does not cover "Distribution" which is implied by the section title. In addition, the section only covers the building sector but not other end uses. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	The section will be renamed "Energy production, transmission and use". Regarding other uses, it should be reminded that the section does not deal with energy use (this falls under mitigation, i.e. IPCC WGIII) but with climate change impacts on energy use. In this aspect, available references deal with the buildings sector (residential, commercial, offices, hotels, etc.), while no peer reviewed references have been found so far on the impacts of climate change on energy use in other sectors such as industry or agriculture (excluding energy use in industrial/ agricultural buildings).
431	74587	23	15	1	15	3	This section misses the important issue of runway length. Hotter temperatures and more humid air means lower air density. "Density altitude" raises the virtual runway elevation; longer take-off rolls are required for liftoff. Already, even new airports at high elevations, Denver Colorado, for example, have to restrict the largest fully loaded aircraft to cooler nighttime take offs and landings. (UNITED STATES OF AMERICA)	We would appreciate the suggestion of any available peer-reviewed references on this issue.
432	63464	23	15	3	15	3	In 2010 the European Organisation for Safety of Air Navigation reported on changes in convective available potential energy (CAPE), a measure of instability in the atmosphere, over Europe's busiest airspace (Maastricht). The study shows possible future increases in weather phenomena associated with severe convection over Europe by the 2020s with the largest changes indicated for summer months. By the 2050s, spring and autumn showed measureable increases too. (Eurocontrol, 2010). Source: http://www.eurocontrol.int/sites/default/files/content/documents/official-documents/facts-and-figures/statfor/challenges-of-growth-climate-adaptation-march-2010.pdf (Diogo de Gusmao, Met Office Hadley Centre)	This is not a peer-reviewed paper.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
433	74588	23	15	6	15	54	Section 23.3.4 (Energy Production, Distribution and Use) is focused on production and use with little apparent on distribution. For example, when extreme weather occurs, above ground power lines are damaged by falling trees due to high winds or instability from rain soaked ground. (UNITED STATES OF AMERICA)	See response to comment No. 430 above. In addition, the mentioned peer-reviewed paper of McColl et al. (2012) found that future wind and gale faults may remain the same, increase, or decrease in the future due to uncertainty in wind gust projections (i.e. there is not a clear sign of the climate change impacts on these type of faults, that is why they have not been mentioned in the text). Regarding instability from rain soaked ground and consequent impacts on transmission lines, to our knowledge this issue has not been examined in the literature so far.
434	83426	23	15	10	15	11	It would be preferable to specify the climate/socioeconomic scenario for this projection. (Katharine Mach, IPCC WGII TSU)	In (Harrison et al., 2008), the UKCIP02 scenarios ('low', 'medium-low', 'medium-high', and 'high') were utilized. However, as the text will be modified more references will be added to this one and thus there is no need to mention specifically these scenarios.
435	61608	23	15	11	15	13	This sentence is confusing - aren't there seasonal and spatial variations in energy density all over Europe? What is "energy density"? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The text will be modified in order to make expected future seasonal variations clearer. The term 'energy density (W/m2)' will be replaced by the term 'energy potential' (as the latter term covers also the projected energy output from a wind turbine at a height of e.g. 80m).
436	61650	23	15	17	15	17	Cannot say power generation in Scandinavia will increase - results is based on a projection. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	'Will' will be replaced by 'is expected to'.
437	83427	23	15	17	15	19	Where values are presented "up to" and "even by" the chapter team should instead present the full range of projected outcomes, including lower and upper bounds. (Katharine Mach, IPCC WGII TSU)	5-14%, 4-8.5%. These ranges will be reported in the text.
438	62005	23	15	17	15	25	There are two additional relevant references recently published on the impact of climate change on hydropower production: Hendrickx and Sauquet (2013) in the Pyrenees and Finger et al. (2012) in the Swiss Alps. - Finger, D., Heinrich, G., Gobiet, A., and Bauder, A. (2012) Projections of future water resources and their uncertainty in a glacierized catchment in the Swiss Alps and the subsequent effects on hydropower production during the 21st century. Water Resources Research, 48, W02521. doi: 10.1029/2011WR010733 - Hendrickx, F. and Sauquet, E. (2013) Impact of warming climate on water management for the Ariège River basin (France). Hydrological Sciences Journal, 58(4), 1-17. doi: 10.1080/02626667.2013.788790 (Jean-Philippe Vidal, Irstea)	The paper of Hendrickx and Sauquet (2013) will be added to the references cited. The paper of Finger et al. (2012) does not provide specific quantitative estimates for changes in electricity production from hydro.
439	64242	23	15	18	15	18	Instead of referring to Jóhannesson et al. (2012), the entire CES report should be referenced here: Thorsteinsson, Th., and H. Björnsson, eds. Climate Change and Energy Systems. Impacts, Risks and Adaptation in the Nordic and Baltic Countries. Nordic Council of Ministers, TemaNord 2011:502, 91–111. The Chapter by Jóhannesson et al. is only about glaciers, snow and ice. The effect on energy production as such is handled in other chapters. (ICELAND)	In order to include at this point of the text only those refs that provide quantitative information on expected changes in hydropower due to CC, this reference will be omitted.
440	69726	23	15	20	15	20	reductions of what ? (NETHERLANDS)	3 out of 5 references (Stanzel and Nachtenbel, 2010; Pasicko et al., 2012; Schaepli et al., 2007) refer directly to hydropower production. Therefore, only these will be retained and the relevant range will be 6-36%.
441	62006	23	15	21	15	22	The publication year of the Paiva et al. study is actually 2010. - Paiva, R., Collischonn, W., Schnetterling, E. B., Vidal, J.-P., Hendrickx, F., and Lopez, A. (2010) The Case Studies. Chapter 6 in Modelling the impact of climate change on water resources [Fung, F.; Lopez, A. & New, M. (ed.)], Wiley-Blackwell, Chichester, UK. pp. 203 (Jean-Philippe Vidal, Irstea)	The publication year will be changed to 2010.
442	59584	23	15	27	0	27	Biofuel production is covered in section 23.4.5 (not 6) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be changed to 23.4.5.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
443	59585	23	15	27	0	28	Some information could be given regarding solar energy as a source to cover the increased energy demands in Europe because of climate change focusing also on the environmental impacts of solar panels. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	As stated also in SOD, no new (after AR4) literature on the impacts of CC on solar energy production was found. The issue of solar energy as a source to cover demand and the environmental impacts of solar panels fall under mitigation, i.e. WGIII of IPCC.
444	59583	23	15	27	15	27	In my opinion the correct question is how solar energy production impacts on climate change. When discussing in line 35 energy demand it is a totally different case if this demand is covered by fossil fuels or by solar energy. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	It is not clear what the reviewer has in mind when suggesting of examining the question on how solar energy production impacts climate change. If by that he means that by using solar energy we use less fossil fuels and thus reduce the risk of climate change, this is again an issue that falls under mitigation, i.e. WGIII of IPCC.
445	61609	23	15	28	15	30	Clarify whether the "lower figures" refer to a smaller decrease or to a lower usable capacity (which would imply a larger decrease). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Lower figures' refers to smaller decreases'. It will be clarified in the text.
446	83428	23	15	30	15	39	The 3.7°C scenario should be clarified--by 2050?! Or by the end of the century even though results are given for 2050? (Katharine Mach, IPCC WGII TSU)	3.7 oC by the end of the century, through the results (i.e. impact on energy demand) are given for 2050. In order to clarify this, the information on the scenario used will be moved from line 38 to line 36, where these authors are mentioned for the first time.
447	61610	23	15	31	15	33	Are there any estimates of changes in transmission efficiency? Higher temperatures lead to increased resistance of power lines and so higher power losses. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	No recent (after AR4) peer reviewed references on the impact of climate change on the efficiency of transmission/distribution lines in Europe were found.
448	74589	23	15	32	15	32	"lighting" or "lightning"? (UNITED STATES OF AMERICA)	Lightning'. It will be corrected in the text.
449	61611	23	15	35	15	36	Will energy demand in Europe really decrease? Sentence on p.4 lines 8-10 states that cooling demand will increase owing to higher incomes, implying greater energy usage. Fig.23-5 shows that electricity demand will increase with climate change, at least over Greece. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Based on the estimations mentioned in the text, energy demand (on annual basis, i.e. incorporating both heating and cooling, and including all energy forms) in Europe as a whole will decrease. This is because energy use for cooling (again in Europe as a whole) is at present still low (although a high rate of increase is expected) and much lower than energy use for heating. When examining sub-regions within Europe and particular energy forms, this sign of change may not hold, as it is the case in Greece where for instance electricity use for cooling is already high and thus a hotter climate will lead to a further increase of this use and to a decrease of (the low, even at present) electricity consumption for heating purposes. Although the net effect (on an annual basis) in this case (and also in other Southern European countries) may be small, seasonal changes (especially in summer) are expected to be prominent. This is reflected by Figure 23-5.
450	61612	23	15	38	15	38	What is a "+3.7 C scenario"? Is this a temperature rise by 2100? Is it from an RCP? Other chapters consider a +2 and +4 C world - is this scenario related to these global mean temperature rises? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	See response to comment No. 446 above.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
451	83429	23	15	39	15	42	It would be preferable to specify the relevant climate/socioeconomic scenario for this estimated outcome. (Katharine Mach, IPCC WGII TSU)	As mentioned in the text, Isaac and van Vuuren examined a +3.7 oC scenario by the end of the century. For better understanding, the info on the scenario used will be moved from line 38 to line 36, where these authors are mentioned for the first time. As for the socio-economic scenario/assumptions associated with this climate scenario, it is the ADAMreference scenario used, while its socio-economic assumptions (GDP, population, etc.) were also used by Isaac and van Vuuren in the paper mentioned. Unfortunately, due to space limitations, all this info cannot be included in the text.
452	59586	23	15	46	15	50	Some reference to EPBD transposition and the anticipated impact of nearly-zero energy buildings should be included to substantiate the anticipated benefits (in addition to passive cooling etc). Interesting to note that EPBD that is the main main legislative instrument for improving the energy efficiency of European buildings and is part of the EU initiatives on climate change, is not referenced. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Nearly-zero energy buildings and their anticipated benefits are an issue that falls mostly under climate change mitigation (i.e. under IPCC WGIII).
453	59594	23	16	0	0	0	Section 23.3.5. This discussion here is shallow. Manufacturing can follow land use changes, adaptation should be focused on not placing industrial infrastructure along the coast. I also do not understand why crop production (part of primary sector/agriculture) is mentioned here where the focus is on the secondary sector (indust./manufact)? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The discussion is not extended since there is not yet enough literature on CC impacts on manufacturing. Crop production is mentioned here only because CC impacts on some crops will impact consequently the quality of manufacturing products using these affected crops as a main raw material (e.g. wine). The text will be simplified in order to not confuse the reader.
454	59595	23	16	0	0	0	The section 23.3.5 needs to be expanded; it is very short.(Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	The available literature on this issue is still very limited (see also comment No. 453 above).
455	74594	23	16	0	45	0	Essentially nothing can be said about this sector given present economic, banking, and insurance theory and practice. All these industries react on a relatively short time scale. The IPCC should perhaps eliminate topical or thematic areas that are well outside the scope of the IPCC. This comment may apply to many other sub-sections of this report as well as all other IPCC regional reports. This is not to say that the discussion of these subjects are not useful. They are, but are highly unlikely to lead to any policy or structural change as such or at any time. Response will typically and always be within a time horizon of a year or a few years at best. This begs the question as to why the IPCC should be involved in making assessments in such areas at all? Make a more concerted effort to tie it to the topic at hand. As an example, since AR4, the reinsurance industry has shown dramatically enhanced ability and interest in incorporating climate change into their decisionmaking. (UNITED STATES OF AMERICA)	Disagree, insurance and banking are essential services, also treated in other places such as Chapter 17, as well as SREX report, and Third and Fourth assessment reports. Adaptation issues within the insurance sector are discussed, here and in Chapter 17.
456	61613	23	16	3	16	10	Paper by Kirsty Lewis & Claire Witham (2012): Manufactured commodities and climate change, Climate Policy, 12:sup01, S62-S72 addresses some impacts of climate change on manufactured goods. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The paper suggested does not provide any quantitative estimates on the impacts of climate change on manufacturing, while its geographical coverage is global and not focused to Europe.
457	74590	23	16	3	16	10	Section 23.3.5 (Industry and Manufacturing) is noticeably short. It reads like a collection of randomly selected implications with no apparent purpose other than to present a few diverse examples. Authors should give serious consideration to find and document examples of which there are many. (UNITED STATES OF AMERICA)	We would appreciate the suggestion of recent (after AR4) peer-reviewed references on this issue. See also response to comment No. 454.
458	74591	23	16	5	16	5	Mentioning sales of ice creams seems to trivialize the issue of climate change. (UNITED STATES OF AMERICA)	The text will be changed to '...future consumption patterns of food and beverage products'.
459	83430	23	16	5	16	5	Are soft drinks and ice cream the most significant examples to provide here? (Katharine Mach, IPCC WGII TSU)	See response to comment No. 458 above.
460	59588	23	16	5	16	10	Perhaps the authors could consider acknowledging that European cement and steel industries are forced to take on additional costs related to climate change (e.g. GHG reductions), while in other steel producing countries these actions are mostly voluntary. As a result, European producers are put at a cost disadvantage and the sectors' long-term attractiveness is diminishing. (Dimitris Damigos, Mining and Metallurgical Engineering, NTUA, Greece) (GREECE)	This is an important issue which however falls under mitigation, i.e. WGIII of IPCC.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
461	59589	23	16	5	16	10	The authors could consider citing the work of Damigos (2012) that monetizes the impacts of climate change on mining industry in the Mediterranean Region, as an example. (Citation: Damigos, D. (2012). Monetizing the impacts of climate change on the Greek mining sector, Mitigation and Adaptation Strategies for Global Change, 17, pp. 865–878). (Dimitris Damigos, Mining and Metallurgical Engineering, NTUA, Greece) (GREECE)	The findings of the reference will be included in the relevant Table of the chapter which refers to estimates on adaptation cost in Europe.
462	83431	23	16	10	16	10	Casual usage of "likely" should be avoided. (Katharine Mach, IPCC WGII TSU)	Noted.
463	57583	23	16	12	16	42	This part should be harmonized with chapter 10.6.1 - european results etc. (Andreas Matzarakis, Albert-Ludwigs-University Freiburg)	For this reason, the conclusions of other studies for the Mediterranean are also mentioned. In addition, the text in section 23.10.3 (Key knowledge gaps and research needs) and more specifically in page 45, lines 15-16 mentions that there is a gap of know
464	61614	23	16	12	16	42	The findings should mostly highlight the changes in seasonality, and not on the 'too hot or not' debate. The 'too hot' article is based on A1B scenario only, and deals with subjective issues under current conditions. A place may be not to hot but it can also be comparatively less attractive than another that is just 'hot enough for comfort'. Extrated from Moreno & the dominant trend in southern Europe is a decrease in good months in summer, whereas in northern Europe there will be an increase in good months in summer, spring and autumn. Interestingly, a coastal strip in southern Spain and Portugal is projected to maintain or even increase (HIRHAM-A2) its current season length. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The whole paragraph indeed makes reference to seasonality, as the expected change of climatic conditions for tourism activities is differentiated between seasons, both for Northern and Southern Europe. The 2 articles mentioned for the Mediterranean (Moreno and Amelung, 2009; Ruttly and Scott, 2010) used indeed the A1 and A1B scenarios, but since they concluded that before 2030 (or even 2060) the region is not expected to become too hot for beach or urban tourism, this will most probably hold for other scenarios like B1, B2 etc. There is still a question what will happen under more 'aggressive' (from the climate change point of view) scenarios. Nevertheless, the wording says 'other studies' in order just to show that there are different findings - it does not aim to draw a definite conclusion on the 'too hot question' as there is not a definite conclusion on this yet.
465	61615	23	16	12	16	42	All these findings are based on TCI index, which has many limitations. And Tourism is a multisectoral, complex sector that needs further integration with other impacts. Also taken from Moreno & Amelung 2009: 'In particular in southern Europe, the worsening situation resulting from deteriorating thermal conditions is further aggravated by increasing water shortages. Peak demand from tourism coincides with peak demand from agriculture, residential areas, the energy sector and nature. It also coincides with the summer dip in water supply, which will very likely be deepened by climate change.' Othe factors such as modified competition with other destinations, impacts in infrastructure, transport and mitigation policies, should be exeplored as well. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Regarding the potential limitations of TCI, this is a methodological issue dealt with by Chapter 10, while Chapter 23 aims to present the specific findings on CC impacts on tourism in Europe. Regarding the complexities of the sector, this is indeed a valid point which is highlighted to some extent in lines 25-26 where economic and environmental conditions at destinations are mentioned.
466	60854	23	16	14	16	22	This section should also use the Amelung et al reference to support the inference that the improvement of the tourism climate of the major Euroepan source countries (N. Europe) will improve and act as a further barrier to Southern Europe tourism. The reference to De Freitas should be deleted as it is superseded by Moreno and Moreno and Amelung. (David Viner, Private)	A new sentence will be added in order to highlight this potential barrier, although there is not agreement between all available studies that this inference mentioned by the reviewer will hold in all cases (e.g. as it the case of the Mediterranean region, where there is uncertainty whether it will be considered as 'too hot' for beach tourism). The reference to de Freitas et al. (2008), together with Moreno (2010), are utilized as examples highlighting the importance of the absence of rain for beach tourism. Instead, the ref to Moreno and Amelung (2009) will be deleted as it is not necessary for this argument.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
467	74592	23	16	14	16	42	Section 23.3.6 (Tourism) devotes much text to the impact of extreme temperatures on tourism and to the snow season impact on skiing. There are other important considerations. Increased impact of coastal storms, fire hazards, extreme weather in winter. Etc. (UNITED STATES OF AMERICA)	Although this is a valid comment, any such addition on these impacts in Europe should be based on peer-reviewed literature, which is at present very limited. We would appreciate the suggestion of any relevant recent (after AR4) peer-reviewed references on these issues.
468	76741	23	16	15	16	15	climate --> "climatic conditions" (Claudio Cassardo, University of Torino)	This will be changed.
469	59590	23	16	16	0	16	Remove semi-colon from the end of the line (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be removed.
470	74593	23	16	18	16	19	There are tourists in hotter places so this seems to overstate the dangers of heat. Will people not acclimatise to a changing climate in their holiday selection? (UNITED STATES OF AMERICA)	For this reason, the conclusions of other studies for the Mediterranean are also mentioned. In addition, the text in section 23.10.3 (Key knowledge gaps and research needs) and more specifically in page 45, lines 15-16 mentions that there is a gap of knowledge on how tourists will respond to marginal climatic conditions (e.g. they may adapt to this up to some extent, or not).
471	61616	23	16	18	16	21	A significant finding, from Hein et al 2009: 'Tourism to north-western Spain would increase during the summer, while the total number of international summer tourists to Spain would sharply decline. From these projected changes, it is clear that climate change will have important impacts on tourist flows in Europe.' Thus, despite the region would not become 'too hot', impacts would be very significant. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	See response to comment No 466 above. Hein et al. will be added as a reference in the new sentence to be added.
472	83432	23	16	18	16	22	The relevant climate/socioeconomic scenarios could be clarified--or are these outcomes projected across scenarios? (Katharine Mach, IPCC WGII TSU)	Each study used one (and sometimes 2) scenarios and thus A1, A1B, A2, B1, and B2 were utilized. A clarification per reference would require too much space.
473	59591	23	16	20	0	22	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	It is not clear what is the problem of the sentence.
474	59592	23	16	21	16	21	"too hot" says little about the thermal comfort. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	'too hot for beach or urban tourism' clearly indicates a case where there is no thermal comfort for these two types of tourism.
475	60373	23	16	24	16	27	The following reference is also relevant in this context: Matzarakis, A., J. Rammelberg, and J. Junk (2013), Assessment of thermal bioclimate and tourism climate potential for central Europe—the example of Luxembourg, Theoretical and Applied Climatology. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	It is not clear how the specific reference is relevant to the sentence mentioned.
476	58924	23	16	30	16	42	The rapid vanishing of glaciers and the increasing slope instability due to permafrost degradation will increasingly influence mountaineering and summer tourism in the Alps. This marked and clearly recognizable impact of warming trends should at least be mentioned. (Wilfried Haeberli, University of Zurich)	No peer-reviewed papers have been identified which examine in a quantitative way these impacts of CC on tourism. We would appreciate the suggestion by the reviewer of any recent (after AR4) references on this topic.
477	76742	23	16	31	16	31	and also below lines 36-38: also snowmaking can be affected by heat wave or an equivalent cold wave (Claudio Cassardo, University of Torino)	It is not clear what is being suggested by the reviewer.
478	60858	23	16	33	16	34	This reference Scott et al, is superfluous, it adds nothing to the review. (David Viner, Private)	The paper by Scott et al. summarizes the results of different studies on this issue, illustrating the different responses of tourists to marginal snow conditions; that is the reason mentioned here. The wording of the sentence will be slightly changed in order to depict this (i.e. 'As Scott et al. (2012) point out, the response...').

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
479	59593	23	16	35	16	35	how demographic changes will affect skiing needs explaining. Again this is a matter of scientific writing. Some statements need a little bit more explaining to become complete. Then the reader can go the the reference cited for more. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	A clarification will be added in the text: '.....demographic changes (e.g. population declines in source countries, trend to ageing populations)...
480	59600	23	17	0	0	0	Section 23.4.1 the discussion here misses the point that “plant production” or agriculture is a land use. And as a land use it is interrelated to other land uses. In other words agriculture is not the only factor that will determine what will happen to agriculture. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The issue of land use is especially addressed in section 23.7.4 on land use planning. The interferences between agricultural land use, landscape fragmentation and biodiversity under climate change are also addressed in section 23.6 on environmental quality.
481	59596	23	17	1	17	4	Perhaps it is worth mentioning here that green economy and green buildings is also a new market for banks? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Agreed, but this is a mitigation issue. We do report on banking risks related to emissions.
482	59597	23	17	6	0	7	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been amended.
483	61995	23	17	9	17	10	You should mention here historical storminess (Paolo Ciavola, University of Ferrara)	Storminess is discussed in Section 23.2.2.
484	59598	23	17	12	0	14	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been amended.
485	70196	23	17	12	17	13	Groundwater extraction may also affect earthquake propagation and damages (González et al., (2012). Nature Geosciences 5: 821-825). There is a potential link here between climate change, water use and tectonic activity. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This link is rather indirect, and the referenced study did not look explicitly at the signal of climate change. We will therefore not include such a statement or this paper at this point in the chapter.
486	74595	23	17	13	17	13	What does this mean - building susidence losses? Insured hail? Is there something missing from the sentence? (UNITED STATES OF AMERICA)	This has been amended.
487	59599	23	17	22	0	27	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence is correct.
488	79024	23	17	27	17	28	Add: "The current diversity of national insurance approaches is likely to persist, as it is rooted in culture and custom, and indeed diversity is a strength in meeting these new challenges (Schwarze, et al, 2011)." Cited almost from p.314 of http://ec.europa.eu/clima/policies/adaptation/what/docs/background_report_part1_en.pdf (worth as well to cite this Impact studies of EU!). Quote: Schwarze, R.; Schwindt, M.; Weck-Hannemann, H.; Raschky, P.; Zahn F.; Wagner. G. (2011): Natural Hazard Insurance in Europe: Tailored Responses to Climate Change are Needed. Environmental Policy and Governance. 21: 14–30. (Reimund Schwarze, Helmholtz Leipzig)	Thanks. We will include this study
489	76517	23	17	30	0	0	Section 23.4. "Implications of Climate Change for Agriculture, Fisheries, Forestry and Bioenergy Production". There should be a sub-section for biodiversity, dealing with the implications climate change (and interactions with other changes) on biodiversity, particularly on terrestrial biodiversity. (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	. Indeed, these issues are addressed in section 23.6.4 (Terrestrial and freshwater ecosystems) and 23.6.5 (Coastal and marine ecosystems)
490	74596	23	17	30	25	41	Is there a reason areas covered in 23.4 cover only Agriculture, Fisheries and Bioenergy production? Are there other topics which might be included in this section? Or at least an explanation of why these were chosen. (UNITED STATES OF AMERICA)	. The section also covers forestry as mentioned in the title: 'Implications of Climate Change for Agriculture, Fisheries, Forestry, and Bioenergy Production'. In addition, there is some reference to aquaculture in this section, although this is not explicitly mentioned in the title (which is already long).

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
491	70198	23	17	32	0	0	Section 23.4.1. Plant (food) production. Any reference to storage of agricultural products? (JORDI CORTINA, UNIVERSITY OF ALICANTE)	. Since there was no significant finding in the literature on the storage of agricultural products for Europe, and given the available page length, this issue is not discussed. Please note that food contamination issues under climate change are addressed in the section on health (23.5).
492	83433	23	17	32	0	0	Section 23.4.1. In developing the final draft of the chapter, this section should be shortened as much as possible. (Katharine Mach, IPCC WGII TSU)	. Agreed, the section has been shortened by half approximately.
493	69727	23	17	39	17	39	missing parenthesis before table 23-5) (NETHERLANDS)	. Corrected
494	69728	23	17	39	17	39	missing parenthesis before table 23-5) (NETHERLANDS)	. Corrected
495	57737	23	17	39	17	42	these sentences seem to misinterpret the studies. They were not focused on yield variability but on changes in average yields. E.g. brisson showed that climate trends were depressing average yields, but did not really address yield variability. (David Lobell, Stanford University)	. Please note that the paper by Brisson 2010 is also cited below for the depression of average yields. This paper also addresses the increased variability. For instance, 'Moreover, if one excludes the year 1956 when amass of cold air from Siberia caused a frost over the whole French wheat crop, the year-to-year variability of production seems to have increased since the start of the 21st century.' (Results, Section 3.1, page 204, Brisson et al., 2010).
496	74602	23	18	0	0	0	Figure 23-6: "cell" is "plant cell"? (UNITED STATES OF AMERICA)	. This sentence which referred to a grid cell in a map has been corrected.
497	74597	23	18	4	18	5	The text refers to a reduction of grape yield in Spain by up to 30kg/ha per millimeter of water deficit. How much of an impact is this? For reference, please add the average expected yield for unstressed conditions, or the percentage of change from that average under presented stress conditions, to allow user to assess the level of impact. (UNITED STATES OF AMERICA)	. Agreed. The Camps and Ramos paper does not provide directly regional grape yields. Therefore, we have deleted the value in the text. For information, with a regional grape yield of 30 Hectolitres per hectare the yield decline can be estimated from this paper at 1% per millimetre of rainfall reduction.
498	76743	23	18	5	18	5	add "of water" after "millimetre" (Claudio Cassardo, University of Torino)	. This part of the sentence has been deleted.
499	74598	23	18	12	18	12	Please introduce the concept of agroclimatic indices for the reader who is not familiar with them. (UNITED STATES OF AMERICA)	. Agro climatic indices are to be included in the glossary of the volume. Page limitation does not allow us to provide definitions in the text.
500	74599	23	18	15	18	15	It is not clear why values 2.5 and 5.4 degrees C were selected for this study. Consultation of Table 23-1 shows that those values are not the extremes of the expected projections. An explanation of the reasons for that selection would be helpful. (UNITED STATES OF AMERICA)	. These are the regional temperature increases for the IPCC SRES B2 and A2 scenarios, respectively. For each SRES scenario, Ciscar et al. (2011) have considered two RCMs. However, their discussion focuses on the lowest [2.5 °C (B2 HadAM3-HIRHAM)], and on the highest [5.4 °C (A2 ECHAM4-RCAO.) warming scenarios. The text was revised in order to explicit the scenarios used.
501	74600	23	18	16	18	16	Please quantify "small" in "...could lead to small changes in crop yield...". (UNITED STATES OF AMERICA)	. This statement has been qualified (on average +3% for the 2.5°C warming) according to Ciscar et al. (2011)
502	61617	23	18	22	18	27	The yield changes using the two GCMs are clearly very different - some discussion of this should be added here. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	. This is now explicitly stated for the study by Donatelli et al., 2012.
503	69729	23	18	24	18	25	unclear sentence formulation about the combination between disease, yield decline and atmospheric CO2 increase (NETHERLANDS)	. The sentence has been revised and simplified.
504	69730	23	18	29	18	29	Please specify under 2 different climate scenarios and which emission scenario (NETHERLANDS)	. The emission scenario has been provided.
505	57738	23	18	32	18	32	can a definition of "crop failure" be given here (David Lobell, Stanford University)	. The term 'crop failure' is adequately defined in English dictionaries such as the Collins dictionary.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
506	59750	23	18	33	18	33	Another reference about crop yield failure may be added. It is shown in the under mentioned paper, that is accepted with major revisions, that the diminution of yields of rainfed olive-tree will be higher than that of irrigated olive-tree in the middle of the 21st century. A multi model approach using 17 RCMs from the ENSEMBLE project has been used to predict future climate projection, allowing to compute the uncertainties of the resulting yields projections. The incertainties also depend on the water resources (river and underground) . Ronchail, J., Cohen, M., Alonso-Roldan M., Garcin, H., Angles, S. and Sultan, B.: Adaptability of Mediterranean agro systems to climate change. The example of the Sierra Mágina olive growing region (Andalusia, Spain) II The future. Submitted to Weather, Climate and Society (Josyane Ronchail, LOCEAN - Laboratory of Oceanography and Climate)	. This reference has been checked.
507	74601	23	18	49	0	0	Figure 23-6: and text before in this sub-section: Comment: The scenarios used are A1B (AR4) and the models used are ECHAM5 and HadC-N3. While these are excellent models, they are not the same "global" set of models used by AR4 or AR5 though they are a part of the larger set of models included in AR4/AR5 and CMIP3/CMIP5. There is no mention of the RCP4.5 scenarios previously mentioned in this WGII report for other assessment variables. While the conclusions arrived at and/or presented are most likely to be valid, one may raise the question as to the internal consistency of the information products used to carry out the assessment of impact. To be noted, this could be a point of curiosity to the random outside reader. Perhaps a few lines of explanation would help the cases presented. Perhaps it is a matter for the consideration of the IPCC for AR6? (UNITED STATES OF AMERICA)	. The availability of crop yield projections using the new RCP scenarios (e.g. RCP4.5) has been checked. Only AR4 scenarios were available in the published literature. Therefore, we could not increase the consistency of the information products by including projections from the AR5 scenarios.
508	59601	23	18	50	0	52	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	. The sentence has been revised
509	59602	23	19	5	0	6	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	. The sentence has been revised
510	70197	23	19	5	19	6	This sentence is probably incomplete; please rewrite. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	. The sentence has been revised
511	58479	23	19	6	19	6	in the absence (Martin Pecheux, Institut des Foraminifères Symbiotiques)	. The sentence has been revised
512	69731	23	19	6	19	6	Please clarify this statement as it seems unclear (NETHERLANDS)	. The sentence has been revised
513	76744	23	19	6	19	6	change "latitudes the absence" in "latitudes due to the absence" (Claudio Cassardo, University of Torino)	. The sentence has been revised
514	69732	23	19	8	19	9	Suggestion: add a transition sentence from Ozone pollution to weeds (NETHERLANDS)	disagree.
515	57418	23	19	8	19	12	There are also certain Solanaceous weeds (Solanum physalifolium, Solanum nigrum) that are likely to increase especially in Northernmost Europe, not only as a weed but also as a source of inoculum for Phytophthora infestans (e.g. Grönberg et al. 2012. Can Weed Hosts Increase Aggressiveness of Phytophthora infestans on Potato? Phytopathology 102:429-433.) (Asko Hannukkala, MTT Agrifood Research Finland)	. Impacts on weed species have been included, but the available page length does not allow for discussing weed/Phytophthora interactions.
516	74603	23	19	8	19	12	A definition of C3 and C4 plants, as photosynthetic pathways, should be included in order to make this section more robust. The pathways determine the use of CO2 by crops and weeds. (UNITED STATES OF AMERICA)	. C3 and C4 species are to be included in the Glossary of the volume.
517	57421	23	19	14	19	30	It should also be added somewhere into this chapter that many bacterial plant diseases especially on potato (Pectobacterium, Dickeya, Ralstonia) will provide much higher risk in warming climate wit higher precipitation (e.g. Hannukkala, A. 2011. Examples of alien pathogens in Finnish potato production - their introduction, establishment and consequences. Agricultural and Food Science 20: 42-61.) (Asko Hannukkala, MTT Agrifood Research Finland)	. Detailed impacts on potatoes cannot be addressed given page length, but reference is made to increased risks at high latitudes.
518	76745	23	19	18	19	18	change "2009) and some" with "2009). Some" (Claudio Cassardo, University of Torino)	. The sentence has been revised
519	57419	23	19	18	19	19	cereal stem rot (Puccinia striiformis) => rot should be rust, Puccinia striiformis = stripe rust, Puccinia graminis= stem rust (Asko Hannukkala, MTT Agrifood Research Finland)	. This has been modified
520	57420	23	19	22	19	24	Also probable change from spring barley to winter barley will increase dramatically risk for barley powdery mildew (Blumeria graminis) in Northermost regions where the pathogen currently cannot overwinter due to lack of winter host (winter barley) Hakala et al. 2011. (Asko Hannukkala, MTT Agrifood Research Finland)	. This has been added with the corresponding reference

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521	57422	23	19	42	20	2	Farmers are also adapting their pesticide use according to increased pest risks. E.g. the sales and application strategies of potato late blight fungicides (Cooke, LE. Et al. 2011 Epidemiology and Integrated Control of Potato Late Blight in Europe. Potato Research 54:183-222) have been affected by increased severity of epidemics caused by Phytophthora infestans. Similar examples can be found also in control of cereal diseases. This tendency in increasing pesticide use is severely conflicting with the new EU Pesticide Regulation (REGULATION (EC) No 1107/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC) to reduce pesticide use in Europe. (Asko Hannukkala, MTT Agrifood Research Finland)	. Reference is made to this issue for Nordic countries especially but page length does not allow to provide more details.
522	76895	23	19	43	0	0	It is odd to refer to global mean temperature change when discussing impacts in Italy. (Food and Agriculture Organization of the United Nations (FAO))	. Reference to global temperature change was provided for the sake of intercomparison of warming scenarios across world regions.
523	69733	23	19	43	19	43	what do you mean with farming system ? (NETHERLANDS)	. A farming system is defined as a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate. (see FAO's definition, http://www.fao.org/farmingsystems/description_en.htm)
524	69734	23	19	48	19	48	transition unclear and not reference: climate change alters breeding targets (NETHERLANDS)	. The sentence has been revised.
525	74604	23	20	11	20	12	The text suggests the need to use economic and ecological optimization models at the farm scale. Are these model and decision support systems available at that scale? How are farmers participating in those modeling efforts and/or accessing those results for farm level planning? In addition, the chapter in general lacks narrative in the line of economic implications related to the assessments in this chapter. What are the financial risks? What are the costs of inaction? What are the costs of addressing the various challenges cited in the chapter? (UNITED STATES OF AMERICA)	. The role of the agriculture sector in sub-regional welfare changes caused by climate change is now addressed with the Ciscar et al., 2011 study. Participatory design for farming system adaptation to climate change was not sufficiently documented to be cited.
526	76896	23	20	17	0	0	The first sentence should cross reference chapter 7's livestock discussion. (Food and Agriculture Organization of the United Nations (FAO))	. This cross-reference has been introduced
527	74605	23	20	17	20	52	Extreme heat events such as the Russian heat wave of 2010 tend to have severe negative impacts on livestock. This should be mentioned in the list of negative climate change impacts. (UNITED STATES OF AMERICA)	. We could not find a peer reviewed reference on livestock impacts for the Russian heat wave of 2010
528	59603	23	20	19	20	19	a daily mean temperature of 18 degrees C': is this how temperature units will be given? (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	. The notation '°C' is used as elsewhere in this report.
529	69735	23	20	21	20	21	specify where pig production is affected by climate change (NETHERLANDS)	. These results come from a meta-analysis of the literature and are therefore generic.
530	74606	23	20	27	20	27	Please clarify meaning of "amount timing". (UNITED STATES OF AMERICA)	. The sentence has been revised.
531	70199	23	20	27	20	39	Section heading (Livestock production) do not correspond to this paragraph. I'd suggest naming this section 'Forage and Livestock production' and move this paragraph at the beginning of the section (JORDI CORTINA, UNIVERSITY OF ALICANTE)	. Livestock production is dependent on feed sources and especially on forage. Therefore climate change impacts on livestock are partly mediated by the availability of forage resources. The use of these resources by livestock is explained.
532	69736	23	20	41	20	41	We would include a transition sentence here from forage failure to disease in livestock production (NETHERLANDS)	. The transition has been improved.
533	70200	23	20	41	20	52	Any reference to false warnings. As the case of avian influenza showed, they may have a strong impact on animal production and economies (JORDI CORTINA, UNIVERSITY OF ALICANTE)	. We did not find a reference linking false warnings and climate change.
534	83434	23	20	43	20	43	If "unlikely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. Casual usage of the reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	. The sentence has been revised to avoid casual usage of unlikely.
535	74607	23	20	44	20	45	In the sentence "Ticks, the primary arthropod vectors of zoonotic diseases in Europe, have likely changed distributions with climate warming" it is hard to access what exactly is the impact and if this is a good or bad thing. Please clarify. (UNITED STATES OF AMERICA)	. The sentence has been expanded to be more specific about the impacts.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
536	69737	23	20	45	20	46	specify the changing distributions + exchange comma with a point after (23.5) (NETHERLANDS)	. The sentence has been expanded to be more specific about the impacts
537	74608	23	20	47	20	47	"project" should be "projected" (UNITED STATES OF AMERICA)	. The sentence has been corrected
538	76746	23	20	47	20	47	project --> projected (Claudio Cassardo, University of Torino)	. The sentence has been corrected
539	70212	23	21	1	0	0	In Sections 23.4.3 and 23.4.4 I found no mention to the interaction between changes in soil moisture availability (particularly drying in southern Europe) and other abiotic factors as salinity and heavy metal pollution. There is evidence that effects of soluble salts and heavy metals depend on soil moisture content. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	. We were not able to find a reference on these interactions for climate change impacts in Europe in the context of agriculture and water use. However, see also section 23.3.1.1 which addresses coastal flooding, including intrusion of salt water.
540	69738	23	21	1	21	2	some citations would be probably needed to support this sentence (after "declining water quality") (NETHERLANDS)	.References were provided in the text
541	59604	23	21	3	21	3	move "confirm" after the reference.(Aristeidis Koutroulis, Water Resources Management & Coastal Engineering Laboratory, Technical University of Crete, Greece) (GREECE)	.Sentence modified
542	59606	23	21	21	0	22	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	.Sentence modified
543	59605	23	21	21	21	21	change "projected increase" to "is projected to increase" (Aristeidis Koutroulis, Water Resources Management & Coastal Engineering Laboratory, Technical University of Crete, Greece) (GREECE)	.Sentence modified
544	65113	23	21	23	21	38	There is useful paper by Moriondo et al (2010) which shows that when modelling the impact on European agriculture of a 2oC increase in temperature, irrigation as adaptation option was more beneficial in southern Europe . In Mitig Adapt Strateg Glob Change (2010) 15:657–679 (Pam Berry, Oxford)	.This paper is cited in section 23.4.1 on adaptation.
545	57739	23	21	29	21	29	why does climate change induce a decline in groundwater recharge? (David Lobell, Stanford University)	. This is because of reduced water drainage, as a result of increased evapotranspiration with warming. A sentence has been added to put this in context.
546	57740	23	21	34	21	34	why would climate change cause irrigation system failure? (David Lobell, Stanford University)	. Irrigation system failure may result from the lack of water.
547	74609	23	21	40	21	40	Please insert reference for the increased water supply and flooding hazards over northern Europe statement. (UNITED STATES OF AMERICA)	. A reference has been added (Falloon and Betts, 2010)
548	65114	23	21	40	21	53	There are a number of ideas here but each sentence seems to deal with a different one and they need crafting in to a coherent arguments (Pam Berry, Oxford)	. This will be revised to improve consistency.
549	59607	23	21	43	21	43	After (Falloon and Betts, 2010). It could be added the following "Recently observed trends and projections for the Mediterranean region (Ludwig et al., 2011) from climate model ensembles indicate a strong susceptibility to change in hydrological regimes, an increasing general shortage of water resources and consequent threats to water availability and management. These projections enhance the necessity for more robust water management, pricing and recycling policies, in order to secure adequate future water supply and prevent tensions among users (García et al., 2011)." Ludwig R, Roson, R., Zografos, C., Kallis, G., 2011. Towards an inter-disciplinary research agenda on climate change, water and security in Southern Europe and neighboring countries, Environmental Science & Policy, 14 (7) 794-803. García-Ruiz, J.M., López-Moreno, J.I., Vicente-Serrano, S.M., Lasanta-Martínez, T., Beguería, S., 2011. Mediterranean water resources in a global change scenario, Earth-Science Reviews, 105 (3-4), 121-139. (Aristeidis Koutroulis, Department of Environmental Engineering, Technical University of Crete, Greece) (GREECE)	. The issue of water pricing has been added.
550	83435	23	22	11	0	0	Section 23.4.4. In developing the final draft of the chapter, this section should be shortened as much as possible. (Katharine Mach, IPCC WGII TSU)	yes the section has been shortened
551	65116	23	22	11	24	3	The forestry section seems to contain a mix of material on trees in general (many of which are not of commercial importance) and then material which refers implicitly or explicitly with issues associated with forestry (i.e. deliberate management of trees). This whole section (23.4.4) needs clarification. (Pam Berry, Oxford)	The section has been modified.
552	59609	23	22	17	0	17	It should be forest populations (not forests) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been changed. It was a typo mistake.
553	59608	23	22	17	22	17	Once again no specific quantitative information is given on forests. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The section has been modified.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
554	70201	23	22	24	22	26	Increased European-wide forest productivity had been described in Schröter, D. et al. (2005). Ecosystem Service Supply and Vulnerability to Global Change in Europe. <i>Science</i> 310: 1333 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This paper is included in the ecosystem services box.
555	60839	23	22	28	22	35	Changes in climate may reduce the success of natural regeneration and hence require adjustments to silvicultural practices. Special attention is required for endangered species such as Spanish black pine (<i>Pinus nigra</i> Arn. ssp <i>salzmannii</i>) in Spain because of impediments to achieve successful natural regeneration (Lucas-Borja et al. 2011). REFERENCE: Lucas-Borja, M.E., T.F Fonseca, P. Silva-Santos, 2011. Natural regeneration of <i>Pinus nigra</i> Arn spp <i>salzmannii</i> forest in Cuenca Mountains (Spain): a problem for sustainable forest management. In: <i>Forestry: Research, Practice and Policies</i> . Editor: Diane A. Boehm. Environmental Science, Engineering and Technology, Nova Science Publishers, New York. ISBN: 978-1-61209-824-1 (Teresa Fidalgo Fonseca, Universidade de Trás-os-Montes e Alto Douro)	The text has been reduced due to limited space available, thus the concept can not be included.
556	60840	23	22	31	22	31	The word continental is misspelt. (Teresa Fidalgo Fonseca, Universidade de Trás-os-Montes e Alto Douro)	The sentence has been changed.
557	57709	23	22	38	0	0	Shifts in forest tree species range due to cliamte change have been reported (Peñuelas and Boada 2003, Peñuelas et al 2007). PEÑUELAS J., OGAYA R., BOADA M., JUMP A. 2007. Migration, invasion and decline: changes in recruitment and forest structure in a warming-linked shift of European beech forest in Catalonia. <i>Ecography</i> 30: 829-838. PEÑUELAS J., BOADA M. 2003 A global change-induced biome shift in the Montseny mountains (NE Spain). <i>Global change Biology</i> 9(2): 131-140. (Josep Penuelas, CREAM-CSIC)	The paper has been considered, even if the sentence has been moved to the section Terrestrial and freshwater ecosystems 22.4.5
558	65115	23	22	40	0	0	Feehan et al is only a review and thus the original paper(s) should be cited - not that I have anything against the paper but the original authors should get the credit. (Pam Berry, Oxford)	The references has been deleted due to need to shorten the section. Some similar concerns has been moved to the section Terrestrial and freshwater ecosystems 22.4.5
559	70204	23	22	42	22	42	Shift in tree species composition may be favoured by dieback of dominant species (Galiano, L., Martínez-Vilalta, J. and Lloret, F. (2010). Drought-Induced Multifactor Decline of Scots Pine in the Pyrenees and Potential Vegetation Change by the Expansion of Co-occurring Oak Species. <i>Ecosystems</i> 13: 978-991). (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The paper has been considered, even if the sentence has been moved to the section Terrestrial and freshwater ecosystems 22.4.5
560	74610	23	22	42	22	45	Explain further the estimates of reduction of economic value of European forest land by 14-50%. What is in the base of the large range? Different scenarios? (UNITED STATES OF AMERICA)	It depends on interest rate and climate scenario applied . This has been clarified in the text.
561	76518	23	22	47	23	4	Sub-section "Fire and storm damage". Consider including the following references: "Pausas, J. G. and Ribeiro, E. (2013), The global fire–productivity relationship. <i>Global Ecology and Biogeography</i> , 22: 728–736. doi: 10.1111/geb.12043" and "Pausas, J. G. and Paula, S. (2012), Fuel shapes the fire–climate relationship: evidence from Mediterranean ecosystems. <i>Global Ecology and Biogeography</i> , 21: 1074–1082. doi: 10.1111/j.1466-8238.2012.00769.x (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Yes, thank you. The section on forest fires has been revised including new suggested papers compatibly also with the need to shorten the section.
562	70202	23	22	48	22	48	Recent studies show a different pattern: non-significant trend in the number of fires since 1986 in Mediterranean Europe, and significant decrease in the last decade. Also a significant decrease in area burnt over the whole period. Jesús San-Miguel-Ayanz , Marcos Rodrigues , Sandra Santos de Oliveira, Claudia Kemper Pacheco , Francisco Moreira , Beatriz Duguy and Andrea Camia (2012). Land Cover Change and Fire Regime in the European Mediterranean Region. Chapter 2 in F. Moreira et al. (eds.), <i>Post-Fire Management and Restoration of Southern European 21 Forests, Managing Forest Ecosystems</i> 24, Elsevier. DOI 10.1007/978-94-007-2208-8_2 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Yes, thank you. The section on forest fires has been revised including new suggested paper.
563	76519	23	22	48	22	49	but see Turco et al (2013). "Turco, M., Llasat, M. C., Tudela, A., Castro, X., and Provenzale, A.: Brief communication Decreasing fires in a Mediterranean region (1970–2010, NE Spain), <i>Nat. Hazards Earth Syst. Sci.</i> , 13, 649-652, doi:10.5194/nhess-13-649-2013" (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	Yes, thank you. The section on forest fires has been revised including new suggested paper.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
564	66044	23	22	48	23	4	I have sent some comments to the first version of this WGII-AR5 that I am afraid have not been considered here. In effect, recent papers have showed that in spite that climate change seems to point to an increase of forest fires, other factors like changes in biomass or management and adaptation strategies, can alter this expected result. Recent studies (Turco et al. 2013a and Turco et al. 2013b) show that both the burned area (BA) and number of fires (NF) series display a decreasing trend in a Mediterranean environment and suggest that the often-reported (see e.g. IPCC 2007, and references therein) increase in the number of fires in last decades in Mediterranean regions, could be at least partially caused by improved detection rather than by an actual increase in fire occurrence Interestingly, the recently published EEA (2012) report indicates that "the number of fires in the Mediterranean region has increased over the period from 1980 to 2000; it has decreased thereafter". While this study represents a valuable resource for climate change impacts in Europe, no homogeneity analysis was performed on fires data, suggesting the possibility of a mixing of actual trends with a growing (and probably stable in the last years) fire detection ability. On the other hand Turco et al (2013a, b) show a decrease in the number of forest fires in the NE of the Iberian Peninsula, since 1970 and it shows an exemple about how good practices and mitigation/adaptation strategies can diminish natural risks. Besides this, a major evaporation and less water resources can also affect the vegetation and diminish the combustible availability. References. Turco, M., M.C. Llasat, J. von Hardenberg, A. Provenzale, 2013a. Impact of climate variability on summer fires in a Mediterranean Environment (Northeastern Iberian Peninsula). Climatic Change, vol. 16, 3, 665-678. DOI 10.1007/s19584-012-0505-6. Turco, M., M. C. Llasat, A. Tudela, X. Castro, and A. Provenzale, 2013b. Decreasing fires in a Mediterranean region (1970–2010, NE Spain). Nat. Hazards Earth Syst. Sci., 13, 649–652, 2013. www.nat-hazards-earth-syst-sci.net/13/649/2013/ doi:10.5194/nhess-13-649-2013; EEA: Climate change, impacts and vulnerability in Europe 2012 - An indicator-based report, Tech. Rep. 12, European Environment Agency, Copenhagen, Denmark, http://www.eea.europa.eu/publications/climate-impacts-and-vulnerability-2012, 2012. (Maria-Carmen Llasat, University of Barcelona)	Yes, thank you. The section on forest fires has been revised including new suggested papers compatibly also with the need to shorten the section.
565	76747	23	22	48	23	4	forest fires sometimes are also caused by the human stupidity, especially in some nations like mine (Italy), in which every summertime there are several hectares burned (Claudio Cassardo, University of Torino)	The section deals only with impact of CC and not humans.
566	83436	23	22	51	22	52	The relevant time frame for this statement could be clarified further. (Katharine Mach, IPCC WGII TSU)	The text has been reduced and modified.
567	59610	23	23	3	23	4	Correct reference brackets. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	This has been corrected in the final version.
568	60838	23	23	18	23	25	Severe windstorm damages are also reported for Southern Europe (European Forest Institute, EFIATLANTIC FORESTORMS database, http://www.efiatlantic.efi.int/portal/databases/forestorms/). For North Portugal (Fonseca, 2004), losses from wind damages are expected to occur 6 years per decade. Probability of mortality in pine forests is directly related to stand density and management practices, evidencing that management could be used as adaptive measure. REFERENCE: Fonseca, T.F., 2004. Modelação do crescimento, mortalidade e distribuição diamétrica, do pinhal bravo no Vale do Tâmega. PhD Thesis. University of Trás-os-Montes e Alto Douro, Vila Real, Portugal, 248 pp. (Teresa Fidalgo Fonseca, Universidade de Trás-os-Montes e Alto Douro)	Despite the paper is interesting, we cannot use literature before 2006.
569	59611	23	23	19	0	21	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The sentence has been modified.
570	59612	23	23	23	0	25	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. The sentence has been corrected.
571	61618	23	23	23	23	23	Are storm losses from the A1B scenario 19%, but 8% from B2? The text implies the losses are the other way round. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This was a mistake: storm losses from the A1B scenario are expected to be 19%, and 8% from A2 (and not B2) . This has been changed in the text.
572	74611	23	23	32	23	33	"survival of a greater number of individuals" here refers to people presumably? Not pests? (UNITED STATES OF AMERICA)	It refers to pests individuals.
573	59613	23	23	35	0	37	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The sentence has been modified.
574	74612	23	23	39	23	41	Please revisit the syntax of the sentence "Spruce bark beetle will be able to initiate...". (UNITED STATES OF AMERICA)	The sentence has been revised and shortened.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
575	76520	23	23	44	24	3	Sub-section "Forest management and land use" Short-term and long-term strategies in forest management to enhance ecosystem resistance and resilience do not consider fires (Bruno Moreira, Centre for Functional Ecology - University of Coimbra)	fire has been included.
576	79066	23	23	44	24	3	You may want to have a look at Bolte, A., C. Ammer, M. Lof, P. Madsen, G. J. Nabuurs, P. Schall, P. Spathelf and J. Rock (2009). "Adaptive forest management in central Europe: Climate change impacts, strategies and integrative concept." Scandinavian Journal Of Forest Research 24(6): 473-482 for a concise overview on forest management options in regard to CC in Europe. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	The text has been reduced due to limited space available, thus the concept can not be included.
577	59614	23	23	45	0	46	Please explain why these factors would strongly reduce accessibility (e.g. by turning areas into swamps). (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This sentences has been removed as it was not of crucial importance.
578	74613	23	23	45	23	45	Why does thawing permafrost limit accessing forests? (UNITED STATES OF AMERICA)	This sentences has been removed as it was not of crucial importance.
579	70203	23	23	51	23	53	Although this statement may be right, the reference supporting it (Giuggiola et al., 2010) is weak. In this short review the lack of consistent information on the interaction between shrubs and trees (and the potential outcomes of shrub removal) is emphasized. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This text has been shortened.
580	66256	23	24	0	0	0	Section 23.4.6. What's there is generally informative and well-written. However, the section is strongly imbalanced. In particular the geographical inbalance is serious since it leads to general statements that in reality only apply to some of the seas bordering Europe. The richest fish stocks in the European region, inhabiting the Norwegian and Barents Seas, are not mentioned at all. Several of the stocks in these cold-water seas are expected to increase their habitat and likely their abundance within the IPCC climate scenarios. The huge (mainly salmon) aquaculture of Norway is not mentioned. Again, the consequences of climate change are not all negative. The areas best suited for salmon aquaculture are likely shifted northwards along the Norwegian coast with rising sea temperatures, but there's no reason to assume a decrease in overall productivity. (Geir Ottersen, Institute of Marine Research)	The text has been improved to ensure better balance.
581	59615	23	24	9	0	11	Miscanthus should be in italics (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	ok it has been corrected
582	70205	23	24	9	24	9	Miscanthus should be in italics (JORDI CORTINA, UNIVERSITY OF ALICANTE)	ok it has been corrected
583	83437	23	24	10	24	16	The relevant climate/socio-economic scenarios for these projections could be clarified. (Katharine Mach, IPCC WGII TSU)	The relevant climate scenarios have been added.
584	70206	23	24	11	24	11	Miscanthus should be in italics (JORDI CORTINA, UNIVERSITY OF ALICANTE)	ok it has been corrected
585	76748	23	24	11	24	25	it seems to me there is a partial comtradiction between the sentence ending at line 18 and the following one (Claudio Cassardo, University of Torino)	The text has been modified in order to clarify the contradiction.
586	76749	23	24	20	24	20	typo: "C3(Salicacee" --> "C3 (Salicacee" (Claudio Cassardo, University of Torino)	The text has been modified as suggested.
587	59616	23	24	26	0	28	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Disagree, sentence is correct.
588	79067	23	24	26	24	28	Due to the technics applied and machinery used in SRC it is "very unlikely" that they will replace existing forests in Central and Northern Europe, at least not to a significant amount. The respective sites are just not suited to be driven on by the farming equipment used in SRC harvesting. They should be considered as an alternative land-use on agricultural lands. What can reduce soil C stocks etc. is a reduction in production times (rotation length) in existing forests, though. But this would be SRF, not SRC. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	The concept is published in a paper of a reputable journal. The argument refer not to elevation (i.e. mountain regions) but to latitudinal extension where there are flat lands.
589	74614	23	24	31	25	41	Reading through the section on Fisheries and Aquaculture is like reading a series of random thoughts. It would be very helpful to have for the reader an introductory paragraph introducing the topic. It could start by saying, "European Fisheries are likely to be affected in the following ways..." Then it would be right to provide the examples. This is the sort of problem that is characteristic of the whole chapter, which is not very readable. (UNITED STATES OF AMERICA)	This section has been restructured to help with readability and has also been shortened to keep within page limits.
590	64576	23	24	35	24	35	23.4.6.: you may wish to cite ch6 here which has a North Atlantic example and a figure on the respective patterns. (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	Cross-reference to chapter 6 has been introduced.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
591	64577	23	24	37	24	39	in the ES it reads "low confidence". ch6 p 30 L 44 reads "medium evidence", ch6 p 51 L 4 "very high confidence" ("paralleled by shifts in seasonal activity, species abundance, migration, and body size (6.3.2., very high confidence)") (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	After checking chapter 6, the confidence level associated to this statement has been increased.
592	79647	23	24	38	24	38	Sentence should read "in response to climate change and intensive fishing in aquatic systems". (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	The sentence has been revised accordingly
593	64578	23	24	44	24	49	These individual examples could be backed by referring to the general principles discussed in chapter 6. (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	Cross reference to chapter 6 has been made
594	79648	23	24	45	24	45	I'm not sure that any quantitative "projections" were provided in this paper, only suggestions. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	The sentence has been modified
595	83438	23	24	47	24	47	If "likely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. Casual usage of the reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	This has been done
596	64579	23	24	51	25	3	ditto: These individual examples could be backed by referring to the general principles discussed in chapter 6 (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	Cross reference to chapter 6 has been made
597	64243	23	24	52	24	53	The text says "Over the past decade, the cod stock has not been restored from its previous collapse (Mieszkowska et al., 2009, ICES, 2012)". As a general statement or reference this highly misleading but judging from the references and the following sentence it is probably intended to refer to cod in the North Sea. If that is the case, then the sentence should be changed to indicate that it only applies to the status of North Sea cod, otherwise it will be taken as referring to all cod stocks. There are more than 10 stocks of cod in the North East Atlantic and their status is very variable. Therefore to talk about cod as there is one stock in the North Atlantic is not correct. In both the Barents Sea and Icelandic waters cod stocks (both spawning and fishable) have been increasing during past decade or so. In fact in the Barents Sea the spawning stock is now at a historical recorded high and the fishable stock at size comparable to the 1950s. See e.g. Report of the Arctic Fisheries Working Group 2012 (AFWG), 20 - 26 April 2012, ICES Headquarters, Copenhagen. ICES CM 2012/ACOM:05. (ICELAND)	This has been corrected and explicit reference to the North Sea cod stock is made.
598	66257	23	24	52	24	53	Which cod stock? The cited paper covers Atlantic cod in general. The sentence applies to the North Sea cod and most of the US and Canadian stocks, but certainly not the Barents Sea stock. Easiest fix is to move this sentence to after the following one. (Geir Ottersen, Institute of Marine Research)	This has been corrected and explicit reference to the North Sea cod stock is made.
599	79649	23	24	52	24	53	This sentence ("has not been restored from its previous collapse") is now out of date as there has been a significant increase in cod numbers in recent years, perhaps as a result of several cold winters. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	The sentence was modified, but the most recent data on North Sea cod stocks have not been published and discussed in peer reviewed journals and are therefore not cited.
600	79650	23	25	3	25	3	Also see Engelhard et al. 2011 [ICES J. Mar. Sci. (2011) 68 (3): 580-591.] that has demonstrated patterns in boreal vs. Lusitanian species in the North Sea. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This reference has been added; thank you for pointing this.
601	59617	23	25	8	0	8	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence revised
602	64580	23	25	8	25	9	ditto: These individual examples could be backed by referring to the general principles discussed in chapter 6 (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	Cross-reference to chapter 6 has been made at the start of the section
603	64581	23	25	11	25	16	see the sections on HABs and spreading pathogens in chapter 6 (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	Cross-reference to chapter 6 has been made at the start of the section
604	64582	23	25	25	25	26	This does not match the Executive summary (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	The sentence has been shortened and the consistency with executive summary improved by mentioning limited and diverging evidence for the net impacts on the net turnover of fisheries.
605	61619	23	25	30	25	33	We recommend to revise SWD (2013) 133 - Climate change adaptation, coastal and marine issues (http://ec.europa.eu/clima/policies/adaptation/what/docs/swd_2013_133_en.pdf) for dealing with fisheries management and planning in EU under climate change (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This directive has been checked as well as the commission document on Principles and recommendations for integrating climate change adaptation considerations under the European maritime and fisheries fund operational programmes.
606	79651	23	25	30	25	33	See the Cheung et al paper [Aquatic Conservation 22(3): 368-388, 2012] that includes useful narrative on changes in the effectiveness of European fishery MPAs that might be included here. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This reference has been added, thank you.

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607	59618	23	25	35	0	35	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence revised
608	79652	23	25	35	25	41	A better description of the mackerel dispute and similar European territorial disagreements is included in the Cheung et al paper [Aquatic Conservation 22(3): 368-388, 2012] (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	The corresponding section (23.9.1) has been revised.
609	74615	23	25	44	0	0	Most specifically, this is referring to human health, in particular PUBLIC HEALTH, being the preferred term. (UNITED STATES OF AMERICA)	Either term is acceptable.
610	83439	23	25	48	25	48	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
611	59620	23	25	48	26	6	Here the results from PHEWE on heat effects can be mentioned. An important issue not taken up in the section, which should be added is the fact that temperature effects on mortality and morbidity depend on the usual climate in an area, i.e. populations adapt to the usual climatic conditions. This is shown in Baccini et al 2008. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	The reference will be added.
612	59619	23	25	48	27	19	In Europe two large multi-centre projects addressing the issues of health effects from meteorological factors and heat waves have been implemented and resulted in significant publications. They are 1. the PHEWE project (funded by DG Research) with key papers: Michelozzi P, Accetta G, De Sario M, et al. High temperature and hospitalizations for cardiovascular and respiratory causes in 12 European cities. Am J Respir Crit Care Med 2009; 179: 383-389 ; Baccini M, Biggeri A, Accetta G et al. Heat effects on Mortality in 15 European cities. Epidemiology 2008; 19:711-719; Analitis A, Katsouyanni K, Biggeri A, Baccini M et al. Effects of Cold Weather on Mortality: Results from 15 European Cities within the PHEWE Project. Am J Epidemiol 2008; 168:1397-408. and 2. the EuroHEAT project (funded by DG SANCO) with key papers D'Ippoliti D, Michelozzi P, Marino C et al. The impact of heat waves on mortality in 9 European cities: results from the EuroHEAT project. Environ Health. 2010; 9: pp.37; Analitis A, Michelozzi P, D' Ippoliti D et al. Effects of Heat Waves on Mortality. Effect Modification and Confounding by Air Pollutants. Epidemiology. 2013; in press. These two projects should be quoted and reference made to their significant results (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	The reference will be added.
613	59621	23	25	48	27	19	There are important health effects of forest fires both through PM increase and others. Relevant publication for Europe: Analitis A, Georgiadis I, Katsouyanni K. Forest fires are associated with elevated mortality in a dense urban setting. Occup Environ Med. 2012; 69(3):158-62. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	Air pollution from forest fires is mentioned in the air quality section and is referred to here.
614	57429	23	25	52	0	0	1) the paper of Corobov et al was published in 2012 (remove in press); 2) to add a second relevant paper of these authors: Corobov R., S. Sheridan, K. Ebi, N. Opopol, 2013: Warm season temperature-mortality relationships in Chisinau (Moldova), International Journal of Atmospheric Sciences, http://dx.doi.org/10.1155/2013/346024 . (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	References will be updated.
615	59622	23	25	52	0	0	The reference Corobov 2011 should be corrected since it has been published; need to also complete the title and is also missing one coauthor. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	References will be updated.
616	60435	23	25	52	0	0	Corobov et al. 2011 refers to Moldova, not southern Europe: move the citation to the end of the previous sentence. (David Parker, Met Office Hadley Centre)	Agreed. This will be amended.
617	59623	23	25	53	25	53	it is not only a matter of heat. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Comment unclear- Do they mean changes in humidity are also important- not a lot of evidence (pop based) on this for Europe.
618	78704	23	25	53	26	1	It is stated: "However, elderly populations in central... and northern Europe... are also vulnerable to heat wave events." Although the elderly are indeed more vulnerable to heat waves, there is evidence of increased daily mortality risk for all age groups at high temperatures in UK regions (Reference: Vardoulakis and Heaviside, 2012). (Sotiris Vardoulakis, Health Protection Agency)	text has been revised

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619	76934	23	26	1	26	2	suggest to include also (a selection of) the references: Matthies F, Bickler G, Cardenosa Marin N, Hales S (eds.). 2008. Heat-health action plans: guidance. World Health Organization Regional Office for Europe. Copenhagen, Denmark (available at http://www.euro.who.int/__data/assets/pdf_file/0006/95919/E91347.pdf ; WHO (2009). EuroHEAT: Improving public health responses to extreme weather events /heat-waves; Technical summary.WHO Regional Office for Europe, Copenhagen. (available at: http://www.euro.who.int/__data/assets/pdf_file/0010/95914/E92474.pdf .; Hajat, S., O'Connor, M., Kosatsky, T. (2010) Health effects of hot weather: from awareness of risk factors to effective health protection, The Lancet, 375: 856-63; Lowe D, Ebi KL, Forsberg B. Heatwave early warning systems and adaptation advice to reduce human health consequences of heatwaves. Int J Environ Res Public Health. 2011;8(12):4623-4648; They identify and describe core elements of heat plans and public health measures; (Eva Franziska Matthies, Consultant)	Additional references on adaptation to heat waves have been included,
620	59624	23	26	4	0	0	The use of the term "cool rooms" is not technically correct. Could it be that it refers to cool roofs ? (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	No - cool rooms means cool rooms indoors.
621	59625	23	26	8	0	0	Discussion on the thermal environment (including thermal stress and thermal comfort) in European cities or regions should be provided taken that it influences energy consumption, air quality and human health and also reflects a valuable parameter in adaption/mitigation plans. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	The discussion on adaptation, energy and cooling has been clarified.
622	59626	23	26	8	26	17	Here the results from the EuroHEAT project should be mentioned on the effects of heat waves on mortality and admissions. An important issue taken up in Analitis et al is the evidence for interaction among heat and air pollution on health effects. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	References have been added.
623	59627	23	26	8	26	17	The issue of the synergistic effects between air pollution and heat, taken up by Analitis et al 2013 should be mentioned. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	We will add reference, but evidence is not clear for a synergistic effect.
624	76750	23	26	9	26	9	typo: morbidity --> morbidity (Claudio Cassardo, University of Torino)	This will be amended.
625	70719	23	26	20	26	24	"During the last decade, in the European Region, 1000 persons are reported to have been killed by floods and more than 3.4 million affected. A review of European data for the years 2000–2011 shows that the number of deaths from flooding was highest in central Europe and the former Soviet Republics. " Reference: Menne B, Murray V (eds). 2013. Floods in the WHO European region: health effects and their prevention. WHO Regional Office for Europe, Copenhagen, Denmark " (Vladimir Kendrovski, World Health Organization Regional Office for Europe)	We will add reference.
626	60855	23	26	22	26	23	The UK Health Protection Authority published a report in Dec 2011 " The Effects of Flooding on Mental Health". This suggest that there are issues associated with flooding and mental health. This should be reviewed. (David Viner, Private)	We will add primary references on flooding and mental health.
627	59628	23	26	25	0	0	Please add a paragraph at this point referring to recent increases of pollen levels in the air and impacts on human health like the following: Analysing a continental-scale pollen data set, Ziello et al. (2012) showed an increasing trend in the yearly amount of airborne pollen for many plant taxa in Europe, which they attributed to the anthropogenic rise of atmospheric CO2 levels. Experimental enhancements of CO2 have demonstrated increases in the pollen amount (Ziska and Caulfield 2000) and in allergenicity (Singer et al. 2005), as for common ragweed. A greater exposure of humans to pollen allergens may have serious consequences for public health as it may affect the incidence and prevalence of allergic diseases, such as allergic rhinitis (common hay fever) and asthma. Citations for the above are the following: Ziska L.H. and F.A. Caulfield, 2000: Rising CO2 and pollen production of common ragweed (<i>Ambrosia artemisiifolia</i>), a known allergy-inducing species: Implications for public health. Australian Journal of Plant Physiology, 27, 893-898. / Singer B.D., L.H. Ziska, D.A. Frenz, D.E. Gebhard and J.G Straka, 2005: Increasing Amb a 1 content in common ragweed (<i>Ambrosia artemisiifolia</i>) pollen as a function of rising atmospheric CO2 concentration. Functional Plant Biology, 32, 667-670 / Ziello C., T.H. Sparks, N. Estrella, J. Belmonte, K.C. Bergmann, E. Bucher, M.A. Brighetti, A. Damialis, M. Detandt, C. Galán, R. Gehrig, Ł. Grewling, A.M. Gutiérrez Bustillo, M. Hallsdóttir, M.-C. Kockhans-Bieda, C. De Linares, D. Myszkowska, A. Pàldy, A. Sánchez, M. Smith, M. Thibaudon, A. Travaglini, A. Uruska, R.M. Valencia-Barrera, D. Vokou, R. Wachter, L.A. de Weger , and A. Menzel, 2012: Changes to airborne pollen counts across Europe. PLOS One 7, e34076. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	For discussion - evidence on changes in pollen does not justify statements regarding human disease, - other than allergic rhinitis and conjunctivitis.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
628	67828	23	26	25	26	36	Usually, in Europe <i>Aedes albopictus</i> (present in wide parts of Europe) is considered a "competent" vector. (not important, because so far there have been only few cases (Madeira) of transmission). WHO is assessing the situation and the risk of dengue in Europe differently. Also ECDC stated in the conclusions of the report "the climatic suitability for dengue transmission in continental Europe" that we need research exploring what would happen "if additional instances of dengue transmitted by <i>Aedes albopictus</i> occurred in Europe". I cite here from an information sheet under development which reviewed recent literature and consulted experts: " <i>Aedes albopictus</i> is reported as widely established and spreading in the western Mediterranean basin, from Spain to Greece, but was only recently found in more eastern countries and around the Black Sea coast (Turkey, Bulgaria, southern Russia). Incursions have been reported in more northern countries, but no establishment has been confirmed to date. <i>Aedes aegypti</i> used to be widespread in southern Europe in the past, seemingly disappeared, but re-introductions are occurring currently. This can be due to many reasons but also supported by a changing climate. <i>Aedes albopictus</i> and <i>Aedes aegypti</i> mosquitoes are effective vectors of the potentially severe diseases such as dengue and chikungunya fever. Travellers (migrant workers, tourists) returning from disease-endemic countries are increasingly introducing dengue, chikungunya viruses and in rare cases yellow fever virus into the European Region. In areas where these invasive mosquitoes have been established or re-established, there is a genuine risk of local transmission of these diseases. The threat of dengue fever in Europe has increased in recent years. The recent locally-transmitted dengue cases have shown that dengue transmission is possible in different areas of continental Europe where <i>Aedes albopictus</i> or <i>Aedes aegypti</i> are present. The outbreak in Madeira has led to reports of the spread of cases into 14 other European countries. The complex pathways and interactions between climate, ecosystem, vector, virus and humans and socio-environmental changes are only partially understood and difficult to model. However, the re-emergence of <i>Aedes aegypti</i> as dengue transmitting mosquito and the wide presence of <i>Aedes albopictus</i> as potential vector in parts of the European Region and the lack of vaccine or treatment make preventive measures highly recommendable regardless of the role of climate change." (Tanja Wolf, WHO Regional Office for Europe)	There is not space for this much detail about vector distributions.
629	70209	23	26	29	26	30	the same sources detect improved climatic conditions over northeastern European countries and the Balkans (JORDI CORTINA, UNIVERSITY OF ALICANTE)	OK.
630	70720	23	26	32	26	32	" Section: (dengue vector that is not present in Europe) to be deleted Comment: <i>Ae. aegypti</i> was found once in Italy (1972) as well as in the Netherlands (2010) and sporadically reported from Turkey. The species has been introduced and has established in Madeira, and it has returned to the northern Black Sea coast (Russia, Abkhazia); Reference: Brown JE, Scholte E-J, Dik M, Den Hartog W, Beeuwkes J, Powell JR. <i>Aedes aegypti</i> mosquitoes imported into the Netherlands, 2010. <i>Emerg Infect Dis.</i> 2011; 17(12): 2335-7. Callot J, Delécolle J-C. Notes d'entomologie. - VI) Localisation septentrionale d' <i>Aedes aegypti</i> . <i>Ann Par Hum Comp.</i> 1972: 665. 58. Schaffner F, Van Bortel W. Current status of invasive mosquitoes in Europe. <i>VBORNET Newsletter.</i> 2010; (2): 6-8. Almeida APG, Goncalves YM, Novo MT, Sousa CA, Melim M, Gracio AJ. Vector monitoring of <i>Aedes aegypti</i> in the Autonomous Region of Madeira, Portugal. <i>Euro Surveill.</i> 2007; 12(11): E071115.6. Yunicheva YU, Ryabova TE, Markovich NY, Bezzhonova OV, Ganushkina LA, Semenov VB, et al. [First data on the presence of breeding populations of the <i>Aedes aegypti</i> L. mosquito in Greater Sochi and various cities of Abkhazia.] <i>Meditzinskaia Parazitologija I Parazitarnye Bolezni.</i> 2008; (3): 40-3." (Vladimir Kendrovski, World Health Organization Regional Office for Europe)	Unfortunately, we do not have space for this level of detail. Phrase about not being present in Europe is deleted- although strictly speaking - it is not established on continental Europe.
631	58480	23	26	32	26	35	<i>A. aegypti</i> ! (Martin Pecheux, Institut des Foraminifères Symbiotiques)	OK.
632	59629	23	26	34	0	36	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	done
633	70721	23	26	35	26	35	" delete "upon the" due to duplication " (Vladimir Kendrovski, World Health Organization Regional Office for Europe)	done
634	67829	23	26	38	26	47	Leishmaniasis: weird interpretation of Ready. No need to flag out the low risk of introduction of exotic species but rather highlight the risk from <i>L. infantum</i> and <i>L. tropica</i> ! (Ready 2010: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19505). add a paragraph break before starting on Malaria (Tanja Wolf, WHO Regional Office for Europe)	The sentence has been revised,
635	83440	23	26	39	26	39	Casual usage of "unlikely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	noted.
636	70208	23	26	42	26	42	do not capitalize <i>Aegypti</i> (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This will be amended.
637	70210	23	26	42	26	42	do not capitalize <i>Aegypti</i> (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This will be amended.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
638	70211	23	26	42	26	42	Leishmania should be in italics (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This will be amended.
639	67830	23	26	43	26	47	What do the assessments on Malaria conclude?? Only that re-emergence would depend on a series of factors? Last sentence lacks reference. Actually, it might be a good idea to list the factors (add: vectorial competence, importation or dispersal of vectors and reservoir hosts, travel, and climatic/environmental change) in the beginning of the evidence about infectious diseases. here also a link to other chapters (health, other regional chapters?) would fit as the transmission principles are similar in other regions and in some regions data is better than in Europe by now. (Tanja Wolf, WHO Regional Office for Europe)	Difficult to get a clear statement of the implications of the malaria studies.
640	59630	23	26	53	0	54	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Text has been improved.
641	67831	23	26	53	26	53	effects (not "affects"); please check the working here. The note in the bracket on reduction in consumption of animal products is misleading; not the reduction in consumption but the reduction in production of such food would reduce methane emissions. This would better fit in 23.8. as it is about mitigation measures not food safety. If you want to say that consuming less animal products to mitigate climate change helps to improve food safety- then say so (and find a reference). With regard to mycotoxins, the case in Germany in winter 2013 increased awareness. See also http://www.efsa.europa.eu/en/supporting/pub/223e.htm (Tanja Wolf, WHO Regional Office for Europe)	sentence removed.
642	70722	23	26	53	26	53	update the reference with new one: European Food Safety Authority (EFSA) and European Centre for Disease Prevention and Control (ECDC). 2013. The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2011. EFSA Journal, 11(4):3129." (Vladimir Kendrovski, World Health Organization Regional Office for Europe)	Done.
643	59631	23	27	1	0	3	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be improved by editing.
644	59632	23	27	2	0	2	patulin should not be in italics (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be amended.
645	59633	23	27	6	0	7	Harmful algal blooms exist both in the sea and in freshwaters and therefore there are both marine and freshwater biotoxins. Hence, they exist in seafood and in that from freshwater. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. We will correct and check with chapter 6.
646	74616	23	27	8	27	9	"There is little evidence" Does this mean that researchers have looked for but found little evidence, or that there is little evidence because the question has not been adequately researched. There is a big distinction between these two possibilities. (UNITED STATES OF AMERICA)	This will be clarified. Very few studies, but those that are show small effects - e.g. Boxall.
647	59634	23	27	10	0	12	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be improved by editing.
648	59635	23	27	14	27	19	Heat-Health watch warning systems are mentioned. But the fact is that these systems have not been evaluated for efficiency compared to the simpler heat warnings and protection plans that have been adopted in other countries. This should be mentioned. It should not be taken for granted that these particular warning systems systems are by definition an improvement for the prevention of heat wave effects. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	Agreed. Text has been revised.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
649	67832	23	27	14	27	19	Well, perhaps you could adjust this statement: the adaptation in the health sector that has been published in relevant journals gives the impression that health adaptation is limited to heat health warning systems. However, at international level the WHO The European Commitment to Act on Environment and Health and The European Regional Framework for Action as well as the amendment of the international health regulation could be considered health adaptation. This includes to 1) integrate health issues in all climate change mitigation and adaptation measures, policies and strategies at all levels and in all sectors. We will assess, prevent and address any adverse health effects of such policies by, for example, strengthening health promotion in environmental policies; 2) strengthen health, social welfare and environmental systems and services to improve their response to the impacts of climate change in a timely manner, for example to extreme weather events and heat waves. In particular, we will protect the supply of water and the provision of sanitation and safe food through adequate preventive, preparedness and adaptive measures; 3) develop and strengthen early warning surveillance and preparedness systems for extreme weather events and disease outbreaks, for example vector-borne diseases, at the animal-human-ecosystem interface, where appropriate; 4) develop and implement educational and public awareness programmes on climate change and health, to encourage healthy, energy-efficient behaviours in all settings and provide information on opportunities for mitigation and adaptation interventions, with a particular focus on vulnerable groups and subregions; 5) collaborate to increase the health sector's contribution to reducing greenhouse gas emissions and strengthen its leadership on energy- and resource-efficient management and stimulate other sectors, such as the food sector, to do the same; 6) encourage research and development, for example with tools for forecasting climate impacts on health, identifying health vulnerability and developing appropriate mitigation and adaptation measures." The Regional Framework is based on five strategic objectives, namely: 1) to ensure that all current and future mitigation and adaptation climate change measures, policies and strategies integrate health issues at all levels; 2) to strengthen health, social and environmental systems and services to improve their capacity to prevent, prepare for, and cope with climate change; 3) to raise awareness to encourage healthy mitigation and adaptation policies in all sectors; 4) to increase the health and environment sectors' contribution to reducing greenhouse gas emissions; 5) to share best practices, research, data, information, technology and tools at all levels on climate change, environment and health. As well WHO guidance on heat and flood protection could be considered health adaptation, as well as national health adaptation plans. http://www.euro.who.int/__data/assets/pdf_file/0006/95919/E91347.pdf and http://reliefweb.int/report/world/floods-who-european-region-health-effects-and-their-prevention (Tanja Wolf, WHO Regional Office for Europe)	This refers to WHO policy - not clear how it relates to evidence of adaptation or avoided impacts.
650	74617	23	27	14	27	19	Perhaps existing institutions ALREADY have the needed capabilities, so adaptation is not needed. For example, health departments routinely measure and report on communicable diseases. If these increase due to climate change, the health departments will already be there quantifying them. (UNITED STATES OF AMERICA)	This is an oversimplification - many climate sensitive diseases are not reportable.
651	59636	23	27	27	0	29	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be improved by editing.
652	59637	23	27	29	27	30	provide relevant reference(s) (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Text has been revised with additional references.
653	59638	23	27	30	27	31	It seems insignificant to me to say about the closure of a road and an airport. The problem of critical infrastructure is not that they close during one event. This section should be focused in my view on passing the message that critical infrastructure should not be located by the coastline. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Agreed. We will update.
654	59639	23	27	35	27	39	It should be additionally mentioned that during heat waves the hospital system is overwhelmed with emergency cases, mainly from heatstroke. Other infrastructure can also be overwhelmed: for example in Athens in the 1987 heat wave (to which only in Athens 2000 extra deaths have been attributed) there was no way to hold the funerals on time. An additional problem has been (both in Athens-1987 and Paris-2003) that physicians were completely unprepared and uneducated to treat heat-strokes, leading to unnecessary losses. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	References need to post2008 to be included- as new findings are highlighted in the chapter.
655	59640	23	27	35	27	39	Within the EuroHEAT project there has been a review of plans for the prevention of heat wave effects in Europe which may be mentioned. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	Agreed. We will add references.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
656	70213	23	27	42	0	0	Section 23.5.3 should mention social impacts of CC-driven migrations from areas outside Europe (e.g., Warner, K.; Ehrhart, C.; Sherbinin, A. de; Adamo, S.; Chai-Onn, T. I. (2009). In Search of Shelter. Mapping the Effects of Climate Change on Human Migration and Displacement. UN University, CARE International, Columbia University, the UN Refugee Agency (UNHCR) and World Bank (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Immigration is discussed in later section.
657	74618	23	27	44	27	47	As in a previous place on the same page, there is a statement to the effect that there is "little evidence that." Is this because the topic has been researched and the findings are negative or that the research done has not adequately addressed this. (UNITED STATES OF AMERICA)	We found no papers on this topic..
658	83441	23	27	45	27	45	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
659	74619	23	27	49	27	54	Reference should be made to the IPCC report on extremes, (later referred to as "SREX"). Is is not accurate to state that little research has been carried out on the impact of extreme weather events, as each event is often studied and analysed in the aftermath. WMO's Annual State of the Climate is one refence that ties together the various global reports on extreme events' analysis. (UNITED STATES OF AMERICA)	We are discussing the quantification of the impact of the extreme in multiple outcomes.
660	74620	23	27	49	28	4	One important point that should be made here is that population density is so high in Europe that in many cases there is development in areas that are particularly flood prone because the "best spots" have already been taken. This amplifies risk. Also, human modification of the landscape in Europe leaves it more vulnerable to extreme events, such as storm related erosion. George Perkins Marsh made this point in his seminal book, "Of Man and Nature" over 150 years ago. (UNITED STATES OF AMERICA)	Agreed. This will be added.
661	59642	23	27	50	0	0	The use of the term "while their homes are repaired" is not technically correct. Rephrase to "while their homes are refurbished" or "while their homes are renovated" . (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	This will be amended.
662	59641	23	27	50	0	52	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be amended.
663	65117	23	27	53	28	1	The social implications of these measures needs to be spelt out e.g. just saying managed retreat is an adaptation option does not contribute to the section. (Pam Berry, Oxford)	Agree. We will add further information.
664	83442	23	28	3	28	3	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
665	59643	23	28	6	0	7	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This will be improved by editing.
666	83443	23	28	12	28	12	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
667	67833	23	28	18	29	35	The wine issue as well as the cultural heritage issues would fit under tourism and economic impacts (Tanja Wolf, WHO Regional Office for Europe)	Disagree, cultural heritage is not just about tourism.
668	83444	23	28	26	28	28	The relevant climate scenario for these projections should be specified. (Katharine Mach, IPCC WGII TSU)	The text has been edited
669	70214	23	28	27	28	28	The difference between Spain and Southern Europe may not be clear (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Reference to Spain has been removed
670	76751	23	28	35	28	36	"Venice now has ... as well as the MOSE system": at present, the MOSE system is not yet active: they are ultimating the works (Claudio Cassardo, University of Torino)	The text has been edited accordingly
671	70227	23	28	36	28	37	Apparent disagreement with statement in P. 12, L. 37 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The statement in P12, L37 refers primarily to north western Europe and not to Venice. The text has been edited to make clear that the statement refers to Venice.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
672	62265	23	28	39	28	51	You can also include the "polder" landscape of the Netherlands in this short assessment of threatened culturally significant landscapes. [Michel A. Lascaris, Climate Change and the Cultural Heritage of Dikes, <i>Vēstis</i> :Journal of the Latvian Academy of Sciences, (2012) 66.3 pgs. 70-77.] There is also an additional level of cultural heritage that doesn't seem to fit into the "built environment" category, urban or rural. Maritime heritage in the form of shipwrecks or other submerged archeological evidence are at risk due to climate change. Climate change is linked to the spread of <i>Teredo navalis</i> (the shipworm) a boring mollusc, in the Rhine/Meuse estuary [Peter Paalvast and Gerard van der Velde "New threats of an old enemy: The distribution of the shipworm <i>Teredo navalis</i> L. (Bivalvia: Teredinidae) related to climate change in the Port of Rotterdam area, the Netherlands," <i>Marine Pollution Bulletin</i> 62.8 (2006) pgs. 1822-1829], and there is already evidence of increased risk to shipwrecks in the Baltic. [Björdal, Charlotte et al. "Strategies for Protection of Wooden Underwater Cultural Heritage in the Baltic Sea Against Marine Borers. The EU Project 'WreckProtect'. Conservation and Management of Archaeological Sites 14.1 (2012): 201-214.] The EU Project 'WreckProtect' (2012) (Adam Sundberg, University of Kansas)	Polders have been added to the list of cultural landscapes. The marine example has also been included.
673	60859	23	29	5	29	35	This section whilst of interest, needs to be economically quantified, is it actually an important sector or one that covers a particular niche. What is the economic importance of this industry to justify this section and its inclusion. (David Viner, Private)	Disagree. This section covers vineyards in terms of cultural heritage rather than the economics of wine production and so an economic argument is not relevant.
674	59644	23	29	22	29	22	"terroir" mixing French with English is a good way to make the text unreadable. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Disagree. This is the accepted terms that is also now used in English, e.g. it is given in the Oxford English Dictionary
675	70215	23	29	33	29	33	AOC is more frequently used for French wines than AC (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This has been corrected.
676	65118	23	29	40	29	50	Ecosystems and their services are important and there should be some discussion of the table and the references should be included, perhaps as an additional column (Pam Berry, Oxford)	This has been done in the new ecosystem services box.
677	59646	23	30	4	0	16	Please add somewhere in this first paragraph the following: Increased levels of allergenic pollen in the air (Ziello et al., 2012) may also become a serious concern. [The citation is given above, comment for p. 26, l. 25. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Evidence for changes in allergenicity is limited.
678	59645	23	30	4	30	27	In the section on air quality it should be clarified that issues related to ways that climate change affects air quality are taken up. The section is poor with reference to additional health effects. There is evidence of synergistic effects of ozone and heat (see EuroHeat papers mentioned above) in Europe. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	The section discusses primarily the impact of climate change on air pollution exposures.
679	61620	23	30	9	30	9	The abbreviation "CTM" is not clear. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Revised.
680	83445	23	30	9	30	9	The phrase "climate change per se" should be clarified. (Katharine Mach, IPCC WGII TSU)	Text revised
681	83446	23	30	10	30	10	If "likely" is being used as calibrated uncertainty language, reflecting a probabilistic basis for its assignment, it should be italicized. Casual usage of the reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	noted.
682	59647	23	30	13	0	14	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted.
683	61621	23	30	13	30	14	Owing to compensating effects of rising temperature and CO2 levels, emissions of some VOCs (isoprene) may not change very much during the 21st century. See paper by Pacifico et al. <i>J. Geophys. Res.</i> , 117, D22302, doi:10.1029/2012JD018276 (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This is discussed in the text.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
684	59648	23	30	28	30	29	There is a considerable number of recent relevant studies not mentioned at all for Europe. It should be clearly pointed that recently an increasing number of studies on climate change impacts on air quality has appeared in the literature based on regional models focusing on Europe [e.g., Langner et al., 2005; Szopa et al., 2006; Giorgi and Meleux, 2007; Hedegaard et al., 2008; Krüger et al., 2008; Katragkou et al., 2010; Andersson and Engardt, 2010; Zanis et al., 2011; Katragkou et al., 2011; Huszar et al., 2011; Juda-Rezler et al., 2012]. Andersson, C., and M. Engardt (2010), European ozone in a future climate: Important changes in dry deposition and isoprene emissions, <i>J. Geophys. Res.</i> , 115, D02303, doi:10.1029/2008JD011690. Giorgi, F., and F. Meleux (2007), Modeling the regional effects of climate change on air quality, <i>C. R. Geosci.</i> , 339, 721–733, doi:10.1016/j.crte.2007.08.006. Hedegaard, G. B., J. Brandt, J. H. Christensen, L. M. Frohn, C. Geels, K. M. Hansen, and M. Stendel (2008), Impacts of climate change on air pollution levels in the Northern Hemisphere with special focus on Europe and the Arctic, <i>Atmos. Chem. Phys.</i> , 8, 3337–3367, doi:10.5194/acp-8-3337-2008. Huszar P., K. Juda-Rezler, T. Halenka, H. Chervenkov, D. Syrakov, B. C. Krueger, P. Zanis, D. Melas, E. Katragkou, M. Reizer, W. Trapp and M. Belda, Potential climate change impacts on ozone and PM levels over Central and Eastern Europe from high resolution simulations, <i>Climate Research</i> , 50, 51–68, doi: 10.3354/cr01036, 2011. Juda-Rezler K., M. Reizer, P. Huszar, B.C. Krüger, P. Zanis, D. Syrakov, E. Katragkou, W. Trapp, D. Melas, H. Chervenkov, I. Tegoulis, T. Halenka, On the effect of climate change on regional air quality over central-eastern Europe: concept, evaluation and future projections, <i>Climate Research</i> , 53, 179–203, doi: 10.3354/cr01072, 2012. Katragkou E., P. Zanis, I. Tegoulis, D. Melas, I. Kioutsioukis, B.C. Krüger, P. Huszar, T. Halenka, S. Rauscher, Decadal regional air quality simulations over Europe in present climate: near surface ozone sensitivity to external meteorological forcing, <i>Atmospheric Chemistry and Physics</i> , 10, 11805–11821, doi:10.5194/acp-10-11805-2010, 2010. Katragkou E., P. Zanis, I. Kioutsioukis, I. Tegoulis, D. Melas, B.C. Krüger, E. Coppola, Future climate change impacts on surface ozone from regional climate-air quality simulations over Europe, <i>Journal of Geophysical Research</i> , 116, D22307, doi:10.1029/2011JD015899, 2011. Krüger, B. C, E. Katragkou, I. Tegoulis, P. Zanis, D. Melas, E. Coppola, S. Rauscher, P. Huszar, T. Halenka (2008), Regional photochemical model calculations for Europe concerning ozone levels in a changing climate, <i>Q. J. Hungarian Meteorol. Serv.</i> , 112(3–4), 285–300. Langner, J., R. Bergstrom, and V. Foltescu (2005), Impact of climate change on surface ozone and deposition of sulphur and nitrogen in Europe, <i>Atmos. Environ.</i> , 39, 1129–1141, doi:10.1016/j.atmosenv.2004.09.082. Szopa, S., D. A. Hauglustaine, R. Vautard, and L. Menut (2006), Future global tropospheric ozone changes and impact on European air quality, <i>Geophys. Res. Lett.</i> , 33, L14805, doi:10.1029/2006GL025860. Zanis P., E. Katragkou, I. Tegoulis, A. Poupkou, D. Melas, P. Huszar, F. Giorgi, Evaluation of near surface ozone in air quality simulations forced by a regional climate model over Europe for the period 1991-2000, <i>Atmospheric Environment</i> , 45, 6489-6500, doi:10.1016/j.atmosenv.2011.09, 2011. (Prodromos Zanis, Department of Meteorology and Climatology, School of Geology, Aristotle University of Thessaloniki, Greece) (GREECE)	Noted.
685	61622	23	30	30	0	0	Desertification is not dealt with in the whole chapter (except as non-climatic trends). Desertification and soil degradation, linked to fires, salinization, water stress, etc. could significantly change in Europe, affecting economy and ecosystem goods and services. This should be captured in the chapter. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Desertification is now mentioned in the soil quality section and is linked to the water stress issue. Links to salinisation are addressed in section on coastal flooding. There are also mentions of degradation in the forest section, as related to forest fires.
686	70228	23	30	39	30	41	It is not clear the area where this statement applies. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	This has been revised
687	59649	23	30	41	0	43	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence has been revised
688	59650	23	30	46	0	48	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence has been revised
689	83447	23	30	48	30	51	The relevant climate scenario for this projection should be specified. (Katharine Mach, IPCC WGII TSU)	Climate scenario to be specified
690	83448	23	30	53	31	3	The relevant climate scenario for this projection should be specified. (Katharine Mach, IPCC WGII TSU)	Climate scenario to be specified
691	59651	23	31	3	0	3	Nobody is expected to remember which counties made EU25. So, please give the names of the EU countries that did not make part of EU25. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The sentence has been revised
692	59652	23	31	5	0	5	Delete J from Smith J. et (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence has been revised

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693	65119	23	31	12	31	15	Conservation agriculture can also contribute to climate mitigation through reductions in energy usage. Khaledian et al. (2010) calculated that direct seeding into mulch for corn and sorghum crops in France reduced energy inputs significantly (as much as 18%) whilst conserving farm output (Pam Berry, Oxford)	Agreed, although as stated by Powlson et al. (2011) 'Increases in SOC from reduced tillage now appear to be much smaller than previously claimed, at least in temperate regions, and in some situations increased N2O emission may negate any increase in stored C'.
694	59653	23	31	19	0	22	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence has been revised
695	74621	23	31	29	31	31	The heat capacity of water is the same whether the water body is shallow or deep, thus it is irrelevant here. Shallow water is more vulnerable to heating because the volume of water is less, and the solar insolation or surficial heat transfer per square meter is more per unit volume than in deep water. Also, make the comparison to deep water explicit. (UNITED STATES OF AMERICA)	The sentence does not state that heat capacity of water per se is different for shallow or deep water, but we have modified the section.
696	57430	23	31	34	0	0	I propose to add after (Boxall et al. 2009): An analysis of water quality changes caused by extreme weather events in the European Region was made in Sinisi and Aertgeerts (2010): Sinisi, L. and R. Aertgeerts (eds.), 2010, Guidance on Water Supply and Sanitation in Extreme Weather Events, WHO Regional Office for Europe, Copenhagen, 106 p. (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	Thanks. This will be considered.
697	74622	23	31	34	31	25	What evidence is there to support this statement about contaminants? (UNITED STATES OF AMERICA)	Agreed. We will support this.
698	74623	23	31	35	31	37	One can imagine scenarios where it would be good to not have nutrients transported downstream. So? (UNITED STATES OF AMERICA)	This statement is stressing some positive effects on phosphorous loads.
699	74624	23	31	36	31	36	Please define "P-retention" and "P-load" (UNITED STATES OF AMERICA)	This has been amended. P=phosphorous.
700	74625	23	31	40	31	43	The sentence implies that nutrient loads will go up even when river flow (Q) is going down. Q and nutrient loading tend to be positively correlated, not negatively correlated. Something would need to be affecting nutrient inputs at the source end, but the connection is not clearly made here. That whole paragraph needs to be rethought and rewritten. (UNITED STATES OF AMERICA)	We have rewritten the paragraph, and the flow is better now.
701	61623	23	31	45	31	47	Sentence is grammatically incorrect and not clear. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been amended.
702	61624	23	31	45	31	47	This sentence does not make sense - it seems to confuse changes in nutrient loadings in northern and southern Europe (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been amended.
703	59657	23	32	0	0	0	Disagreement to sentence "Farmers across Europe are currently adapting to climate change". On the contrary, farming is following unsustainable practices in the majority of European countries, a fact which has led to the depletion of water resources as well as to considerable amounts of soil pollution due to the excessive use of fertilizers. Changes in the reformed Common Agricultural Policy to the direction of climate/environment protection needs to be referred. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	Depletion of water resources by agriculture is addressed in section 23.4.3 (Water resources and agriculture). In the same way, land degradation in Europe is addressed in section 23.6.2+I695
704	65120	23	32	5	32	7	Habitat shrinkage should not be occurring everywhere as something must be replacing what is lost and there is projected expansion of some e.g. boreal forests at higher latitudes. These two sentence therefore need putting in context/qualified. (Pam Berry, Oxford)	Agree. The text has been changed and in order to better address the topic.
705	61625	23	32	5	32	37	This section does not explicitly discuss habitat quality. Habitats may move with climate change but the quality of new areas may be low, as plants/animals need time to adapt, (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The section deals with the impacts of climate change on the habitats, that inevitably will cause also impacts on the habitat quality. However, even if any specific literature has been found on the impacts of climate change on the habitat quality, the section has been modified in order to better address the argument.
706	83449	23	32	9	32	10	Instead of using "up to" to specify the ranges, it would be preferable to specify the lower and upper bounds of the full range more clearly. (Katharine Mach, IPCC WGII TSU)	The section has been shortened and the sentence has been removed.
707	61626	23	32	11	32	13	The last part of the sentence is not clear. How can plants inhabit areas that are "climatically unsuitable"? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Areas that will become "climatically unsuitable" for some species at the end of the century will lose plants creating an extinction debt. However the section has been shortened and the sentence has been removed.
708	59654	23	32	15	0	17	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agree. The section has been reorganized and the text has been improved.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
709	70229	23	32	15	32	17	not 'mean altitude of the uplands is projected to increase' but 'mean altitude of the upland communities is projected to increase' (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Agree. The section has been reorganized and the text has been improved.
710	76752	23	32	19	32	19	"In respect to" --> "With respect to" (Claudio Cassardo, University of Torino)	Agree. The section has been reorganized and the text has been improved.
711	59655	23	32	31	0	34	I suggest the following phrase to be added. "These estimates are drawn from studies which consider changes in the conditions of sites and hence their ability to conserve species under future scenarios, but which ignore the connectivity-related spatial properties of the network that could facilitate flow of individuals and colonization between neighboring sites. In a recent study, Mazaris et al. (2013) demonstrated that the spatial distribution of the Natura 2000 network could facilitate connectivity between sites for four birds of prey providing rather robust sub-networks that could ensure species conservation". [Citation for this is the following: Mazaris, A.D., A.D. Papanikolaou, M. Barbet-Massin, A.S. Kallimanis, F.Jiguet, D.S. Schmeller, and J.D. Pantis, 2013: Evaluating the connectivity of a protected areas' network under the prism of global change: the efficiency of the European Natura 2000 network for four birds of prey. PLoS ONE 8, e59640. This phrase could be inserted in line 35, before the sentence starting with 'It has been highlighted ...']. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The text has been revised and modified and the paper has been introduced.
712	63779	23	32	31	32	34	Citation: "Protected areas play a key role for conservation of biodiversity under climate change compared to unprotected areas, although by 2080, 58+/- 2.6% of the species would lose suitable climate in protected areas. Natura 2000 areas will be not effective or more impacted than unprotected areas, under A1FI, A2, B1, B2 scenarios (Araujo et al., 2011). Similar concerns about effectiveness of protected areas are found for butterflies in Germany (Filz et al., 2012)." Comment: 1) in the given sentence it is not clear that in the original paper of Araujo the analysis differentiates between three categories: protected areas, unprotected areas and Natura 2000. This may lead to confusion. 2) One key finding is based on data of plants ("in fact, the Natura 2000 is less effective in retaining suitable climate for plant species than sets of randomly selected unprotected areas") but data of birds show different results ("For half of the remaining combinations of taxonomic groups and scenarios, the Natura 2000 provides no better buffer against climate change than areas outside the network, with the exception of birds"). 3) In Araujo's paper some explanations are given for differences in changes of climate suitability between protected areas and Natura 2000: "Differences in changes of climate suitability between protected areas and Natura 2000 are partly related with topography. Most protected areas are in mountains or rugged environments. The Natura 2000 also prioritizes farmlands and these are located in lower and flatter lands. Because proportional range losses arising from climate change are usually more pronounced in flatlands than in rugged terrains, the Natura 2000 is more vulnerable to climate change." Suggestion: Due to the reduction of findings and explanations of the original paper the given sentences may lead to misinterpretations. Therefore, we propose to either delete the statement about Natura 2000 here and add some explanations about protected areas, so the sentence would read: "Protected areas play a key role for conservation of biodiversity under climate change compared to unprotected areas, although by 2080, 58+/- 2.6% of the species would lose suitable climate in protected areas under A1FI, A2, B1, B2 scenarios, since the protected areas analysed are mainly located in mountainous areas" or to give an explanation about protected areas and make an additional statement about Natura 2000, so the sentence would read: "Protected areas play a key role for conservation of biodiversity under climate change compared to unprotected areas, although by 2080, 58+/- 2.6% of the species would lose suitable climate in protected areas, since the protected areas analysed are mainly located in mountainous areas. Natura 2000 areas will be more impacted than unprotected areas, under A1FI, A2, B1, B2 scenarios (Araujo et al., 2011). Similar concerns about effectiveness of protected areas are found for butterflies in Germany (Filz et al., 2012). However, Natura 2000 areas have a higher potential to serve as stepping stones and to receive new species than unprotected areas (Ellwanger et al., 2012)." Literature cited: Ellwanger, G., Ssymank, A. Paulsch, C. (Eds.) (2012): Natura 2000 and Climate Change – a Challenge. – Naturschutz und Biologische Vielfalt 118. – Münster (Landwirtschaftsverlag), 212 pp. (GERMANY)	The text has been revised and modified and the paper has been introduced.
713	76753	23	32	32	32	32	"58 +/- 2.6%" --> "58 +/3" (Claudio Cassardo, University of Torino)	Disagree. In the original paper is reported the second decimal place.
714	83450	23	32	32	32	32	It would be helpful to clarify if the projected outcome here is across all 4 scenarios listed on line 34. (Katharine Mach, IPCC WGII TSU)	The list of scenarios have been moved before in order to clarify the sentence.
715	74626	23	32	33	32	33	Please define Natura 2000 areas (UNITED STATES OF AMERICA)	Disagree, We believe that it is not necessary to define here NATURA2000 AREAS

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
716	61627	23	32	33	32	34	This sentence is not clear. 58% of which species? All species? A sample of species? Also, the statement on Natura 2000, out of context, is misleading. See comment related about page 5 (23-25). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The text has been revised and modified.
717	66377	23	32	38	32	0	A totality of shifts in ecosystem composition and local losses of habitats and species, noted in section 23.6.4, mean that cosequences will be more deteriorative in heavily transformed landscapes with strong fragmentation and deficit of natural and subnatural habitats; e.g. that was noted for Moldova (Andreev, 2011) (Andreev, A.V., 2011: Factors of probable future changes of (sub)natural ecosystems, linked with climate change. [Trombitsky, I. and Corobov R. (ed.)]. Transboundary cooperation in climate change adaptation of the Dniester River basin. Collection of scientific articles. Kishinev: ECO-Tiras. P. 8-20. [In Russian.]) (Alexei Andreev, BIOTICA Ecological Society)	the general concept it is already covered in the text
718	79068	23	32	40	33	8	There is disagreement between physiological modelling results and modelling using climatic (or other) envelopes. The range wherein e.g. trees can grow often by far exceeds the range of conditions represented by any envelope. Please have a look into this and make sure the literature you use here reflects both aspects. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	there is no literature that consistently compare physiological and climate envelope models for assessing species distribution. Thus we have considered both the approaches in the analysis.
719	59656	23	32	40	33	38	In southern Europe, loss of biodiversity will be more extreme because southern Europe is cut off northern Africa by the intervention of the Mediterranean Sea. The Mediterranean is an important barrier for many species that cannot cross it, for example ground living arthropods or snails. (Anastasios Legakis, Department of Biology, University of Athens, Greece) (GREECE)	There is not literature about this.
720	57710	23	32	43	0	0	PEÑUELAS J., OGAYA R., BOADA M., JUMP A. 2007. Migration, invasion and decline: changes in recruitment and forest structure in a warming-linked shift of European beech forest in Catalonia. Ecography 30: 829-838. (Josep Penuelas, CREAM-CSIC)	The reference has been included in the text.
721	76754	23	32	44	32	44	+3.9 and -1.4: which is the baseline? (Claudio Cassardo, University of Torino)	The section has been shortened and the sentence has been removed.
722	65121	23	32	46	32	48	Feehan et al is only a review and thus the original paper(s) should be cited. (Pam Berry, Oxford)	The section has been shortened and the sentence has been removed as well as the citation.
723	76755	23	32	47	32	47	"10 days earlier than 50 years ago": 10/50 gives 2, while in the text 2.5 is referenced... (Claudio Cassardo, University of Torino)	The section has been shortened and the sentence has been removed as well as the citation.
724	65122	23	33	2	33	5	Trees are also slower to respond because of their longer time to reach reproduction and their longevity (Pam Berry, Oxford)	There is not literature about this.
725	83451	23	33	5	33	7	The projections being communicated in this statement could be clarified--both parts of the sentence pertain to southern Europe?? How are 2020, 2050, and 2080 to be interpreted; are the patterns of change similar or different for these time periods? (Katharine Mach, IPCC WGII TSU)	High latitudes refers to Northern Europe.
726	65123	23	33	13	33	14	Feehan et al is only a review and thus the original paper(s) should be cited (Pam Berry, Oxford)	The text has been revised and modified including more original references.
727	66378	23	33	13	33	14	Nevertheless, foreseen worsening of water quality means that extra generations are possible only for a limited number of damselfly species that are resistant to eutrophication and oxygen deficit while droughts suppress butterfly populations. (Alexei Andreev, BIOTICA Ecological Society)	The section has been modified
728	83452	23	33	16	33	16	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	The term "likely" has been removed.
729	61628	23	33	18	33	35	These sentences imply the changes will occur or have occurred, yet the seem to refer to projections based on model results. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	the text has been changed and the observed and projections are more clear.
730	76756	23	33	22	33	22	typo: "2005)Jiguet" --> "2005) Jiguet" (Claudio Cassardo, University of Torino)	ok, it has been changed.
731	66379	23	33	26	0	0	Comparison of recent and retrospective data about populations of wild bees show that strengthening droughts may drastically influence upon pollinators of sponateous flora and crops in southern part of the IPCC Continental subregion (Andreev et al., in press). (Andreev, A. Stratan, V., Gargalic., S. [In press.] Apoidea of Moldova in the contexts of climate change and landscape degradatation. Journal of Academy Sciencesof Moldova. Life Sciences.) (Alexei Andreev, BIOTICA Ecological Society)	We didn't find the paper. Possible citation are from papers published before 31st August 2013.
732	59658	23	33	27	0	29	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Agreed. The text has been corrected.

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733	83453	23	33	27	33	27	For the described "5-9%" is this the expected outcome without climate change?? This point could be clarified. Also, it would be preferable to provide the full range instead of the "up to" formulation. (Katharine Mach, IPCC WGII TSU)	Agreed. The text has been improved.
734	83454	23	33	29	33	29	It would be helpful to clarify what is meant here by "climate cooling." As a hypothetical, as observed over deep-time historically, etc.? (Katharine Mach, IPCC WGII TSU)	The sentence has been modified.
735	65124	23	33	41	0	0	The section on invasives in Chapter 4 is excellent, as it covers the mechanisms of invasions and points out some gains AND losses. I don't know how many of the papers could be used here (Pam Berry, Oxford)	We have tried to consider as much as possible in this section, however much of the material will be present in the specific chapter 4.
736	70217	23	33	45	0	0	Section Invasive. This section should also mention that species used for biofuel may become invasive (European Environment Agency (2012). The impacts of invasive alien species in Europe. doi:10.2800/65864) (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The suggestion has been considered and the reference has been added.
737	64583	23	34	5	35	3	23.6.5.: this section to be balanced with the North Atlantic and other sections in chapters 5, 6 and 30 (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	This has been amended.
738	79653	23	34	5	35	3	Generally this section doesn't do justice to the large amount of information on climate change and European seas, it is very superficial and could have taken much more from the OSPAR 2010 QSR or the UK MCCIP supporting documents (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	There is a space limitation. The suggested references/sources are not fully provided.
739	79654	23	34	23	34	23	It should read "cod larvae" as adults do not eat zooplankton. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This has been amended.
740	64584	23	34	23	34	28	this section contrasts the statement in the executive summary (Lena Menzel, Alfred Wegener Institute for Polar and Marine Research)	Don't agree, although it is not clear exactly which 'statements in the executive summary are being referred to here.
741	79655	23	34	24	34	25	This sentence gives the impression that cod have declined in all northern sea. It should say that there has been a decline in mid latitude areas such as the Irish Sea and North Sea but a massive increase further north (in the Barents Sea). (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This has been amended.
742	79656	23	34	30	34	30	It should read "are also linked to the establishment and spreading of invasive species". (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This has been amended.
743	74627	23	34	30	34	37	One could argue, cogently, that climate change has resulted in the redistribution and extension of range of organisms in the past, and that such changes in distribution are both natural and expected. The case for species colonizing an area that they have not been in before being called invasive (a pejorative term implying anthropogenic factors) under such conditions is obviously not strong. The point being made here, should be that the rate of climate change is unprecedented and anthropogenic. Therefore, species are thus invasive by that criterion. If so, this section might be made more clear. Otherwise, this section doesn't hold up very well to scrutiny. (UNITED STATES OF AMERICA)	The section has been edited to accommodate this point.
744	83455	23	34	32	34	32	Coordination with the ocean chapters could be considered for this statement. In general, it seems many semi-enclosed seas are not fully representative of other coastal and ocean ecosystems. (Katharine Mach, IPCC WGII TSU)	The language has been edited to tone down this statement.
745	79657	23	34	34	34	34	"has been associated with" doesn't make sense in this context - check the grammar. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	The sentence has been edited.
746	74628	23	34	42	34	45	It is not clear whether the freshwater input statement is part of the HELCOM reference. (UNITED STATES OF AMERICA)	No it's not, as indicated in the text.
747	79658	23	34	43	34	43	"Freshening of the salinity" - phrase doesn't make sense. Seawaters can 'freshen' but salinity is a measure of freshening. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	Not clear
748	79659	23	34	47	34	47	It should read "wetter winters and summers in catchments surrounding the Arctic and North Sea". (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This has been amended.
749	83456	23	34	49	34	51	It would be preferable to specify the relevant climate/socioeconomic scenario for this protected outcome. (Katharine Mach, IPCC WGII TSU)	The sentence has been edited.
750	79660	23	34	50	34	50	It should read "could inhibit growth and development of shell forming species". (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This has been amended.

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751	59659	23	34	54	34	54	The authors could consider citing also the work of Kontogianni et al. (2011). (Citation: Kontogianni, A., Tourkolias, C., Skourtos, M., Papanikolaou, M. (2011). Linking Sea Level Rise Damage and Vulnerability Assessment: The Case of Greece, International Perspectives on Global Environmental Change, Young, S. (Ed.), pp. 375 – 398, InTech, Available at: http://www.intechopen.com/books/international-perspectives-on-global-environmental-change/linking-sea-level-rise-damage-and-vulnerability-assessment-the-case-of-greece). (Dimitris Damigos, Mining and Metallurgical Engineering, NTUA, Greece) (GREECE)	The reference was considered
752	79661	23	35	1	35	1	It should read "infrastructure development". (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	This has been amended.
753	59660	23	35	6	38	17	In 23.7 there is only one very short mention of adaptation strategies that concern terrestrial and freshwater biodiversity. At least, something should be added in Rural Development and also a short text on economic goods and services provided by biodiversity in Economic Assessments of Adaptations. (Anastasios Legakis, Department of Biology, University of Athens, Greece) (GREECE)	Disagree, adaptation for biodiversity is covered in Section 23.6.4.
754	74629	23	35	9	42	49	Especially Section 23-7 – 23-9: Well written as a discussion of various possibilities. Specifics, time lines and trajectories will, defacto, be impossible to predict. Nevertheless, the discussions of these important topical areas are likely to be critical to provide a framework for future policy making decisions. (UNITED STATES OF AMERICA)	Thanks.
755	59662	23	35	12	0	13	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Disagree, sentence is correct.
756	59661	23	35	12	35	12	"considerable progress" is perhaps too much reassuring. Good quality data is missing. EU legislation is missing if I am not mistaking. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Disagree, much data and studies are present, or becoming available, there is a European platform for this. Also, national level policymaking and EU legislation is emerging.
757	74630	23	35	12	35	34	Line 12 says considerable progress has been made, yet line 33 says few measures have been implemented. Which is it? (UNITED STATES OF AMERICA)	Agreed, implementation has not been achieved everywhere, but planning and development has.
758	61629	23	35	14	35	17	Revise according to actual adoption of the Strategy (April 2013) and its contents (Communication + accompanying documents). The accompanying documents provide guidance to EU actors, and insights on EU mainstreaming adaptation into EU policies; the Communication focuses on ensuring informed adaptation action and support across the EU territory. The Climate Adaptation Platform could be renamed (Climate-ADAPT), defined (A Web-based platform aiming to support Europe in adapting to climate change) and the link added (http://climate-adapt.eea.europa.eu/) (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thanks, we have revised accordingly.
759	76757	23	35	17	35	17	"to be published in March 2013": since we are now in May, it has been already published (Claudio Cassardo, University of Torino)	This was obviously at the time of writing. This has been amended.
760	59663	23	35	27	0	30	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been amended.
761	76758	23	35	29	35	29	seven: why do not indicate them? (Claudio Cassardo, University of Torino)	Agreed. They will be included.
762	61630	23	35	37	0	0	Madrid does not have an adaptation plan or strategy. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have checked, and in fact they are developing a plan (as the sentence in our text states).
763	59664	23	35	40	0	41	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been amended.
764	65823	23	35	47	36	9	Section 23.7.1: Consider adaptation review in coastal zones. Brown S, Hanson S, Nicholls RJ: Implications of sea-level rise and extreme events around Europe: A review of coastal urban environments and adaptation. Submitted to Climatic Change (Sally Brown, University of Southampton)	We would have liked to include this paper, but it was not accepted before the AR5 deadline for literature.
765	83457	23	35	51	35	52	The wording of this statement should be adjusted to avoid potential interpretations of policy prescription. (Katharine Mach, IPCC WGII TSU)	Agreed. This will be adjusted.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
766	61631	23	36	12	0	0	This section deserves further development and linkage of water management with impacts and vulnerability to climate change (not only water for agriculture; a linkage with demands and consumption patterns in Industry, Urban and direct human consumption, energy...can be done. There are some studies addressing this.). Effects on management and planning and competing for water resources should be further developed. Transboundary issues should also be highlighted here. There are good examples of long-term planning in Europe that mainstream adaptation to climate change. The EU Water Policy should be quoted here. The Spanish Water regulation is another example of integration of climate projections into medium term water planning. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Agreed. However, there are very few scientific publications addressing these issues, AR5 cannot report on policy documents only. We will include cross-basin issues.
767	70677	23	36	12	36	12	I think that the Water Framework Directive (WFD), which operationally started in 2010, should be mentioned in this section (in the draft, the WFD is only mentioned with reference to the 'Water quality' issue). P36 L16: Discussions are on-going at the EU level on how Member States should incorporate climate change considerations into the implementation of EU water policy. This issue is all the more a highlight with the development of the first river basin management planning under the Water Framework Directive (WFD), which operationally started in 2010" (Quevauviller, 2011). Quevauviller, Ph, 2011: Adapting to climatic change: reducing water-related risks in Europe – EU policy and research considerations, Environ. Sci. Pol., 14(7), 722. (Marco Borga, University of Padova)	Thanks, we will include this reference and the WFD here.
768	57431	23	36	23	36	24	The reference (UNECE, 2009) on the Guidance is absent in the list of references. I suppose this publication is: UNECE, 2009, Guidance on water adaptation to climate change. United Nations, New York and Geneva, 128 p. (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	This will be amended in the FGD draft.
769	57432	23	36	24	0	0	To add after (EC, 2009b) the following reference: UNECE, 2009, Transboundary Flood Risk Management: Experience from the UNECE Region. United Nations, New York and Geneva, 79 pp. (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	Interesting, but these are generic reports related to transboundary issues, not climate change.
770	57433	23	36	26	0	0	I propose to add: Territorial cohesion in water management is discussed in (EEA, 2012). (EEA, 2012: Territorial cohesion and water management in Europe: the spatial perspective. EEA Technical report No. 4/2012, EEA, Copenhagen, 78 pp. doi:10.2800/49764 (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	We considered this, but this document does not treat adaptation.
771	63780	23	36	29	36	50	This paragraph focuses very much on risks on the Rhine and the Rhine-Delta. You may consider adding results from the Alpine Region; e.g. the project Adaptalp (http://www.adaptalp.org/). A possible reference may be: AdaptAlp (2011): Meeting the risk of climate change and natural hazards in the Alps. Common Strategic Paper. http://www.adaptalp.org/index.php?option=com_docman&task=doc_download&gid=348&Itemid=79 Suggestion: add in line 39 In the Alpine area, an international network of governmental institutions has agreed on a list of 10 actions on how to include the current knowledge about climate impacts in natural hazard management. The climate impacts were assessed based on an ensemble of 14 regional climate projections. (GERMANY)	Agreed. Although examples are included from UK, we will also include other perspectives, such as from the Alps.
772	57434	23	36	34	0	0	I propose to add after '... mapping of flood risks': ...and risk-based management of river basins (Brils and Harris, 2009) (Brils, J. and B. Harris (Eds.). 2009. Towards Risk-Based Management of European River Basins: Key findings and recommendations of the RISKBASE project. Utrecht, the Netherlands, 47pp. (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	Not peer-reviewed, and we have already several citations on mapping and risk-based management.
773	70678	23	36	42	36	42	Options to reduce the consequences of flooding to exposed communities include social capacity building for natural hazards. Specific strategies of social capacity building include assessment and quantification of social vulnerability, as well as risk communication and risk education (Kuhlicke et al., 2011). Kuhlicke, C., Steinführer, A., Begg, C., Bianchizza, C., Bründl, M., Buchecker, M., De Marchi, B., Di Masso Tarditti, M., Höppner, C., Komac, B., Lemkow, L., Luther, J., Mccarthy, S., Pellizzoni, L., Renn, O., Scolobig, A., Supramaniam, M., Tapsell, S., Wachinger, G., Walker, G., Whittle, R., Zorn, M., Faulkner, H., 2011: Perspectives on social capacity building for natural hazards: Outlining an emerging field of research and practice in Europe. Environmental Science and Policy, 14 (7), pp. 804-814. (Marco Borga, University of Padova)	Thanks, will consider to include.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
774	67834	23	36	51	26	51	in case you want to give an example on risk management with regard to urban heat, please see/wait for (submitted and under review): Wolf, T and GR McGregor: The Development of a Heat Wave Vulnerability Index for London, United Kingdom. Weather and Climate Extremes. WACE-D-13-00001 and Wolf, T, McGregor GR and A Analitis: Performance Assessment of a Heat Wave Vulnerability Index for Greater London, United Kingdom Weather, Climate and Society. WCAS-D-13-00014 (Tanja Wolf, WHO Regional Office for Europe)	Thanks, but these papers were not available before the AR5 deadline.
775	59671	23	37	0	0	0	Section 23.7.4 this section is missing the links of land use planning to forest/agriculture/coastal areas etc. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	We are not aware of appropriate references related to these sectors.
776	61632	23	37	1	0	0	Section 23.7.4: The EEA Report -No 2/2012 "Urban adaptation to climate change in Europe" is not cited at all in this chapter. This section may be an appropriate one to do so. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have tried to avoid using non-peer reviewed reports, and have focused on the peer-reviewed literature.
777	60856	23	37	1	37	37	This section covers one of the largest issues for Europe: how to couple climate change resilience and adaptation, to economic growth and conservation. This section has spectacularly failed to address this. Natural England have published a series of reports on this issue. This reflects a purely academic based review on one that does not take account of real world examples, practical applications and solutions. (David Viner, Private)	The IPCC process is a scientific synthesis of peer-reviewed literature. It addresses policy issues when these are reported in this literature. Furthermore, this section is not about 'economic growth'.
778	74631	23	37	3	37	37	Lines 3, 16, and 32 seem to be self contradictory (UNITED STATES OF AMERICA)	It's not clear why these lines are considered to be contradictory. What is the contradiction?
779	59665	23	37	5	37	5	"lacks concrete instruments" is a wrong message and also a contradiction since in other parts of the chapter concrete instruments are motioned with respect to spatial planning. "Managed retreat" is mentioned in page 28 line 1 for example. This can be a no-cost instrument adopted in spatial planning. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Yes, agreed. The language has been toned-down in this sentence.
780	59666	23	37	6	0	9	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The sentence has been amended.
781	83458	23	37	6	37	6	The author team could consider presenting calibrated uncertainty language to characterize the evidence described here, following the uncertainties guidance for authors. (Katharine Mach, IPCC WGII TSU)	Difficult to do, since the evidence is lacking
782	61633	23	37	9	37	11	In many counties' could be replaced by 'In some countries' (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The sentence has been amended.
783	63781	23	37	24	37	27	Please add short explanation of "green infrastructure" as in EU COM (2013): "Green Infrastructure is addressing the spatial structure of natural and semi-natural areas but also other environmental features which enables citizens to benefit from its multiple services. The underlying principle of Green Infrastructure is that the same area of land can frequently offer multiple benefits if ecosystems its ecosystems are in a healthy state." (Source: European Commission 2013 Green Infrastructure (GI) - Enhancing Europe's Natural Capital. Brussels COM (2013) 249 final, 6.5.2013) (GERMANY)	A definition will be included in the Report Glossary.
784	59667	23	37	25	37	25	a number of planners would argue that "increasing property values" can be a benefit for an owner but not for an urban area (gentrification etc) (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The point has been deleted from the sentence to avoid confusion.
785	59668	23	37	28	37	28	I have the impression that the text tends to focus to what is costly and perhaps minor in terms of mitigation impact and miss the important no-cost mitigation through planning (e.g. managed retreat). (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The chapter is not about climate mitigation.
786	78348	23	37	30	0	0	You could also cite Hamin, Elisabeth M., et Nicole Gurrán. 2009. « Urban form and climate change: Balancing adaptation and mitigation in the U.S. and Australia ». Habitat International 33 (3) (july): 238-245. (Vincent Viguié, CIRED)	The reference has been included.
787	59669	23	37	32	37	32	European policies might look to spatial planning for these reasons but they do not care to provide reliable data to spatial planning. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Not sure what the point is here?
788	59670	23	37	49	0	50	Please explain better what this finding means. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The text has been modified to try to clarify the point.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
789	61634	23	38	2	0	0	Section 23.7.6 & Table 23-3: The Bank of Greece (2011) financed a study of climate change impacts on Greece (http://www.bankofgreece.gr/Pages/en/klima/default.aspx). Chapter 3 of the report provides an assessment of the cost of climate change for Greece, including cost of adaptation measures (e.g. cost of implementing adaptation measures for protecting the coastal system for 2100: from €381.6 million to €3,345.6 million). Bank of Greece, 2011: The environmental, economic and social impacts of climate change in Greece, Climate Change Impacts Study Committee, 494p. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thanks. We will include cost estimates from this study in the Table.
790	76759	23	38	9	38	9	another paper in which one of the conclusions is that "The comparison between the climatological indices over the 30 years reference period 1971–2000 and the decade 2000–2009 outlined a general decrease in the amount of snow precipitation, and a shift in the seasonal distribution of the snow precipitation in the most recent period." is by Terzago S., Cassardo C., Cremonini R. and Fratianni S. (2010): "Snow Precipitation and Snow Cover Climatic Variability for the Period 1971–2009 in the Southwestern Italian Alps: The 2008–2009 Snow Season Case Study", <i>Water</i> , 2, 773-787; doi:10.3390/w2040773 (Claudio Cassardo, University of Torino)	Snow was not included as a key parameter.
791	76760	23	38	13	38	13	"in Europe and the Netherlands": the Netherlands is Europe, so please change in "the whole Europe and the Netherland alone", or something similar (Claudio Cassardo, University of Torino)	This has been amended.
792	59672	23	38	23	0	0	Air Quality deserves a separate section under the Co-Benefits ... chapter. After all, the effects of bad air quality of health in Europe are among the most important public health problems today and as air quality interacts with climate change, mutual co-benefits of mitigation measures are important. (Klea Katsouyanni, Hygiene, Epidemiology and Medical Statistics, University of Athens Medical School, Greece) (GREECE)	Noted- but the chapter structure has been agreed.
793	65125	23	38	23	38	33	A review of climate change adaptation and mitigation strategies for agriculture, forests, energy, urban, rivers and coasts, health, tourism and conservation, and their effect on biodiversity is provided in Berry, P.M. (ed.) (2009) <i>Biodiversity in the Balance – Mitigation and Adaptation Conflicts and Synergies</i> . Pensoft Publishers, Sofia, Bulgaria. Also in Paterson, J.S., Araújo, M.B., Berry, P.M., Piper, J.M., and Rounsevell, M.D.A.R. (2008) <i>Mitigation, adaptation and the threat to biodiversity</i> . <i>Conservation Biology</i> , 22, 1352-1355. Also for energy - Berry, P.M. and Paterson, J.S. (2009) <i>Energy mitigation, adaptation and biodiversity: synergies and antagonisms</i> . <i>Beyond Kyoto: Addressing the Challenges of Climate Change</i> . IOP Conference Series: Earth and Environmental Science 8, 012023. doi:10.1088/1755-1315/8/1/012023. (Pam Berry, Oxford)	Noted. These refs are added to the chapter .
794	76897	23	38	25	0	0	This paragraph's discussion should cross reference the chapter that deals with adaptation and mitigation synergies. The current discussion is not specific to the region of the chapter. (Food and Agriculture Organization of the United Nations (FAO))	Text has been revised to make it more regionally relevant.
795	78349	23	38	36	0	0	In section 23.8.1, you may also cite two other examples of trade-offs between mitigation and adaptation: the "density conundrum" (cf. section 8.5.2) and the trade-off between density and natural hazard exposure (cf. Viguié, Vincent, and Hallegatte, Stéphane . 2012. « Trade-offs and Synergies in Urban Climate Policies ». <i>Nature Climate Change</i> 2 (5) (mars 4): 334-337. doi:10.1038/nclimate1434. Burby, R. J., A. C Nelson, D. Parker, et J. Handmer. 2001. « Urban Containment Policy and Exposure to Natural Hazards: Is There a Connection? » <i>Journal of Environmental Planning and Management</i> 44 (4): 475–490. Burby, R.J., E. L Birch, et S. M Wachter. 2006. « The problems of containment and the promise of planning. » In <i>Rebuilding urban places after disaster: lessons from Hurricane Katrina</i> . University of Pennsylvania Press.) (Vincent Viguié, CIRED)	Unclear what the climate mitigation issues is here.
796	83459	23	38	38	38	38	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	noted.
797	59673	23	38	38	38	43	Why is this discussion about dwellings here and not in settlements section? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Because this section is about mitigation co-benefit and unintended consequences.
798	59674	23	38	41	38	42	"...some acting to reduce temperatures and others acting to increase temperatures" is not clear; need to rephrase. (Costas Balaras, Institute for Environmental Research and Sustainable Development, National Observatory of Athens, Greece) (GREECE)	Text has been clarified.
799	83460	23	38	46	38	46	Instead of "up to 27%" it would be much preferable to provide the full projected range, including both lower and upper bounds. (Katharine Mach, IPCC WGII TSU)	noted
800	83461	23	39	1	39	1	It would be preferable to specify further and with more detail what is meant by "potential. (Katharine Mach, IPCC WGII TSU)	noted
801	59675	23	39	4	39	20	these parts also look out of place. E.g. tourism is not production and to discuss ski resorts in terms of infrastructure is very limited. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	noted

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
802	76761	23	39	8	39	10	if they use renewable energy (like solar), they will not emit (or emit very few) GG (Claudio Cassardo, University of Torino)	This is important for mitigation.
803	60860	23	39	25	39	54	23.8.2 This section needs to account for the interactions of heatwaves on the carbon flux. For example the increase in CO2 flux from the terrestrial sink to the atmosphere in 2003 and 2010. (David Viner, Private)	This is mentioned with e.g. the reference by Ciais et al., 2005
804	79069	23	39	30	39	32	The way the text is worded right now is an over-simplification and could lead to misinterpretations, unfortunately. Please check whether this statement relates to the SINK really and not to the POOLS. "Sink" refers to the uptake of C from the atmosphere and is - to a certain extent - not depending on the size of the underlying pools. Changes in the C stocks in the pool lead to a calculatory weakening of the sink, although the absolute removal from the atmosphere may even be increased. Thus, the fate of the C taken from the pools has to be considered in such a case, too. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	This has been slightly expanded to refer to carbon stocks and to the notion of a carbon debt generated by the decline of carbon stocks.
805	59676	23	39	31	0	31	'25-40' what? (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece)	Sentence was revised and % added
806	58481	23	39	31	39	31	25-40% (Martin Pecheux, Institut des Foraminifères Symbiotiques)	Sentence was revised and % added
807	61635	23	39	31	39	31	Add "%" after "25-40". (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Sentence was revised and % added
808	70218	23	39	35	39	37	I would not call ecological restoration of abandoned land an agricultural practice. In this respect, the EU Biodiversity Strategy to 2020 (http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm) should be mentioned in this chapter. The strategy includes measures with profound implications on CC adaption and mitigation. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Because of page length limits, reference to ecological restoration has been kept in the text. However, Figure 23.8 addresses the links between adaptation, mitigation and biodiversity.
809	74632	23	39	35	39	44	This paragraph is weak because it contains multiple topics and rewriting is suggested. A better statement would be "substitution of manufactured N fertilizer with biological N fixation." (UNITED STATES OF AMERICA)	The sentence was improved and the paragraph has also been revised
810	76898	23	39	46	40	9	Are these discussions specific to the region of the chapter? If not, take it out from the chapter and move it to chapter 7. (Food and Agriculture Organization of the United Nations (FAO))	Most references concern Europe. Additional references were used given that their conclusions are relevant for Europe.
811	65126	23	40	0	0	0	Figure 23.8 is attributed to the wrong Paterson. The original reference is Paterson, J.S., Araújo, M.B., Berry, P.M., Piper, J.M., and Rounsevell, M.D.A.R. (2008) Mitigation, adaptation and the threat to biodiversity. Conservation Biology, 22, 1352-1355. (Pam Berry, Oxford)	reference has been corrected.
812	61636	23	40	5	40	15	What about loss of land for growing crops if it is used for bioenergy instead? Might this drive deforestation or other ecosystem degradation in other countries? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	.Disagree. Interactions between climate change, land use for bioenergy and tropical deforestation have not been addressed for Europe specifically in the scientific literature, but rather at a global scale. Therefore these issues need to be assessed in the sectoral chapters (e.g. Chapter 7 on food security) rather than in the Europe chapter.
813	83462	23	40	10	40	14	Where "could" is used on line 10 and 14, it would be preferable to specify more precisely on what factors the outcomes are conditional. (Katharine Mach, IPCC WGII TSU)	Sentence has been revised
814	59677	23	40	20	0	20	Please replace 'significant' with another word; keep it only for statistical significance. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence has been revised
815	59678	23	40	21	0	23	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Sentence has been revised
816	74633	23	40	22	40	22	"to coherent" should be "to develop coherent" (UNITED STATES OF AMERICA)	Sentence has been revised.
817	61637	23	40	26	40	28	What are the results of the research into housing? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	More detail has been added on housing issues.
818	59679	23	40	31	41	5	In 23.8 there is no mention of adaptation strategies that concern terrestrial and freshwater biodiversity, apart from one figure (fig. 23.8). (Anastasios Legakis, Department of Biology, University of Athens, Greece) (GREECE)	The discussion has been improved, with more examples.
819	83463	23	40	36	40	36	Use the "should" could be considered prescriptive, and it may be preferable to adjust wording here. (Katharine Mach, IPCC WGII TSU)	noted

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
820	83464	23	40	39	40	39	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	noted
821	65127	23	40	48	0	0	Given above comment need to change reference to Paterson et al., 2008 (Pam Berry, Oxford)	done
822	65128	23	41	2	0	0	Given above comment need to change reference to Paterson et al., 2008 (Pam Berry, Oxford)	done
823	59680	23	41	5	41	5	Why will there be a need for urbanization on nature conservation? (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Comment is not clear.
824	74634	23	41	8	41	16	Citing the studies about Nordic countries having a higher adaptive capacity than Southern European countries is important, but for a document such as this report, leaving out the primary reasons for that finding is problematic. I'd suggest bolstering this subsection to explain why the Nordic countries are more advanced on adaptation (e.g. is it cultural? is it because of an easier set of environmental challenges?) (UNITED STATES OF AMERICA)	This statement has been removed.
825	83465	23	41	11	41	11	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	noted
826	74635	23	41	13	41	13	Greiving et al. had no corresponding entry in the bibliography, same with ESPON, for that matter. (UNITED STATES OF AMERICA)	noted- This has been fixed.
827	74636	23	41	13	41	13	The references Greiving et al. and ESPON lack date of publication. (UNITED STATES OF AMERICA)	now fixed
828	59681	23	41	21	0	21	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Done
829	83466	23	41	31	41	32	The relevant climate/socioeconomic scenarios and other assumptions for this projection should be specified. (Katharine Mach, IPCC WGII TSU)	noted
830	74637	23	41	32	41	32	Are these four items agriculture, river floods, coastal areas, and tourism - "market impacts" or topic areas? (UNITED STATES OF AMERICA)	noted
831	60857	23	42	1	42	49	The importance of the interactions of tourism with climate change, society and the environment have been overlooked in this section. This should relate back to 23.3.6 (David Viner, Private)	The sentence in line 25 will be enhanced in order to reflect these interactions.
832	83467	23	42	3	42	3	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
833	76762	23	42	4	42	4	"Europe region. Further, the region is" --> "European region. Further, Europe is" (Claudio Cassardo, University of Torino)	Done.
834	59683	23	42	9	0	0	Box 23-3 "Climate Change Impacts in the Mediterranean" is interesting, yet incomplete. Further (quantitative) information needs to be provided in terms of changes on sea surface temperature distribution, coastal erosion, depletion of fishing stocks, desertification.(Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	This box has been removed, and text moved to section 23.9.
835	59682	23	42	9	42	27	In Box 23.3 it is not clear whether the text refers to the terrestrial or the marine part of Mediterranean countries. (Anastasios Legakis, Department of Biology, University of Athens, Greece) (GREECE)	This box has been removed, and text moved to section 23.9.
836	67835	23	42	9	42	28	Now it should be possible to refer to the Regional Assessment of Climate Change in the Mediterranean. For the health impacts see: Tanja Wolf et al. Health. In: Regional Assessment of Climate Change in the Mediterranean: Part V: People. Springer, Springer. http://www.springer.com/earth+sciences+and+geography/earth+system+sciences/book/978-94-007-5768-4 (Tanja Wolf, WHO Regional Office for Europe)	This box has been removed, and text moved to section 23.9.
837	83468	23	42	22	42	22	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	This will be improved by editing.
838	64244	23	42	37	42	37	The sentence says "Another inter-regional implication concerns the changes in the location of commercial fish stocks shared with non member states". The whole chapter 23 is titled "Europe" but not "European Union" and therefore it is not correct to talk about member states here without explicitly defining the term. Without doing so member states could equally well refer to UN or NATO member states, which is hardly the intention here. The text should therefore say "shared between different states within the European region". (ICELAND)	Agreed. This will be corrected.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
839	66325	23	43	1	43	1	I wonder if the author team have checked out the ESPON report on vulnerability to climate change in Europe, though it remains to be seen if this adds any new insights to what you already have in the chapter (full reference is given here, so I've done the hard transcription work for you!): Greiving S, Flex F, Lindner C, Lückenkötter J, Schmidt-Thomé P, Klein J, Tarvainen T, Jarva J, Backman B, Luoma S, Langeland O, Langset B, Medby P, Davoudi S, Tranos E, Holsten A, Kropp J, Walter C, Lissner T, Roithmeier O, M. K, Juhola S, P. N, Peltonen L, Vehmas J, Sauri D, Serra A, Olcina J, March H, Martín-Vide J, Vera F, Padilla E, Serra-Llobet A, Csete M, Pálvölgyi T, Göncz A, Király D, Schneller K, Staub F, Peleanu I, Petrisor A-I, Dzurdenik J, Tesliar J, Visy E, Bouwman A, Knoop J, Ligtoet W, van Minnen J, Kruse S, Pütz M, Stiffler M, Baumgartner D (2011) ESPON Climate: Climate Change and Territorial Effects on Regions and Local Economies. Scientific Report., ESPON & IRPUD, TU Dortmund University, Germany, p. 291. (Timothy Carter, Finnish Environment Institute)	Greiving is included in 23.9
840	83469	23	43	3	0	0	Section 23.10.1. Given the emphasis of chapter 19 and the report as a whole, it would be preferable here to present key risks instead of key vulnerabilities. Additionally, it would be helpful to indicate, wherever possible, the degree to which key risks increase with increasing level of climate change and the degree to which they can be reduced through adaptation. And, for all material in this section, clear line-of-sight references should be provided to supporting chapter sections. (Katharine Mach, IPCC WGII TSU)	noted.
841	84791	23	43	3	0	0	Section 23.10.1: This information is very useful, but also overlaps with the executive summary. Please consider how these presentations interact, and ensure that the key messages are presented clearly in the executive summary. For material retained here, please ensure clear line of sight to other chapter sections where this material is discussed, and also consider what information is appropriate to present here without calibrated uncertainty language. Conclusions of the chapter should not be presented here without such language. (Michael Mastrandrea, IPCC WGII TSU)	Agreed. This will be improved by editing.
842	65129	23	43	10	43	12	This statement need some qualification based on the time-scale considered. For species, for example, climate change is reckoned to become more important by the middle of the 21st century (Pam Berry, Oxford)	Agreed. This will be amended.
843	83470	23	43	19	43	19	It could be helpful to clarify what is meant by "confirmed"--for example, it could be possible to interpret this description as indicating that the vulnerabilities have been observed to play out to date in observed impacts. Presumably, the author team means that these are still future-oriented key vulnerabilities for which further research has confirmed already understood patterns of vulnerability and risk. (Katharine Mach, IPCC WGII TSU)	The text has been improved to clarify this point.
844	63782	23	43	19	44	41	The key findings (which are most likely to be read by decision makers) still should provide uncertainty guidance following the "calibrated language". (GERMANY)	This was not possible.
845	70230	23	43	24	43	25	This statement should be revised. As explained elsewhere, recent studies show a different pattern: non-significant trend in the number of fires since 1986 in Mediterranean Europe, and significant decrease in the last decade. Also a significant decrease in area burnt over the whole period. Jesús San-Miguel-Ayanz , Marcos Rodrigues , Sandra Santos de Oliveira, Claudia Kemper Pacheco , Francisco Moreira , Beatriz Duguay and Andrea Camia (2012). Land Cover Change and Fire Regime in the European Mediterranean Region. Chapter 2 in F. Moreira et al. (eds.), Post-Fire Management and Restoration of Southern European 21 Forests, Managing Forest Ecosystems 24, Elsevier. DOI 10.1007/978-94-007-2208-8_2 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The text has been revised. See comments above
846	61638	23	43	31	40	31	This statement is too general - not all European settlements are at risk from flooding. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Agree. There are large differences
847	59685	23	43	33	0	0	Add to emerging vulnerabilities: "Increase of share of citizens living in cities by 2020 and respective trends in urban sprawl".(Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	We did not feel there was sufficient evidence to support this statement.
848	59684	23	43	33	44	14	In 23.10.1, Emerging vulnerabilities, mention should be made to the fact that many non-migrating species of southern Europe will move northwards but they will not be replaced by other species since the Mediterranean Sea will act as a barrier. (Anastasios Legakis, Department of Biology, University of Athens, Greece) (GREECE)	Noted.
849	59686	23	43	37	0	37	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Done.
850	83471	23	43	39	43	39	Casual usage of "likely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Noted.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
851	59687	23	43	42	43	42	I am not sure that this is correct for areas connected to the energy grid where energy can be sold in other countries. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	This is general statement- and does not imply a risk in all areas.
852	83472	23	43	46	43	46	Casual usage of "unlikely" should be avoided, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Noted
853	70220	23	43	53	43	53	This is particularly important in semi-arid areas, as the pool of species adapted to drier and warmer conditions is missing in Europe (i.e., there are no European species to replace current ones in these areas, as climate will become drier and warmer) (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Agreed. No action.
854	59688	23	43	54	44	1	The phrase 'There are legal barriers to introduce new species' is misleading because it suggests that the problem would be faced by changing laws and public opinion. The references on which this statement is based reflect only one sector of scientific opinion, namely those who believe that the current precautionary regime is too strong. The real problem is that the introduction of alien species have unforeseeable consequences and for this reason legal systems usually apply the precautionary principle. Before suggesting introduction of new species, other realistic options should be considered. For these reasons I suggest removal of the phrase. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This is also a statement of fact- that legal barriers are present and does not imply that the problem will be solved (?faced) by changing laws and public opinion.
855	59689	23	44	4	0	6	This phrase sounds like something from a pro-pesticides and antibiotics campaign. The author should better describe the potential danger, and also the need for our society to be on the alert so as to take appropriate measures and amend, if needed, public policies. There are major health and environmental implications and, therefore, this issue should not be dealt with and presented in simplistic ways. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This a statement of fact - and the authors feel it does not reflect a position of either pro or anti pesticide policies.
856	69739	23	44	8	44	8	"Past events indicate the vulnerability of transport, energy agriculture, water resources and health systems." should be: "Past events indicate the vulnerability of transport, energy, agriculture, water resources and health systems." (NETHERLANDS)	This will be amended.
857	65130	23	44	20	44	21	Section 23.10.2 needs to go much earlier in Section 23.2 (Pam Berry, Oxford)	This is a valid point, including Table 23-6
858	60436	23	44	22	0	0	There are two Tables 23-6, of which you are referring to the 2nd here. The first one, on limits to adaptation, is important but appears not to be referenced in the text. (David Parker, Met Office Hadley Centre)	Table numbering has been corrected.
859	74638	23	44	22	44	29	Table 23-6 does not do what the text says, "summarises the evidence. Perhaps the writer is refereing to table on page 89 instead of 88? What "further and better quality evidence since 2007"? Alcamo et al., is 2007, so, what came more recently? (UNITED STATES OF AMERICA)	Table numbering has been corrected.
860	83473	23	44	28	44	36	All calibrated uncertainty language on these lines should be italicized, including summary terms for evidence and agreement, levels of confidence, and likelihood terms. (Katharine Mach, IPCC WGII TSU)	Noted
861	74639	23	44	31	44	38	Is there "high Confidence" that the increase is dure to increased exposures or is there high confidence that it is unclear about the contribution by climate change? Or both? (UNITED STATES OF AMERICA)	The legend has been clarified
862	59690	23	44	33	0	36	Please improve the phrase (unfinished sentences, and/or disagreement between subject and verb, and/or rather poor english) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
863	61639	23	44	40	44	41	Reference to Table 23-6. there are two Tables 23-6 (page 88, and page 89-90). This references to page 89-90 (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Table numbering has been corrected.
864	70231	23	44	41	44	41	There are 2 Tables named 23-6 (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Table numbering has been corrected.
865	60861	23	44	44	24	33	Due to the academic bias of the authors there are few referecnes to practical commercial implememntation of climate change adapation/resilience. This should be addressed in the AR6, or even better a Special Report on Infrastructure and Resilience. (David Viner, Private)	There is limited literature on documented examples of adaptation
866	74640	23	44	44	45	33	Section 23-10-3 (Key Knowledge Gaps and Research Needed): Well written and encapsulates many well known gaps. Assuredly, there are likely to be more gaps than mentioned. Perhaps this section should be expanded to include other gaps as noted throughout the chapters preceding. Suggest deleting references to specific examples in the bulleted itemized list, such as: air conditioning, tourism, air transport. (UNITED STATES OF AMERICA)	thanks
867	59691	23	44	46	45	33	As section 23.10.3 is a very important section, much attention should be paid to it. (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
868	59692	23	44	49	0	0	Additional specific research needs are: "Impact of climate change to cultural heritage", "Research on the resilience/vulnerability of populations to thermal stress", "Capacity of local and national government to respond to urban sprawl and promote sustainable spatial planning", "Research towards a commonly accepted set of climate change indicators", "Research on new materials for buildings/constructions for climate change mitigation".(Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	The research gaps have been updated, based on the assessment of the authors.
869	59693	23	44	50	0	51	Could be better (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
870	59694	23	44	52	0	53	What is the meaning of 'including the use of this information in decision making' in the context of (developing) tools for costing and valuation of specific adaptation options? (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This statement is clear.
871	60862	23	45	0	45	0	Who asked the Frequently asked questions? Why these three? (David Viner, Private)	TSU requested these.
872	59695	23	45	5	0	5	Could be much better (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
873	59696	23	45	6	0	6	Could be much better (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
874	59697	23	45	11	0	11	to inform policy? (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
875	59698	23	45	15	0	16	Could be much better (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted.
876	74641	23	45	21	45	21	What is purpose of phrase "[needs to be more specific]"? (UNITED STATES OF AMERICA)	This has now been deleted.
877	70221	23	45	23	45	24	I'd extend this point to cover not only extreme events but also gradual trends in temperature and precipitation. Estimations of species turnover in response to CC are still rudimentary. This should include studies on spontaneous colonization of non-European species on bioclimatic border areas. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	noted.
878	74642	23	45	28	45	33	The text is unclear. Is this trying to say governments sometimes impose policies that limit access to data? Is that what inappropriate confidentiality means? (UNITED STATES OF AMERICA)	text has been revised.
879	59699	23	45	29	0	30	Reasons should be better defined or explained (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
880	71419	23	45	29	45	30	This sentence is particularly awkward - "reasons include: government agencies require commercialisation, inappropriate confidentiality." The structure is odd and a little more detail would be useful. (CANADA)	text has been revised
881	59700	23	45	30	0	33	Could be much better (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	noted
882	74643	23	45	36	46	17	Please specify the source of these FAQ's. A survey of the public? Of scientists? One could think of many other FAQ's, such as "what are the most important mitigation actions needed and where?" and "what are the most important adaptation actions needed and where?" are two in particular that would be most welcomed for this chapter. (UNITED STATES OF AMERICA)	The FAQs were chosen by chapter authors.
883	74644	23	45	36	46	17	The chapter could benefit from additional FAQs. Some that we have identified as being valuable include: (1) What have been successful examples of adaptation planning in the region; (2) Can lessons learned/best practices be transferred? (UNITED STATES OF AMERICA)	We were limited by space.
884	74645	23	45	36	46	17	The frequently asked questions section is a great idea, though we're puzzled that the collective group of authors only thought of three questions worth asking. Here are a few more to consider:What are the economic implications of the various climate implications for Europe cited in this chapter? What business sectors are likely to be most impacted? What regions, countries or provinces in Europe are most susceptible to climate change impacts? What are the primary sectors or geographic regions for which Europe must prioritize developing adaptation plans? As it is written now, it appears as though this was either rushed or done without substantial thought. We would suggest reviewing the entire chapter and putting a short but more useful series of FAQs together. (UNITED STATES OF AMERICA)	We were limited by space.
885	83474	23	45	40	45	40	For the described increase in risk after the middle of the century, should it also be mentioned that the risk would increase differently depending on the relevant climate/socioeconomic scenario and emissions trajectory? (Katharine Mach, IPCC WGII TSU)	this has been discussed in the text.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
886	61996	23	45	49	45	50	The Mediterranean should be included in the area where coastal squeeze will take place. Many areas, like the coast of southern France and the northern Adriatic are already heavily protected by coastal defenses (Paolo Ciavola, University of Ferrara)	noted
887	74646	23	45	52	46	2	While the text clearly states that climate impacts changes in vectors and hosts, it omits impacts on pathogens. All these, pathogens, vectors and host, can be impacted by climate change. This section should also specify that it is considering human public health aspects, not necessarily livestock, plant ecology health, etc. (UNITED STATES OF AMERICA)	Animal, plant and human diseases all need good surveillance.
888	83475	23	46	6	46	6	Casual usage of "likely" should be avoided. (Katharine Mach, IPCC WGII TSU)	noted
889	65597	23	46	10	46	17	This is a weak answer. Can't we do better than "may be compensated". Is compensation probable or merely possible? (David Flint, Cass Business School)	Text has been revised.
890	66380	23	49	14	0	0	Biodiversity and climate change: Reports and guidance developed under the Bern Convention – Volume II, 2012: Nature and Environment No. 160. ISBN 978-92-871-7059-0. 429 p. (Alexei Andreev, BIOTICA Ecological Society)	Noted
891	70207	23	50	51	50	52	The title of this reference should be: Suitability of European climate for the Asian tiger mosquito <i>Aedes albopictus</i> : recent trends and future scenarios (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Noted
892	57435	23	52	28	52	29	Incorrect wording of the reference. Must be: Corobov, R., S. Sheridan, N. Opopol and K. Ebi, 2012: Heat-related mortality in Moldova: the summer of 2007. International Journal of Climatology. doi: 10.1002/joc.3610. (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	Noted.
893	61640	23	55	14	55	18	The references "EEA, 2008" and "EEA-JRC-WHO, 2008" refer to the same publication; the correct reference is "EEA-JRC-WHO, 2008" (see comment above). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected.
894	66326	23	56	51	56	52	Reference is incorrect here. Should be: Fronzek, S., Luoto, M. and Carter, T.R. 2006. Potential effect of climate change on the distribution of palsa mires in subarctic Fennoscandia. Climate Research 32: 1-12. (Timothy Carter, Finnish Environment Institute)	Noted
895	62007	23	57	55	57	56	The updated reference is: - Giuntoli, I., Renard, B., Vidal, J.-P., and Bard, A. (2013) Low flows in France and their relationship to large-scale climate indices. Journal of Hydrology, 482, 105-118. doi: 10.1016/j.jhydrol.2012.12.038 (Jean-Philippe Vidal, Irstea)	Noted
896	60437	23	65	32	0	0	Journal name should be Ecohealth. (David Parker, Met Office Hadley Centre)	noted
897	74647	23	68	20	68	20	The reference information insufficient to locate document (UNITED STATES OF AMERICA)	noted
898	62008	23	69	34	69	36	Some typos in the author names, title and publication year. The complete reference is: - Paiva, R., Collischonn, W., Schnetterling, E. B., Vidal, J.-P., Hendrickx, F., and Lopez, A. (2010) The Case Studies. Chapter 6 in Modelling the impact of climate change on water resources [Fung, F.; Lopez, A. & New, M. (ed.)], Wiley-Blackwell, Chichester, UK. pp. 203 (Jean-Philippe Vidal, Irstea)	This will be improved by editing.
899	62009	23	78	35	78	36	First name initials are incomplete. The complete reference is: - Vidal, J.-P. and Wade, S. D. (2009) A multimodel assessment of future climatological droughts in the United Kingdom. International Journal of Climatology, 29(14), 2056-2071. doi: 10.1002/joc.1843 (Jean-Philippe Vidal, Irstea)	Noted
900	70555	23	80	14	80	14	first name is given instead of surname in the reference. The reference should be: Wong, W.K., Beldring, S., Engen-Skaugen, T., Haddeland, I. and Hisdal, H. (2011) Climate Change effects on spatiotemporal patterns of hydroclimatological summer droughts in Norway. J. Hydrometeor., 12, 1205-1220, doi: 10.1175/2011JHM1357.1 (Hege Hisdal, Norwegian Water Resources and Energy Directorate)	Noted
901	59701	23	81	0	0	0	Tabl23-1: In the legend, the symbol is *, whereas in the Table itself, it is x (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	Thanks. This will be amended.
902	60374	23	81	0	0	0	Table 23-1: Please provide information what the figure in parenthesis behind the climate parameters in column 2 refer to. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	The numbers refer to the defined climate indices at the webpage http://etccdi.pacificclimate.org/list_27_indices.shtml , we have deleted them now, because it seems to be confusing.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
903	74648	23	81	0	0	0	Table 23-1: Please define the numbers in parenthesis in the column "Climate Parameters". Note that symbols used (x) in the table differ from the ones in the caption (*) and in the narrative. How is the growing season length defined? It is surprising to see the growing season length decrease in the Southern region of Europe in future projections. Is it the case that the temperatures are outside of the range acceptable for growth? If so, being that range dependent on the specie itself, how is that generalized in this table? Please clarify. (UNITED STATES OF AMERICA)	The growing season length is increasing in southern Europe in all scenarios. Sorry, there must be a misunderstanding. The numbers in the parenthesis refer to the defined climate indices at the webpage http://etccdi.pacificclimate.org/list_27_indices.shtml , we deleted them now, because it seems to be confusing. The table is moved to the supplementary material and we added the definition of indices there.
904	76763	23	81	0	0	0	in rows 3 ("frost days") and 8 ("cold spell duration index") maximum values are lower than minimum ones. In column Atlantic, second row by bottom, I suppose "-11" is a typo for "11". Finally, I think that indices cannot be simply referenced as in the note, but should be summarized. (Claudio Cassardo, University of Torino)	The Min and Max are related to minimum change and maximum change that means that minus 11 could be the maximum change (more than plus 2). The table is now moved to the supplementary material and for better understanding we changed the rows min and max to upper and lower bound. For more explanation see supplementary material.
905	83476	23	81	0	0	0	Table 23-1. Within the caption, it would be helpful also to clarify what the min and max within the "measure" column represent--the minimum and maximum projection within the ensemble? Additionally, all usages of "likely" should be italicized. Also, within the "climate parameters" entries, it would be helpful to clarify what the parenthetical numbers represent. Finally, for the index definition, is it possible to specify relevant publications as well in which the index is used or defined? (Katharine Mach, IPCC WGII TSU)	The Min and Max are related to minimum change and maximum change. In the new table, now in the supplementary material, we changed it for better understanding. The parenthetical numbers refer to the number of indices at the webpage. We added now the references: Karl, T.R., N. Nicholls, and A. Ghazi, 1999: CLIVAR/GCOS/WMO workshop on indices and indicators for climate extremes: Workshop summary. Climatic Change, 42, 3-7. Peterson, T.C., and Co-authors: Report on the Activities of the Working Group on Climate Change Detection and Related Rapporteurs 1998-2001. WMO, Rep. WCDMP-47, WMO-TD 1071, Geneve, Switzerland, 143pp.
906	63783	23	81	0	85	0	Tables 23-1 A/B; 23-2; 23-4: Order of columns should be the same for all tables. (GERMANY)	ok
907	70191	23	82	0	0	0	Table 32-1. Short explanation of the variables listed in this Table may be needed. Otherwise, terms as 'summer days' and 'tropical nights' may be confusing, and may denote subjective perceptions (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Thank you. The table is now moved to the supplementary material and we will add the definitions of the indices there.
908	76764	23	82	0	0	0	same as in previous page: maximum values are lower than minimum ones. (Claudio Cassardo, University of Torino)	The Min and Max are related to minimum change and maximum change that means that minus 11 could be the maximum change (more than plus 2). The table is now moved to the supplementary Material and for better understanding we changed the rows min and max to upper and lower bound. For more explanation see Supplementary Material.
909	61641	23	82	1	0	0	RCP2.6 is very important for 2 C target, so results from this scenario should also be presented here. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thanks, for RCP2.6 there are not enough high resolved simulations available. In WG1 Annex1 SM2.6 there are results from global simulation with RCP2.6 presented.
910	59702	23	83	0	0	0	Tabl23-2: Empty cells should be described what they correspond to: No change? No forecast? (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The table has been revised.
911	60438	23	83	0	0	0	Table 23-2. Pests rather than pest control are expected to decrease in the Southern sub-region and increase in the Continental, Northern and Alpine regions (Table 23-4). The alpine skiing season will stay the same or decrease (Table 23-4). (David Parker, Met Office Hadley Centre)	Agreed. The table has been updated.
912	70216	23	83	0	0	0	Table 23.2 caption or content contains no bibliographical reference (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The table is based on the evidence in the chapter - and the references are listed within the main text. There are too many to include in the table. We have improved the legend.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
913	74649	23	83	0	0	0	Table 23-2: The table appears to try to convey the same sort of trend information that is in Table23-4. Both tables should use the same indicators, either words or arrows. Put both tables in the same column order. (UNITED STATES OF AMERICA)	The table has been revised with indicators that indicate the evidence based. The ecosystem services table has been kept separate from the impacts table.
914	74650	23	83	0	0	0	Table 23-2: What is certainly of assessment entries? (UNITED STATES OF AMERICA)	This has been addressed in revised table which addresses number of papers but it was not possible to assess fully the uncertainties associated with individual studies.
915	76765	23	83	0	0	0	an empty cell means statistically not significant, or no change? (Claudio Cassardo, University of Torino)	Empty cells will be used to indicate a lack of published evidence for that topic/subregion.
916	83477	23	83	0	0	0	Table 23-2. The timeframe for these impacts should be specified--are the trends for now through the end of the century? Also, wherever "increasing to decreasing" is described or "to" it would be helpful to clarify if a range of possible outcomes across models/scenarios is being indicated or if the direction of change is anticipated to change over time. (Katharine Mach, IPCC WGII TSU)	Time frame is specified (2050). Not possible to put in that level of detail
917	61642	23	83	1	0	0	1) It would be useful to have explanation on sources (and also confidence, uncertainty...)for building this table. 2) Why biodiversity is a cultural service? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been addressed in the revised table. Biodiversity can be seen as either a service or stock from which services flow-as discussed in the text.
918	63784	23	84	0	0	0	Table 23.3, column "Cost estimate", rows 5, 6 and 8: Are these costs per year? (GERMANY)	Time period is specified for all estimates
919	79070	23	84	0	0	0	Table 23 - 3: Please replace "population" with "region". (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	Agreed. This has been amended.
920	83478	23	84	0	0	0	Table 23-3. For these estimates, it would be preferable to specify as appropriate the relevant climate/socio-economic scenarios in addition to the relevant time frame. For the final example, it would be helpful to specify further what is meant by "future climatic conditions similar to those of 2003"--in terms of the observed heat wave that year? (Katharine Mach, IPCC WGII TSU)	Timeframe is indicated on one of the columns. Only adaptation costs are included in the final version
921	59703	23	85	0	0	0	Tabl23-4: The last column should have a description on top; add Section (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This has been amended.
922	61643	23	85	0	0	0	Table 23-4: The downward pointing arrow in the cell "Wind energy production / Southern" should be "red" rather than "green". (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected.
923	63785	23	85	0	0	0	Table 23-4: Load factor of inland ships up to 2050. Different results are mentioned e.g. in the reference given in comment on chapter 23; page 14; line 43-46 or in: Holtmann B., Scholten, A., Baumhauer, R., Rothstein, B., Gründer, D., Renner, V., Nilson, E. (2012): Analyses of the Impact of Climate Change on Inland Waterway Transport and Industry on the Rhine. Weißensee Verlag, Bonn. 60-65. Available online: http://www.bmvbs.de/cae/servlet/contentblob/100384/publicationFile/69428/kliwas-second-status-conference.pdf (GERMANY)	Comment is not clear. Load factor not specified.
924	74651	23	85	0	0	0	Table 23-4: The decision to use color coding will mean that any reader seeing this in black and white print will not be able to discern whether it is a green or red or black arrow. (UNITED STATES OF AMERICA)	Noted- will be discussed during final production stage.
925	74652	23	85	0	0	0	Table 23-4: The significance of the color on the arrows appears to be unclear. How can you have both positive and negative trends in arable production in the alpine zone? Perhaps this table should be removed, if no further clarifying information is available. (UNITED STATES OF AMERICA)	The legend regarding the arrows has been revised to make it clearer.
926	83479	23	85	0	0	0	Table 23-4. Following from my overall comments on "characterization of future risks" the chapter team may wish to consider characterizing the degree to which risks can be reduced through proactive adaptation. Additionally, in the caption on page 86, it could be clarified what is meant when more than one arrow is given within a box--for such cases, are a range of projected outcomes found across models, is there variability in the outcome dependent on aspects of context, does the direction of change shift over time, etc.? (Katharine Mach, IPCC WGII TSU)	As discussed in the legend, the risks are assessed assuming no adaptation.
927	84792	23	85	0	0	0	Table 23-4: Can anything more be said that just direction of change in some cases (e.g., relative magnitudes)? Is there a way to integrate information on the extent to which adaptation can reduce these impacts into this table? (Michael Mastrandrea, IPCC WGII TSU)	Not possible without making table too complicated.
928	76766	23	85	0	86	0	the format of the first column is wrong and part of words are superimposed!!! What is the use of the arrows in the middle of the page at page 86? (Claudio Cassardo, University of Torino)	This should have been fixed.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
929	61644	23	85	1	0	0	It is unclear that Table 23-4 provides a good synthesis of climate change impacts in Europe. Within Health and Social issues, Are the damage on cultural buildings or th loss of cultural landscapes the main concerns? What about poverty, inequalities, vulnerable groups and regions? Concerning environmental quality, what about the panoply of ecosystems goods and services, water availability, etc? Impacts to key economic sectors and infrastructure and assets are also missing (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This table synthesises the evidence in the chapter according to the structure of the chapter.
930	59704	23	86	0	0	0	Table 23-4. Overprinting of table. (Athanasios Loukas, Civil Engineering Department, University of Thessaly, Greece)	This has been corrected.
931	57436	23	87	0	0	0	Table 23.5: I propose to include in the row 2007/2008: In 2007 the hottest summer has been recorded since 1887 in Moldova that resulted in about 200 excess deaths in capital city Chisinau (Corobov et al, 2010; Corobov et al, 2012). (Ilya Trombitsky, Eco-TIRAS International Environmental Association of River Keepers)	We did not include this event because it was not included in the original paper.
932	59705	23	87	0	0	0	Tabl23-5: For 2003, there are no references for information of Production Systems etc. For 2007/2008, in the same column, among others it is written 'turned ... floods into a national catastrophe'. Since these years concern the regions of England and Wales and Southern Europe, we cannot know what national means here. In the third column for 2010, it is written since 150 (?), whereas in the fifth column it is written Crop yields (what happened to them?). Also, the Table and the cell content should be better formatted (for instance, there are periods in some cells, but not in others). (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	The table has been updated and all impacts are fully supported by references.
933	63786	23	87	0	0	0	Table 23-5: The impact of the 2003 heat wave (hot summer) in Europe is stated with approx 35,000 deaths. In Table TS.2, in the TS, page 88 in comparison there are stated 70,000 excess deaths for the same 2003 summer. These statements have to be coherent. (GERMANY)	35000 is the correct figure for the heat wave (August period).
934	74653	23	87	0	0	0	Table 23-5: What is "social distress" under agriculture? Is this supposed to be under the column "health and social welfare"? (UNITED STATES OF AMERICA)	The text has been revised to clarify the outcomes measured.
935	83480	23	87	0	0	0	Table 23-5. For the impacts described, is it possible to provide any information on the types of coping/adaptive responses observed and their effectiveness? (Katharine Mach, IPCC WGII TSU)	The objective of the table is to describe the impacts. Whether response have been put in place after the event is discussed in the text.
936	61645	23	87	1	0	0	Could also add March 2013 - coldest in UK for 50 years, has caused loss of many crops and livestock plus social distress in parts of the UK (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We did not include this event as outside the time period of the report.
937	59706	23	88	0	0	0	Table 23.6: Is there really no adaptation approach for forests other than introducing new species? (see 2nd and 3rd columns for forests) (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	There are limited options for adaptation in forestry.
938	61997	23	88	0	0	0	Table 23-6: Barredo et al., 2012 is cited by does not appear in the reference list (Paolo Ciavola, University of Ferrara)	This has been corrected.
939	79071	23	88	0	0	0	Table 23 - 6: Please check - if the solution is to use smaller vessels existing barges below the optimal size are no problem. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	The finding is based on current evidence
940	83481	23	88	0	0	0	Table 23-6. This table is not introduced in the text of the chapter, and thus its interpretation should be clarified. Also, while the caption asserts that limits to adaptation are characterized here, it seems that barrier/constraints are very much emphasized. The scope of the table should be clarified. (Katharine Mach, IPCC WGII TSU)	This has been corrected
941	61646	23	88	1	89	0	There are two tables with the same caption number. There is no reference in Chapter 23 in the table with the caption "Limits to adaptation measures in Europe". (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This has been corrected.
942	59707	23	89	0	0	0	Tabl23-6: 2nd column, for Atopic disease: Please remove s from pollens; it should be pollen. Also, the citation Ariano et al. 2010 does not exist in References (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	This item was deleted from the table.
943	66327	23	89	0	0	0	Table 23-6: How about farmer responses in sowing of spring crops? See: Kaukoranta T, Hakala K (2008) Impact of spring warming on sowing times of cereal, potato and sugar beet in Finland. Agricultural and Food Science 17:165-176. (Timothy Carter, Finnish Environment Institute)	The table has been updated.
944	69740	23	89	0	0	0	"Tree spices" should be: "Tree species" (NETHERLANDS)	This has been corrected.
945	79072	23	89	0	0	0	Table should be 23 - 7 and "tree spices" are meant to be "tree species", I suppose. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	This has been corrected.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
946	83482	23	89	0	0	0	Table 23-6. All calibrated uncertainty language within the table should be italicized. (Katharine Mach, IPCC WGII TSU)	The table has been revised.
947	70219	23	90	0	0	0	Table 23.6. No level of confidence in detection is given. (JORDI CORTINA, UNIVERSITY OF ALICANTE)	The table has been revised.
948	59710	23	91	0	0	0	Figure 23-1 the coastline should be visible for all countries within the frame of the map for orientation purposes The projection of the map is probably wrong distorting northern countries. Lambert projection is typically used for Europe (23.6 is probably Lambert) (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	The map has been updated according to IPCC style.
949	60375	23	91	0	0	0	Figure 23-1: Please add political boundaries to the map, so as to better distinguish the different regions. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	The map has been updated according to IPCC style.
950	64718	23	91	0	0	0	Fig 23.1: is it really useful to use that a fine separation of regions? Alpine regions can be found in the north, east and so one? Are trends in those regions really comparable? (Frank Kreienkamp, Climate & Environment Consulting Potsdam GmbH)	Within the main text, the Alpine regions are aggregated. However, we recognise that they are difference between them, and different alpine regions are assessed with respect to climate extremes in the supplemental material (Table 23SM-2)
951	74654	23	91	0	0	0	Figure 23-1: It is not very easy to differentiate the patterns in the legend. Readability of the image could be improved by adopting more contrast between the patterns used. (UNITED STATES OF AMERICA)	This figure has been redrawn.
952	83483	23	91	0	0	0	Figure 23-1. It could be very helpful to also show country borders on this map. (Katharine Mach, IPCC WGII TSU)	This figure has been redrawn.
953	59711	23	92	0	0	0	Figure 23.2. Marginally readable. Areas seem distorted. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Thank you. We have changed the layout for better visibility.
954	60376	23	92	0	0	0	Figure 23-2: This comment applies to this figure, but also Fig 23-3, 23-4. The hatched areas between robustness and significance are difficult to discern. I suggest to not include white colour in the colour scheme, and put colours only there where changes are robust between models. The regions where statistical significance is reached can then be hatched. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	Thank you. We have changed the layout for better visibility.
955	61647	23	92	0	0	0	Figure 23-2: The two panels A and B present multi-model ensemble projections for two similar emission scenarios. One would assume that these two projections are rather similar, but this is not the case. Please double-check the correctness of panel B. If that panel was indeed correct, a clear explanation is needed why the projections from the EURO-CORDEX experiment no longer project an increase in heat waves. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The Figure is correct. Please notice that A1B is now moved to the supplement. Only RCPs are displayed in the chapter. The temperature change in A1B scenario is much stronger than in RCP4.5 scenario. Due to the threshold dependence of the index definition such a big difference appears. Please have a look at Jacob et al 2013, Figure 1b, f.
956	70192	23	92	0	0	0	Fig. 23-2. Do not use the term 'unfortunately' in the caption, as it denotes subjectivity (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Thank you. We have changed the text.
957	81448	23	92	0	100	0	Figures: The hashing makes the maps look fuzzy and hard to understand the details of the map. Use lighter hashing or increase the contrast between hashing color and background color. (Yuka Estrada, IPCC WGII TSU)	Thank you. We have changed the layout for better visibility.
958	85233	23	92	30	93	30	Where is the information on the number of cold waves. They are far more significant (Vincent Gray, Climate Consultant)	Information about number of cold waves is in Table 23-1 (moved to supplementary material) , unfortunately there is not enough space for more figures
959	59712	23	93	0	0	0	Figure 23.3. Marginally readable. Areas seem distorted. Bad maps. (Dimitris Stathakis, Urban and Regional Planning, University of Thessaly, Greece) (GREECE)	Thank you. We have changed the layout for better visibility.
960	74655	23	93	0	0	0	Figure 23-2B: This figure is very faint and difficult to follow details. (UNITED STATES OF AMERICA)	Thank you. We have changed the layout for better visibility.
961	59708	23	94	0	0	0	Fig23-3: There should be written somewhere that DJF corresponds to December, January, February, MAM to... (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	We changed the text.
962	70193	23	94	0	0	0	Fig. 23-2. Do not use the term 'unfortunately' in the caption, as it denotes subjectivity (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Agreed.
963	74656	23	94	0	0	0	Figure 23-3: Both A and B (page 95) are too faint to read with clarity. The robustness and significance hatching doesn't have enough contrast against the dark green background. A lighter color background and more emphasis on the hatching might ameliorate this. (UNITED STATES OF AMERICA)	Thank you. We have changed the layout for better visibility.
964	83484	23	94	0	0	0	Figure 23-3. It is hard to see the color underneath the hatching. Alternative visualizations should be considered to enhance clarity. (Katharine Mach, IPCC WGII TSU)	Thank you. We have changed the layout for better visibility.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
965	79073	23	94	0	95	0	Figure 23 - 3: Please reconsider the choice of colours for the class "30 - 40" and the hatchings (and width of hatching). This is hardly distinguishable. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	Thank you. We have changed the layout for better visibility.
966	61648	23	94	1	95	0	Hatched areas are very difficult to see, and distinguishing areas which have either robust changes or significant changes only is impossible. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thank you. We have changed the layout for better visibility.
967	70194	23	96	0	0	0	Fig. 23-2. Do not use the term 'unfortunately' in the caption, as it denotes subjectivity (JORDI CORTINA, UNIVERSITY OF ALICANTE)	Agreed. This will be amended.
968	59709	23	96	0	97	0	Fig23-4: In the legend, it is written that 'For the eastern part of Turkey, unfortunately no regional climate model projections are available. Although this is seen in Fig (A), it is not in (B), where projections cover all Turkey [please check also the dot in eastern Turkey, in Fig. 23-2 (B)] (Despoina Vokou, Department of Ecology, School of Biology, Aristotle University of Thessaloniki, Greece) (GREECE)	We deleted "unfortunately". Note that Figure A (A1B) is moved to the supplement. Figure B is covering more of Turkey but not the eastern parts of Black sea, Eastern Anatolia and southeast Anatolia. The dot you mentioned is a lake which is mask (like all water surfaces).
969	60377	23	98	0	0	0	Do the acronyms A2/B2 refer to SRES scenarios? Also give more information on the scenarios considered. (Andrew Ferrone, Public Research Centre - Gabriel Lippmann)	Figure has been redrawn and legend clarified.
970	74657	23	98	0	0	0	Figure 23-5: The y-axis labels is written over the tick-marks for the y-axis such that both are illegible. (UNITED STATES OF AMERICA)	Fixed.
971	74658	23	98	0	0	0	Figure 23-5: User a graduated color bar for the 5 climate scenarios, from light emissions to heavier so that the eye can attend to the detail. (UNITED STATES OF AMERICA)	Figure may be redrawn by TSU
972	79074	23	98	0	0	0	Figure 23 - 5: If climate and economy are from the same scenario, please unify the names. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	The figure can be updated by the TSU at final production.
973	83485	23	98	0	0	0	Figure 23-5. The identity of the gray bars should be specified. (Katharine Mach, IPCC WGII TSU)	Figure may be redrawn by TSU
974	74659	23	100	0	0	0	Figure 23-7: Please present the change in forest fire risk between the baseline and the scenario 2011-2040, as presented for the 2041-2070. The patterns (legend) for very high and very low are indistinguishable in gray scale. (UNITED STATES OF AMERICA)	1) This difference graph for 2011-2040 is not available from the published study; 2) Space is limited; 3) effects and limited.
975	74660	23	101	0	0	0	Figure 23-8: Put the slide bars in a visually-comprehensive order so that the eye can attend to the information presented, i.e. on top win-lose-win the order would be forest conservation, afforestation, biofuels, low-tillcultivation, etc and on the win-win-win Green rooftops, ex situ conservation, urban tree planting, species translocatino, etc. (UNITED STATES OF AMERICA)	The legend for this figure has been revised and expanded. We have not altered the figure as it is published.
976	74661	23	101	0	0	0	Figure 23-8: The caption needs to provide more information about the interpretation of Win-Lose-Win, etc. (UNITED STATES OF AMERICA)	The legend for this figure has been revised and expanded
977	76767	23	101	0	0	0	this figure is not at all clear to me... what is the variable on the y axis? (Claudio Cassardo, University of Torino)	The legend for this figure has been revised and expanded
978	79075	23	101	0	0	0	Figure 23 - 8: Please explain IN THE HEADING what is the order of "win - ... - ...". This must be given with the figure (not in the text) and it is not intuitive. (Joachim Rock, Johann Heinrich von Thuenen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries)	The legend for this figure has been revised and expanded
979	81449	23	101	0	0	0	Figure 23-8: The author team should further develop the caption of this figure to provide a guide for the reader in interpreting the concepts illustrated. In particular, please explain how the concepts win-lose-lose etc are organized, and the purpose of the lines emanating from each of the boxes. (Yuka Estrada, IPCC WGII TSU)	The legend for this figure has been revised and expanded
980	83486	23	101	0	0	0	Figure 23-8. Within the caption for this figure, the "win/lose-win/lose-win/lose" ordering should be clarified as representing "mitigation-adaptation-biodiversity." (Katharine Mach, IPCC WGII TSU)	The legend for this figure has been revised and expanded
981	84793	23	101	0	0	0	Figure 23-8: Please specify the ordering of the win/lose dimensions, as this can be confusing. (Michael Mastrandrea, IPCC WGII TSU)	The legend for this figure has been revised and expanded
982	61649	23	101	1	0	0	Figure caption should state what order the results on adaptation, mitigation and biodiversity are. Does win-lose-win mean you win on adaptation and biodiveristy but lose out on mitigation? Why is there no lose-lose-lose space on this figure? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The legend for this figure has been revised and expanded