IPCC WGII
Fourth Assessment Report
Climate Change Impacts, Adaptation and Vulnerability

Government and Expert Review of Second Order Draft

Specific Comments

EXPERT REVIEW COMMENTS

Chapter 2

August 2006

Organization of the review comments file

Comments are organized as follows:

(a) First are the comments from the Co-Chairs and TSU. These:
  (i) track the development of the ZOD and FOD, and your responses to review comments on each of these drafts, and then
  (ii) present comments on the Second-Order Draft

(b) Second are the comments from the Expert Reviewers, organized in the same format as your FOD comments file.

Discussion of expert review comments and record keeping

IT IS RECOMMENDED THAT:

- AUTHORS BEGIN WORK ON THE COMMENTS IMMEDIATELY. SUBSTANTIVE COMMENTS NEED TO BE SEPARATED FROM NON-SUBSTANTIVE, AND THE TWO SHOULD BE TREATED DIFFERENTLY
- CONTACT IS MADE BETWEEN AUTHORS AND THEIR REVIEW EDITORS IN AUGUST

Substantive comments

- The chapter writing team should discuss all substantive expert review comments, by email and/or at Cape Town.
- Substantive comments require full and proper consideration. The *Principles Governing IPCC Work* state that:
  - genuine controversies should be reflected adequately in the text of the Report and
  - it is the role of the Review Editors to advise the lead authors on how to handle contentious/controversial issues
- You must record the outcome of these discussions in this document, under the column 'Notes of the Writing Team'.

Non-substantive comments

- For non-substantive comments, a very brief entry should be made in the column 'Notes of the Writing Team'. The following terms are acceptable:
  - Addressed
  - Not applicable
  - Text removed
  - A tick to denote a comment has been addressed (somewhere on the document this should be stated)

General

- The record should be kept in this document, ideally electronically.
- The document becomes part of the traceable account of the Working Group II Fourth Assessment. When completed to the satisfaction of the Review Editors, a copy should be returned to the TSU by the **8th December 2006**.

Chapter 2

Comments from the Co-Chairs/TSU are laid out as follows: first we comment on whether the SOD addresses the comments we made on the ZOD; second we comment on whether the SOD addresses the comments we made on the FOD; our concluding comments on the Second-Order Draft are at the end

	Chapter 2 ZOD comments by Co-Chairs and TSU	Has this been addressed in the SOD?	Author responses:
2.Z1	This a dense and detailed draft, the result of commitment by the authors. In parts it seems too dense and detailed for its audience (NB. which is not solely, or even mainly, the research community. The intended audience is first: government). It needs to be understandable to the non-specialist reader. Avoid acronyms, if at all possible. It seems that this chapter would benefit from a summary table or matrix near the beginning of what is to come in the chapter to help readers navigate around the complex and detailed text	The SOD is well written - easy and straight-forward to read. No summary table at the beginning of the SOD	Perhaps, but others have a different opinion, so revisions are necessary. We have decided not to include a Table, as we feel that a sufficient overview of the chapter can be obtained from the list of contents
2.Z2	We suggest the team considers two key questions: a) what have been the advances in method that significantly affect the veracity / robustness of the AR4 impact assessment as compared with the TAR? b) what are the projected future changes in climate upon which the AR4 assessment is based?	The SOD highlights where advances have reduced for example, uncertainties with respect to greater model agreement etc This has been addressed in the SOD	We have improved the information on advances and have indicated how uncertainties have been affected by these. We have refined the information according to the latest WG I information
2.Z3	Given limitations of space we suggest you focus on these and condense other detail or refer readers to it offline. In following this advice we feel there could be: a) more in Part 2 about the resultant impact assessments and their robustness; b) less in Part 2 about methods of scenario development and more on the projected futures	a) This has been done in the SOD b) projected futures focussed in section 3	No further action required
2.Z4	Length is a problem: You need to reduce the current text length by 22 pages (see Doc 3 of Blue Book for this calculation).	Still overlength	We have reduced the length to the target.
2.Z5	We suggest that at the beginning you summarise the state of knowledge on method/ scenarios in the TAR, and define your subject matter; but do it in 2 pages. NB. definitions will be in the glossary at the end of the volume so the reader can simply be referred to that.	Done in 2.6 pages	We have revised this introductory information, shortening and avoiding repetition within the text and with information other chapters and the glossary
2.Z6	The chapter is currently a game of two halves - the first aLMost exclusively on methods and the second aLMost exclusively on characterization. The authors need to work to draw some links and give the chapter a more coherent	Greater integration. Scenarios covered in section 2	No further action required

	structure.		
2.Z7	There are connections that could be made and are important: e.g. the extensive methods material on SRES in part 3 might be better in part 2, but very much reduced in length (after all, it is a method); and the projected climate and socio-economic futures under SRES be in part 3. Incidentally the omission of SRES impact estimates from part 2 is curious. We would have thought that the new impact assessments for SRES futures have potentially transformed our understanding of estimates previously based on only (e.g.) 1% forcing. They show how very widely the impacts vary between SRES futures, not because of different emissions but because of differences in population / income (vulnerability). The SRES work could be said to have reduced confidence in our previous estimates.	Scenarios covered in detail in section 2 Now inclusion of SRES impacts in section 2 but no specifics i.e., range across SRES of e.g., # at risk from hunger/flooding/water stress. Just statement that the assumptions have a greater effect on impacts than climate change	No further action required We have improved the referencing to examples found in other chapters – there is no space to include detailed examples in the chapter
2.Z8	Where is the discussion of the new impact estimates for stabilisation scenarios?	Still absent	A section on this was omitted by mistake from the SOD and has been reinstated, revised and shortened
2.Z9	Is it not the case that the major advance has been the combination of new methods and new scenarios, especially new estimates for impacts under SRES and stabilisation. This deserves space of it own	Stabilization impacts not covered. The combination of new methods and new scenarios isn't spelt out to the reader as a major advance	We have included discussion of the combination of new methods and scenarios covering these issues. They are also emphasised in the Executive Summary.
2.Z10	What of the new coupled impacts models and GCMs just now reporting results (e.g. the Hadley coupled model). [= Tim Wheeler, Richard Betts et al.]	GCMs mentioned on p35 but states were not available for inclusion in AR4 impacts but are described in WG1	This information is mentioned briefly in the context of how new projections differ from pre-TAR projections assumed in this volume, but reference is made to WG I where there is a full discussion.
2.Z11	Regarding part 3: Figure A1 is the key message from part 3, in portraying the climate futures for the reader, and we suggest it be at the front of part 3, not at the back; then describe how depiction of this future is generated (but note that most readers are not interested in methods of scenario development and can be referred to this offline).	Figure A1 no longer in SOD	Figure A1 was replaced in the SOD by a much more detailed figure summarising pre-TAR regional AOGCM projections and contrasting these to comparable AR4 projections. This Figure has been retained but slightly simplified.
2.Z12	Can map(s) showing (at least one example of) geographical patterns of projected future change be given.	Not given for T or PPT but Figure 2.8 shows change in cropland area for 4 scenarios	There is too little space to include a map, but we have referenced WG I where there are numerous examples.
2.Z13	Can the same be shown for stabilisation futures?	Not shown	There is no space for including such a map, and in any case the argument for including such a map is weak, since the pattern of climate change is very similar to that for unmitigated climate change.
2.Z14	Can SL scenarios be included here rather than in coasts chapter, please?	SL (SRES-based) scenarios are discussed in 2.2.2.7 p17 and 2.3.1.3 p40	We have liaised with the coastal chapter (6) and Nicholls has contributed some new

			material and is now listed as a CA
2.Z15	Can sections be provided on a) THC and b) extreme SL scenarios due to WAI collapse, etc.	Now included in 2.2.2.12 p22	No further action needed
2.Z16	There's quite a lot of overlap between Chapters 19 and 2, in that both discuss thresholds. Maybe they could get together to divide responsibilities and save space.		Most reference to thresholds in Chapter 19 have been removed save to define that denoting a key vulnerability – we give a brief but more complete summary
2.Z17	Throughout the Methods section (2.2) it would help to have many more examples. Currently this is very dense and theoretical	Still short on real-world examples. Would benefit if these were added	We have attempted to provide examples where these enhance the message, but space is a major constraint
2.Z18	There is surprisingly little material there from the US on impacts - there must be more than this. For example, the US National Assessment has a useful section on uncertainty which could be discussed here	US National Assessment is included in the SOD. In addition there are a couple of US related examples of impacts. There are few real-world examples of impacts and the chapter could benefit from being more illustrative.	There are now more US examples, based on helpful suggestions from reviewers.
2.Z19	There are some large gaps in the consideration of extremes/surprises etc. For example, there is nothing on accelerated warming (methane hydrates). There is nothing on the developing literature using extreme value analyses (PRUDENCE project, David Stephenson, Brabson et al papers)	EVA and methane hydrates not discussed in the SOD	Extreme value modelling is referred to in Section 2.4.6.1. Methane hydrates are not discussed because we know of no CCIAV studies that have considered scenarios assuming their amplifying effects on warming.
2.Z20	Altogether, the Methods section relies heavily on GCM runs from the TAR, with few updates. Plans for updating are suggested, and much of the material which is here will have to be discarded. The authors will likely need to report on the WGI Hawaii conference to report analyses based on the PCMDI runs. There is much still to be done on this aspect	p35 states the new generation of GCM runs were not available for inclusion in AR4 impacts assessment but are described in WG1. Section 2.3.1.2 does compare TAR to AR4 model projections for T and PPT. Section 2 does discuss results from the more recent GCMs e.g., section 2.2.12	No further action required, except for refinement of SOD information
2.Z21	Can you broaden your author base by using CAs more, e.g., in boxed examples of new impacts assessment that used new methods, etc. Your CA list is very short at present.	CAs increased from 1 → 9	No further action required
	Chapter 2 FOD comments by Co-Chairs and TSU	**Has this been addressed in the SOD?**	**Author responses:**
2.F1	Obviously, some work has gone into this draft but I think this chapter is not seeing the wood from the trees. The key issue is not what new methods and what new scenarios but what difference they have made to the assessment of impacts/adaptation/vulnerability; how far they have narrowed the range of uncertainty (or v.v.); how far they have altered our confidence, etc. The two main points that are asked of	The SOD has stated clearly throughout the chapter the advances that have been made and implications these have for impact assessment – but the latter could be made clearer throughout the body of the text (clear in conclusions and ES)	We have attempted to improve the substantiation of our headline conclusions about advances, by more illustrations (where there is space) and by detailed citations to material presented at length in other chapters

	the chapter: a) (not only) what new methods since TAR BUT how have these altered our ability to assess future impacts i.e "resulting uncertainties and confidence future levels" which is the title of the sub-section in the Plenary-approved outline. And b) (not only) what new methods in scenario development but WHAT ARE THE scenarios that characterise the impacts assessments that follow in this volume.		
2.F2	On the latter (above, i.e. scenarios): It is essential that the reader can refer here to a summary of the future climates that underpin the material covered in later chapters eg 1) regional temp and precip change under SRES (in the ZoD on p 60 you presented graphs of these, but these are not in the FoD; yet (not all but at least an intelligible summary of) the scenarios used by authors (that is, presented to them in the scenario material you developed for LA1 and 2) must be reported here. and 2) temp and CO2 levels in various stablisation scenarios; and 3) how these differ from IS92a or 1% forcing (because many of the assessed impacts in the volume are under this scenario. And there should be at least some global maps of projected T and P.	Regional, seasonal T and PPT changes are summarised in Fig 2.7 which shows AR4 and TAR model projections for A2 and ranges for the 4 SRES scenarios based on 7 pre-TAR GCMs Not shown in SOD No global maps of T and PPT projections	No further action required, except for refinement of the figure We have specified the stabilisation levels assumed by WG I based on pathways starting with B1 and A1B SRES scenarios We do not have space for such maps, but reference WG I which does.
2.F3	Of course, there is pressure for space, but remember that the readers need not have detail of the new methods that you give them (they can be referred to this); what they want to know is what current scenarios are being used, how they differ from previous (in the TAR) and what this means for the impacts/vulnerability/adaptation assessment that follow in subsequent chapters.	Comparison to TAR projections is covered on p36 What advances mean for impact assessment etc is highlighted in the ES and conclusions.	No further action required, except for refinement of the figure and sharpening of the messages in the text that are carried forward to the ES and conclusions
2.F4	And on the former (above) i.e. methods: Again, one gets lost in the detail. The main questions are: a) What new methods have been developed since TAR that have narrowed the range of uncertainty and give us greater confidence in the current assessment; where were the main uncertainties due to method in TAR; where has uncertainty reduced/confidence increased since TAR; and, the corollary, b) Where have advances in methods revealed greater uncertainty, that we did not realise before. For example, the introduction of socio-economic assumptions in the SRES has revealed aLMost order of magnitude differences in impacts between (for example) A2 and B2, which did not exist in TAR, where a single value often characterised impacts under IS92a with single best-estimate	These issues are most clearly stated in the conclusions	A short section on uncertainty has been added (section 2.2.7). This qualifies the assertion in b). What has happened is that uncertainty has shifted from being known towards being quantified. There is also a paragraph on uncertainty in section 2.5.

	technology/population etc.		
2.F5	Length: This is the same as in ZoD, although a cut of one third was requested at LA2. A cut of AT LEAST ONE THIRD is still needed.	SOD still over length but much closer to target	We have achieved the target length
2.F6	Since the page length limits have to be met, under any circumstances, it is necessary to cut much of the detail, and use sources to guide the reader elsewhere to the detail. I would also argue strongly that you must make more room to guide the reader on a) The IMPLICATIONS FOR THE ASSESSMENT of the new methods and b) DESCRIBING AND REPORTING the new scenarios that underpin the assessments in the chapters that follow.		We have endeavoured to do this.
2.F7	Contributing Authors: There are few of these at present	Now 9	We are satisfied with this number
2.F8	Author list: should have nationality in brackets alongside names	It does	No further action required
2.F9	Executive Summary: This currently fails to signal the major advances that have or have not been made. Can you find lead sentences (those in italics) that deliver the main messages: eg a) there have been major improvements in…b) little advance has been made regarding....c) new socio-economic scenarios have enabled... (NB there were some just emerging in TAR, now we have masses of them) d) for the first time scenarios of mitigation (particularly of stabilisation) are available, thus enabling assessment of damage avoidance under varying policies of emissions reduction (NB there was not a single such assessment available in TAR)	ES is now much more focussed, following the advice/suggestions made.	The ES has been shortened to meet the one-page target desired by the TSU
	Chapter 2 SOD comments by Co-Chairs and TSU		**Author responses:**
2.S1	**LENGTH:**	Actual = 45, target = 40 (12% over)	We have achieved the target length
2.S2	**ARE PAO HEADINGS PRESENT?**	Roughly. PAO has 'New developments in methods' with one sub-heading. This has been changed to 'Developments in methods' with 4 sub sections. 'Characterising the future:….' With 5 suggested sub-headings is 'Characterising the future in this assessment' with 2 sub headings	The structure has been altered to reflect reviewer comments. All of the topics included in the Plenary Agreed Outline are covered, though headings are somewhat different
2.S3	**HAVE MOST GENERAL COMMENTS OF ERs FROM ZOD AND FOD BEEN COVERED?**	Yes. There are a couple that haven't. 1) natural variability and its importance hasn't been addressed and 2) a suggestion was made to tabulate the sources of uncertainty and the relative	. Natural variability is mentioned in several sections relating to climate scenarios (Box 2.3, Fig 1), to coping ranges (section 2.2.3) and to sensitivity analysis (section 2.4.3).

		importance at different times and places. This hasn't been followed through and it would be a useful table to have	We have not been able to draw up a substantial review/table on uncertainty because uncertainties span WG I, II and III (so perhaps are more suitable for synthesis) and because of complex interactions between the scientific aim of reducing uncertainty and assessment aims of managing uncertainty.
2.S4	**ARE REFERENCES BROADLY COMPLETE?**	yes	Yes, we have checked all of these.
2.S5	**IS THERE LINE-OF-SIGHT TEXT ➔ ES AND TEXT+ES ➔ TS+SPM?**	Yes	Yes, we have included these cross-references
2.S6	Well written chapter, well structured and easy to follow – some minor editing required – these are highlighted in the Excel spreadsheet		No further action on substance is required, but actions are needed on content
2.S7	Would benefit from the inclusion of more illustrative examples		We have enhanced our cross-referencing to examples in chapters
2.S8	Figure 2.7 contains a lot of information but is very complex – readers may not take the time to decipher its message. Projected changes in T and PPT might be better plotted on global maps		We have removed some detail from the figures, but have retained them. We have not included maps due to space constraints
2.S9	Although covered in the conclusions chapter 2 could more clearly state in the body of the chapter how these advances have improved/complicated impact assessments.		We have clarified the importance of advances in methods within the body of the chapter
2.S10	**<u>In summary, the authors need to:</u>** • Include more on Stabilization/mitigation scenarios : summarise what new ones have been made since TAR • More illustrative, real-world examples would be very useful • Uncertainty sources, and importance at different times and places would be useful • T and Prec global change maps from WG1 would be a useful inclusion (eg those in WG1 SPM) • Needs shortening by 5 pages		We have added new material Improved and better chapter citations There is improved discussion of this No maps due to space constraints We have achieved the required target length

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-1	A	0		0		BASF fully supports increased instruction of established science and technology at all grade levels. Climate science, specifically the topic of anthropogenic climate change, is still the subject of much debate, therefore, BASF only supports further instruction in established science (James Bero, BASF)	No action required
E-2-2	A	0		0		This chapter is looking very good now. Much more concise and readable. The authors have obviously worked hard and I congratulate them on a good job. (Richard Betts, Met Office Hadley Centre)	No action required
E-2-3	A	0				Though it is clearly stated, it would be important to strongly highlight the uncertainty in the chain of methods to characterize the future, from the definition of scenarios themselves, the global projections, the regional projections to the very end concernig the uncertainty in impacts. (Silvina SoLMan, CONICET - UBA)	This was done in the TAR and we don't have room to repeat it. A short section on uncertainty has been added. We believe the emphasis should shift from the scientific concept of uncertainty towards managing it for decision-making..
E-2-4	A	0				The overall Chapter is concise and clear. (Silvina SoLMan, CONICET - UBA)	No action required
E-2-5	A	0				The chapter is improved from earlier drafts and reads very well. I have only a small number of comments to make. I still feel that it cound have covered better the use of visualisation / decision-testing tools (like Floodranger, developed at UCL London). These have been shown to be useful for creating understanding among stakeholders, both about climate risks and about the implications of their actions - e.g on adaptation. (Richenda Connell, acclimatise)	We have added new material to (briefly) illustrate various methods, including reference to visualisation tools in Section 2.3.4
E-2-6	A	0				The authors absolutely need to sort out what they mean by the word "approach", and how an "approach" is different from a "method". These terms have different meanings in different sections of the chapter (and sometimes even in the same section). In Section 2.1 (page 5, line 15) it says that a "hierarchy of a approaches, methods and results" will be used. This hierarchy is impossible to follow, primarily because it is not clear what is considered to be an "approach" versus what is considered to be a "method". (Julie Winkler, Michigan State Univeristy)	We have revisited our use of terminology and carefully checked through the entire text to ensure consistent usage throughout.
E-2-7	A	0				Quite a bit of wordsmithing is still needed. Particularly watch for the use of "this" or "these" as the subject of a sentence, as the noun that is being referred to was not always clear. Consistency of terminology is also a concern. (Julie Winkler, Michigan State Univeristy)	We have tightened up the use of vocabulary
E-2-8	A	0				Overall, this chapter is a vast improvement from the earlier version, and clearly explains the different techniques used for producing scenarios, and the new	No action required

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						techniques developed since the last assessment (Alan Robock, Rutgers University)	
E-2-9	A	0				I think this chapter would be more effective if it was limited to a discussion of climate assessment methods. The section (i.e., Section 2.3) on what the authors refer to on page 2, line 5 as the "main scenarios" seems very out of place and provides only a moderate amount of additional information beyond earlier sections (i.e., Section 2.2). Also, it is not clear why Figure 2.7 and Table 2.5 should be included in this chapter. Aren't the expected changes and the confidence in these changes the topics of the following chapters (or the topic of chapters in the WG I report)? (Julie Winkler, Michigan State Univeristy)	We are required to include discussion of the futures assumed in this WG II assessment, which in most cases pre-date the information contained in the current WG I report. This is why we are reporting a comparison of the WG II assumptions with WG I material.
E-2-10	A	0				I start this review by reiterating a recommendation that I made in my earlier reviews. That is, the authors need to rethink the organization of this chapter. I find the current organization awkward and feel that it detracts from the chapter's overall effectiveness. The table of contents on page 1 gives an early hint that there are some organizational difficulties. The length of the different subsections is very unbalanced ranging from just one (Section 2.1) and two (Section 2.4) pages to 28 (Section 2.2) pages. In fact, 60 percent of the chapter falls into Section 2.2. Digging deeper into the chapter, one finds that Section 2.2.2 has 14(!) subsections. Another hint that the organization needs work is that the authors are constantly referring to subsections either later or earlier in the chapter (below I indicate the places where these references are made). Obviously, this chapter contains valuable information, and I recommend that the authors think about how they can structure the chapter to make it easier for readers to comprehend and integrate this useful material. (Julie Winkler, Michigan State Univeristy)	The authors have restructured the headings to address some of the concerns of the reviewer. However, we are somewhat constrained in our actions, as the chapter also has to adhere to headings included in the IPCC Agreed Plenary Outline.
E-2-11	A	0				I am confused that no one contributor from Northern Eurasian states (former USSR and Mongolia) was invited to contribute to Chapters 1 and 2. The environmental changes there (in particular, in Siberia and Central Asia) are among the largest in the world, are overlapping with socioeconomic changes, and ... are not assessed by specialists from this region. I realise that this mishap is now impossible to fix but foresee gaps, biases, and low quality statements when the contributions of outsiders unfamiliar with the region are used as substitutes. Sorry to start with such negative comment but this is the case. (Pavel Groisman, University Corp. for Atmospheric Research)	We acknowledge the reviewer's concern, but are unable to alter the composition of the Lead Author team, which was agreed following the IPCC nomination process. However, we have discussed various issues with LAs from this region (for example, the representation of projected changes in climate in Box 2.8, Figure 1, and some of the findings of the Arctic Climate Impact Assessment).
E-2-12	A	0				General- This chapter provides a clear, accessible and useful compendium of	No further action required

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						methods. (Merylyn Hedger, Environment Agency)	
E-2-13	A	0				General comments: I think that the chapter has improved tremendously since the FOD and that there is a lot of very useful information here. Section 2.2 on Methods for Characterising the Future seems quite similar to Section 2.3 on Characterising the Future in this Assessment, thus maybe they could be placed together, followed by a section on data needs, then key conclusions and future directions. (Karen O'Brien, University of Oslo)	The suggestion to merge sections 2.2 and 2.3 has been taken up, by placing section 2.3 material in boxes.
E-2-14	A	0				General comment: This draft is much improved, exhibiting better coverage of the multifaceted developments in methods and scenario construction. (Elizabeth Malone, Joint Global Change Research Institute)	No further action
E-2-15	A	0				General comment 1: I think there are two main messages that should come out of this chapter for non-academic decision-makers: (1) that decision-making in the face of acknowledged uncertainty requires information regarding the risk (probability times consequences) and thus uncertainty does not mean do nothing, (2) that scenarios and their evaluation as to consequences informs choices as to policies that might lead to one or other scenario being realised. General comment 2: There is at least one example of a policy-related scenario that is very important since it comes from an evaluation of policy decided upon by six major emitting countries, those in the Asia Pacific Partnership on Clean Development and Climate (AP6). This scenario should be discussed and evaluated in neutral terms for where it fits amongst the SRES and stabilisation scenarios. It is evaluated in a report, "Technological Development and Economic Growth" by the Australian Bureau of Agricultural and Resource Economics (ABARE), see www.abareconomics.com. Figure 12 in that document provides an estimate of global emissions at 2050 arising from the AP6 proposals, with a reference case of 22 GT C-e in 2050, and a 23% reduction due to the AP6 policies (applied globally) to 17 GT C-e, which is approximately double the emissions in 2000. This is the only example I know of, where there is a specific projection of the result of agreed policies. I would have thought that some comment on where that fits in the range of other scenarios, and what it could mean for global warming and thresholds that might be exceeded, would be valuable. Any discussion would of course require great care to be policy-relevant but not policy-prescriptive. My estimate is that it is fairly close to the SRES A2 scenario, implying a global warming at 2100 of order 3dC. (Barrie Pittock, CSIRO retired)	We have tried to emphasise the importance of presenting information in terms of risk (expressed as probability times consequence, e.g. in new Figure 2.1) The point about scenarios should be implicit in the opening paragraph of the introduction as well as throughout the section on characterising the future (2.4). The scenarios in this report are strictly emissions mitigation scenarios and were not used for CCIAV assessment. They could be added as a general reference for mitigation scenarios, but otherwise are relevant to WG3, not to our chapter. No action taken.
E-2-16	A	0				Are the climate envelope/biodiversity loss models discussed somewhere else? At	Bioclimatic niche models are discussed here

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						least, they point to an important climate change impact. One set of scenarios not yet mentioned, but mybe relevant is the ALARM scenarios. Here is a brief description fyi: ALARM is an Integrated Project (IP) in the EU's 6th Framework Program. It tests methods to assess the loss of biodiversity, and one of the tools developed is a set of integrated scenarios. The modelling group is an interdisciplinary team with Tim Carter representing the climate component, Mark Rounsevell the land use and I the socio-economic part. Using the combination of storylines (narratives) and modelling exercises we integrate the SRES scenarios (A1FI, A2, B1) and a spatially explicit land use model disaggregated to the NUTS 3 level (based on the ATEAM models, recalculated) with an econometric input-output model developed in the EU-funded MOSUS project. The latter combines economic data with energy and material flows, and calculates domestic economic development, resource consumption, emissions and employment plus the trade in some forty categories of goods between most countries of the world. Although the models used are global ones, the focus of the analysis is one region, Europe, and how changes there affect the world (and vice versa). Economic development trends cannot be spatially disaggregated to a sub-national level based on the available data, but for their impacts we have developed rules to spatially differentiate population density, migration, income disparities and income development (based on Rounsevell et al 2006). The emission trajectories resulting from the econometric model are – at least in some scenarios – significantly lower than those assumed in the SRES scenarios; the economic and land use models (they are combined to use each others data) do not describe an A2 or a B1 world. Nonetheless we can use these SRES scenarios as descriptions of the climate changes, as the deviation of the emission paths will lead to changes in climate effects only beyond the scenario perspective: evolving input-output model cannot be usefully run for more than 20 years, so the time horizon is a simulation to 2020 with a projection of some parameters to 2050. The scenarios analysed cover a broad range of social, economic, political and geo-biosphere parameters. There are three core scenarios, in the IPCC terminology a policy driven one, a backcasting scenario (inverse projection) of regional mitigation, and a more or less resilience driven one. The results confirm the limited economic impacts of climate change in the observation period (like Nordhaus who finds the loss of 3 to 8 months of economic growth over a 50 to 100 years period). They furthermore show that even a radical mitigation policy in Europe will result in	and also in Chapter 4, which is cross-referenced. Unfortunately, the ALARM scenarios have not yet been published in a form that they can be cited (even as grey literature).

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						nothing more than a delay in global warming of a few years, if not other parts of the world follow suit. The conclusion for climate policy is that as the impacts e.g. on biodiversity, but also on the living conditions in the South are serious, action must be taken and Europe is well advised to be a frontrunner. However, international cooperation must make sure that other parts of the world follow suit, maybe like minded countries first, in the post-Kyoto phase. A second conclusion is that it is in vain to hope that due to cost reasons the market or the business sector would act on their own behalf; instead dedicated political decisions are needed to set the framework right for climate mitigation. Adaptation will happen rather easily in the business sector, as the speed of change in the economic system is so much higher than in the bio-geosphere that it can easily accommodate these changes of the environment. The situation is rather different for the three additional shock scenarios ("wild cards", hazard driven scenarios). They are artificial experiments, simulating in a model-supported semi-quantitative narrative three singular events with widespread consequences: one environmental (THC collapse), one economic (peak oil) and one societal shock (a pandemia). In IPCC terminology they can be characterised as implausible but based on an inherent logic (we prefer to call them possible, plausible, but improbable). For the THC collapse, since the warming was of limited economic effect, so is the interim cooling (if it materialises after 2050 – nowadays the shock would be significant, but this is not a plausible scenario). The quadrupling of the oil price fist sounds like a safe receipt for an economic disaster, and so it is (minus a fifth of the GDP) – for less than five years. Then the economic growth bounces back to the old level (or possibly even more), since due to international trade the money that has flown out of the importing countries comes back in form of product orders. As a result, the economic damage is limited, but since a high bill has to be paid for imports, the social impact is serious, resembling the wave of poverty resulting from the East Asian economic crisis a few years ago. What would be the most plausible policy response? For Europe, most probably a massive investment in biofuels (they can be on the market within a year, faster than most alternatives, and they provide fluid fuel). The expected result is a massive pressure on agricultural land, leading to significant losses of biodiversity. So what looked like an economic crisis turns out to be a social one, and the policies to mitigate it create an environmental disaster (even if they may reduce GHG emissions). For us, this example illustrates the need to further develop integrated social, environmental, economic and climate models (far beyond what we now have	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						at hands), as the impacts can shift from one domain to another, and any model not representing the different domains might lead to policy recommendations with dramatic but not recognised side effects. The pandemia is either an economic transformation with some sectors loosing and others winning, with an overall reduction of GDP below 10% and an early rebound, or leads to the total collapse of the economy. The latter would be the case if about 20% of the population would drop off the production process – some dead or in sick leave, but more of them trying to escape infection by avoiding to all events where many people meet (as observed in the bird flue epidemic in China). All simulation results are discussed against the background of the narratives, thus making it possible to accommodate even diverging simulation data (like the SRES scenarios in a non-SRES world). This provides a high degree of flexibility and enforces a consequently integrated assessment. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	
E-2-17	A	0				Also, I don't think it is possible to identify "the main scenarios" that are used in the following chapters. I just finished reviewing Chapter 14, and there were no obvious "main scenarios". In fact, the climate scenarios used in many (close to half?) of the references cited in Chapter 14 were based on FAR and SAR simulations rather than the SRES-based simulations from the TAR. Very little of the cited literature had utilized SRES-downscaled economic and/or population scenarios. (Julie Winkler, Michigan State Univeristy)	We have surveyed 17 core chapters in WG II and done a count of studies that employed SRES-based scenarios, earlier IPCC-based scenarios or other scenarios. Our findings are mixed, showing that SRES-based scenarios are used in a large number, though probably not the majority of studies cited. However, nearly all the climate projections referred to in WG I are SRES-driven, so these are still our reference scenarios for summarising impacts for WG II, even though the scenarios used in specific impact studies may not be SRES-based. WG II authors have been asked to relate their collective findings from studies employing a range of scenario to climate futures based on SRES. These findings are described briefly in a footnote to section 2.4.6.
E-2-18	A	2	1			Executive Summary. To me this appears to be too dully technical rather than pitched to policy-makers, and especially lacks an explicit discussion of the treatment of uncertainty, despite the prominent discussion of dealing with uncertainty via risk management and probabilities in the main text. I think it is necessary to tackle head on and explicitly the common argument that as uncertainties are so large, it is too early to act, and so just do more research. A	We have revised the ES to be more concise and to reflect the key messages. The role of scenarios is also clarified. However, we can only present and interpret what is in the literature; we must stop short of advocacy, whatever our personal beliefs.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						simple analogy is needed, like why we insure our house against fire, even though the chance of it burning down this year is small. Another point that should be made here is that the role of scenarios in CCIAV is not so much to predict the future, but to explore the consequences of alternative futures in order to inform choices about policy. (Barrie Pittock, CSIRO retired)	
E-2-19	A	2	4	2	6	I would drop this objective given the wide range of scenarios and methods used in the following chapters, with some of the cited literature using scenarios dating to FAR-era simulations. (Julie Winkler, Michigan State Univeristy)	We have revised this objective to refer to "some of" the scenarios and methods. However, this objective must be retained as it is in the Plenary Agreed Outline for the volume.
E-2-20	A	2	9			CCIAV was already written out in line 4. (Julie Winkler, Michigan State Univeristy)	This has now been omitted
E-2-21	A	2	12	2	14	Are the items in the series “methods” or are they “themes”? Also, “of” does not have to be repeated. (Julie Winkler, Michigan State Univeristy)	This has been revised to omit repeated "of".
E-2-22	A	2	16	2	21	While I definetely agree that "risk management is a useful framework for decision-making" I am not convienced that "there is an emerging recognition that risk management is a unifying framework for decision-making on climate change". Is there enough evidence in the literature to support this? i don't think so. What about other approaches such as robustness (see Lempert et al. 2005,2006), NUSAP (van der Sluijs et al., 2005), etc.? (Suraje Dessai, Tyndall Centre for Climate Change Research)	We have moderated the language regarding risk management and have also described the approaches suggested by the reviewer. However, many reviewers seem to agree that there has been a shift in emphasis towards these methods, and we think it needs to be reflected. NUSAP is quite clearly a method and while robustness is an approach, neither have been used in CCIAV assessments to my knowledge (although NUSAP for flood risk in the UK perhaps), whereas the growth of risk management is extremely rapid. That said, there are cases where these methods would be preferable to probabilistic methods but they do not preclude risk management.
E-2-23	A	2	16	2	21	Here risk management is the subject, but uncertainty does not even rate a mention. Too much is taken for granted. (Barrie Pittock, CSIRO retired)	We have enhanced the treatment of uncertainty throughout the text (e.g. sections 2.2.7 and 2.5).
E-2-24	A	2	31	2	37	This needs to address the misconception that if other stresses besides climate change are "more important", eg., population growth, this adds to the marginal	We have added something in the text (section 2.3) but there is too little space to treat this in

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						effect of climate change by increasing exposure and vulnerability. Different stresses are not necessarily in competition, they can synergistically add to the vulnerability and thus make the impact of climate change greater. (Barrie Pittock, CSIRO retired)	the ES.
E-2-25	A	2	31	2	33	Awkward sentence. (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-26	A	2	32			global scenarios of? Population, etc.? (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-27	A	2	36			Note that including an “in” before “adaptive” changes the meaning of this sentence compared to if it was left out. (Julie Winkler, Michigan State Univeristy)	It is intended to be there and we have added an "and" to reinforce this
E-2-28	A	2	39	2	46	Perhaps this paragraph should go before lines 31-37. (Julie Winkler, Michigan State Univeristy)	We have merged two paragraphs on scenarios, but we still think these should come after the earlier paragraph.
E-2-29	A	2	40		41	Page 2, line 40-41 (also p 41 l 16-20): (Joachim H. Spangenberg, Sustainable Europe Research Institute)	Cross reference to later comment
E-2-30	A	2	50			“process knowledge” Awkward. (Julie Winkler, Michigan State Univeristy)	This paragraph has been moved to the conclusions and revised
E-2-31	A	2	51			“this”? Instead “which has limited” (Julie Winkler, Michigan State Univeristy)	Wording has been revised
E-2-32	A	3	4	3	13	Global warming theory relies heavily on computer modeling of long-term climatology, and some models show adverse effects on climate while others do not; therefore, there needs to be global initiatives to systematically review the different global warming computer models to better understanding their ability to predict average temperatures over the long-term (James Bero, BASF)	This comment is addressed fully in the WG I report, which deals with the science of climate change, including climate modelling
E-2-33	A	3	4	3	4	A cautionary note, "regionalisation" is used to describe the action when data are distributed in the spatial domain (e.g. using interpolation or simulation). Strictly speaking, what is described in the section is not distribution of data in space as the GCM has already produced regulary spaced data in this domain. Instead, the next stage is to increase the spatial resolution, i.e., are you not talking about downscaling rather than regionalisation? (Marie Ekstrom, University of East Anglia)	Regionalisation was a term adopted instead of downscaling in the TAR, WG I regional climate chapter (10). We have applied the usage here for consistency and have added a footnote to explain this.
E-2-34	A	3	5	3	7	Repeats what already was said on page 2 lines 10-11. (Julie Winkler, Michigan State Univeristy)	We disagree: the first point refers tro scenarios in general, the second to AOGCM-based scenarios. In any case, the wording has now changed with the point being merged with

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							another.
E-2-35	A	3	7	3	8	Perhaps you should specify what domain you are increasing the resolution in, space, time or both? (Marie Ekstrom, University of East Anglia)	We have added "spatial" to qualify this
E-2-36	A	4	11	4	13	Suggest this be deleted. If kept, reconsider the "prominent examples" portion of the sentence. After reading Section 2.3, it was not clear to me what were the "prominent examples". (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-37	A	4	14	4	20	The policy for AR4 is not clear here. Is this chapter the only chapter in the AR4 devoted to assessment methods? Is (or will) there also a Special Report? (Julie Winkler, Michigan State Univeristy)	Yes. this is the only chapter in WG II devoted to assessment methods, though Chapter 1 covers methods of assessing observed impacts. There will not be a Special Report.
E-2-38	A	4	24			What is meant by "assessment directions"? And by "temporal aspects" do you mean temporal scales? (Julie Winkler, Michigan State Univeristy)	Sentence deleted
E-2-39	A	4	24			"to treat the management of uncertainty". Awkward. (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-40	A	3	27	3	27	Insert: ".. of impact for various assumed emission scenarios (ie., conditional likelihoods)…" (Barrie Pittock, CSIRO retired)	This point has been shortened, so the suggested wording is not now relevant
E-2-41	A	3	28	3	28	Insert: "…of the future, such as emission trajectories and technological change, are still …" (Barrie Pittock, CSIRO retired)	This point has been shortened, so the suggested wording is not now relevant
E-2-42	A	4	36			"process-based methods" is unclear. Even after reading the entire chapter and coming back to this line, it is not exactly clear what process-based methods are and where in the chapter they are discussed. (Julie Winkler, Michigan State Univeristy)	The text and been modified and clarified regarding this point
E-2-43	A	4	39	4	40	"integration of both models and processes"? Don't models (or at least some models) include process? Climate models, for example, include physical processes. (Julie Winkler, Michigan State Univeristy)	The text and been modified and clarified regarding this point , which meant assessment process rather than physical process
E-2-44	A	5	1	5	6	I found this paragraph repetitive. Most of this information is already stated on the previous page. (Julie Winkler, Michigan State Univeristy)	The paragraph has been omitted
E-2-45	A	4	1			Section 2.1 has little content. It is wordy but doesn't deliver a clear message. (George Seielstad, University of North Dakota)	Text has been modified and shortened
E-2-46	A	4	5		6	requirements and required - suggest replace required with needed (Clair Hanson, IPCC TSU)	Text has been highly modified

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-47	A	5	1	5	1	There is no such thing as a non-climate future. There will always be a climate. (George Seielstad, University of North Dakota)	The reviewer has misunderstood the meaning, which refers to future conditions other than climate. We have clarified the meaning where the term is used.
E-2-48	A	5	10			"other research and policy communities" Such as? Compared to? (Julie Winkler, Michigan State Univeristy)	This paragraph has been removed.
E-2-49	A	5	12	5	13	I assume this means studies using the SRES scenarios, since policy interventions have been modeled and explored for decades. (Elizabeth Malone, Joint Global Change Research Institute)	This paragraph has been removed.
E-2-50	A	5	15			If it is the authors' intent that the following material is organized first by "approach", then by "method", and finally by "result", that does not come across in the chapter. Rather, it is quite difficult to follow the organization of the chapter. (Julie Winkler, Michigan State Univeristy)	It is not intended that the chapter follow this format. There is not sufficient room for results. The relationship between approach and method has been clarified, and these are treated consecutively.
E-2-51	A	5	15			Here is an alternative organization scheme for you to consider. The alternative organization is based on the authors' statement in Section 2.1 (page 5, line 15) that a "hierarchy of approaches, methods and results" will be used to organize the chapter. (Julie Winkler, Michigan State Univeristy)	See above
E-2-52	A	5	16			Later in the chapter the authors confuse "approach" with "subject material". (Julie Winkler, Michigan State Univeristy)	Text has been substantially modified
E-2-53	A	5	17	5	18	The sentence "In that sense…" does not follow from the definition of approach in the previous sentence. (Julie Winkler, Michigan State Univeristy)	Text has been substantially modified
E-2-54	A	5	31	5	31	"future directions" in regard to methods, or what? (Barrie Pittock, CSIRO retired)	Future directions are in regard to methods of assessment and the development of future characterisations.
E-2-55	A	5	34			This heading is confusing. Earlier on this page (lines 15-20) you distinguish between "approaches" and "methods". You then (line 23) say that you are going to begin the chapter by with a description of different approaches. So why isn't this heading labeled "approaches" rather than "methods"? Why label it "methods" when methods are a subsumed under "approach"? (Julie Winkler, Michigan State Univeristy)	Heading has been changed
E-2-56	A	5	36			This section would benefit from mentioning Dessai et al. (2005) On the role of climate scenarios for adaptation planning. Global Environmnetal Change, 15, 87-97. They consider three assessment frameworks: the IPCC approach, risk approaches, and human development approaches. While the first two frameworks	This whole section has been changed substantially and the issue of human development methods brought more to the fore

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						are well covered the last one is not. There is no mention of new methods and techniques being applied to climate change adaptation such as: livelihood frameworks, resilience, robustness, etc. (Suraje Dessai, Tyndall Centre for Climate Change Research)	
E-2-57	A	5	40			"approaches and methods" Aren't approaches and methods defined differently and isn't this section suppose to be on approaches (not methods)? (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-58	A	5	41			Define "top down" and "bottom up" here rather than later on page 7 [note that the definition on page 7 is better than the one given here.] (Julie Winkler, Michigan State Univeristy)	This section has been edited and the suggested text included
E-2-59	A	5	43			The standard approach should be defined here. (Julie Winkler, Michigan State Univeristy)	Done
E-2-60	A	5	44			I suggest that a short summary of the seven-step approach be included so that the readers do not have to go back to the IPPC volume to find it. [at a minimum give a more detailed reference (including page numbers) so that they can find the earlier description quickly] (Julie Winkler, Michigan State Univeristy)	Done in a footnote
E-2-61	A	5	48	5	49	[Note that subheadings below are based on page 5, lines 48-49 where you state that in this chapter you will focus on the standard climate-scenario-driven, adaptation, vulnerability and risk management approaches. (Later you say that integrated assessments are also an approach, but perhaps integrated assessments are better considered as a "method"?) However, alternative labels for the subheadings, based on Table 2.3, would be "Natural-hazard driven", "Vulnerability/Resilience-Driven", and "Policy-Driven," as these items are all labeled as "approaches" in Table 2.3. A point that I am trying to make here is that the use of the term "approach" is very confusing, and it is not at all clear what the authors consider to be an "approach." This confuses the chapter's organization, as "approach" is said to be the top level in the organizational hierarchy.] 2.2.1 Conventional approaches to assessment 2.2.2. Risk management approach 2.2.2.1 Reconciling conventional assessment approaches with risk management 2.2.3 Adaptation approach 2.2.4 Vulnerability approach 2.2.5 Summary 2.3 Characterizing the future [I suggest organizing this section around Figure B2.2.1] 2.3.1 Why do we characterize the future?	We have attempted to implement some of these suggestions, in particular to group the sections on future characterisations together.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						2.3.2 Artificial experiments 2.3.3 Analogues 2.3.4 Storylines 2.3.4.1 SRES global storylines 2.3.5 Scenarios 2.3.5.1 Climate scenarios 2.3.5.2 Sea level scenarios 2.3.5.3 Scenarios of atmospheric gas components 2.3.5.4 Socio-economic scenarios 2.3.5.5 Land use scenarios 2.3.5.6 Future technology scenarios 2.3.5.7 Adaptation scenarios 2.3.5.8 Mitigation/stabilization scenarios 2.3.6 Projections 2.3.7 Probabilistic Futures 2.3.9 Summary 2.4 CCIAV Assessment Methods 2.4.1 Involving stakeholders 2.4.2 Integrating scenarios 2.4.3 Defining and utilizing thresholds, criteria for risk, and coping ranges 2.4.4 Evaluating adaptation options 2.4.5 Methods for assessing vulnerability 2.4.6 Integrated assessments 2.4.7 Communicating uncertainty and risk 2.4.8 Summary 2.5 Data needs for assessment [However, unless this section is expanded, I suggest it be dropped entirely.] 2.6 Key conclusions and future directions (Julie Winkler, Michigan State Univeristy)	
E-2-62	A	5	51	6	13	The reference to "top-down" and "bottom-up" is confusing as the difference between these two is not described in this paragraph.This is not done until Table 2.2 which is not referred to here. (Barrie Pittock, CSIRO retired)	Table 2.1 improved and top-down bottom up reworded.
E-2-63	A	6	1			section 1:reference is made to the “stress – impact – response” model; a more sophisticated version is the “driving force – pressure – state – impact – response” DPSIR model used by the European Environment Agency EEA. However, as we have shown (Maxim, O’Connor, submitted), the scheme can be “anchored” in	The terms top-down and bottom-up have been retained but mainly because they are a common shorthand. We spend much less time on orientation of approaches here and point

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						different domains. Thus we can either define environmental factors like climate change or biodiversity loss as pressures on the socio-economic system, which then suffers impacts and generates responses, or take anthropogenic effects like pollutant and GHG emissions from society and economy as pressures. These have an impact on and lead to responses of the bio-geo-sphere. In this view, the process is circular (i.e. it has no up- and downside), social and natural systems co-evolve, and the terminology of "bottom-up" versus "top-down" becomes obsolete (it simply makes no sense except for describing the geographical scale of analysis), but using it indicates a specific partial view of the observer. This does not imply switching between the frames of reference (p 8 l 11), but constituting a new, more complex one. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	the reader towards the point that the richer applications now use both in a single assessment. However, the reviewer misses the point that it is the point of view of different actors and views towards risk that is being switched, not the directions of research.
E-2-64	A	6	3			"some more"? (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-65	A	6	5	6	6	The sentence "In this chapter…" is out of place. It should be in Section 2.1. (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-66	A	6	7			The standard IPCC approach - can you briefly outline what the 7 steps approach is that is mentioed in the previous paragraph (Clair Hanson, IPCC TSU)	Done in a footnote
E-2-67	A	6	7			"context"? (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-68	A	6	11			"concrete adaptations"? (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-69	A	6	12	6	13	Are you saying that adaptation and vulnerability assessments are no longer "outputs" but stand alone "methods"? (Julie Winkler, Michigan State Univeristy)	Text removed**,** but yes, we are saying they are approaches in their own right
E-2-70	A	6	12			reference to material later in the chapter. (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-71	A	6	15			At this point in the chapter a reader new to climate impact assessment would not know the limitations of the standard climate scenario-driven approach. (Julie Winkler, Michigan State Univeristy)	These limitations are now briefly mentioned earlier
E-2-72	A	6	17			"techniques"? Are techniques "approaches" or "methods"? (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-73	A	6	19	6	23	Awkward sentence structure. Are "needs" objectives? "interrelationships" are also probably not "objectives". (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-74	A	6	25	6	27	This paragraph would fit better in the subsection on risk management approaches.	These sections (originally 2.2.1.2 to 2.2.1.4)

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Julie Winkler, Michigan State Univeristy)	have all been heavily edited into one section on risk (2.2.6)
E-2-75	A	6	25			What "needs"? The objectives listed above? (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-76	A	6	31	6	33	Not bvious how managing risk enhances the greenhouse effect, as stated. (George Seielstad, University of North Dakota)	Text removed
E-2-77	A	6	31	6	47	Both of the first 2 paragraphs could be skipped. Section 2.2.1.2 could start at line 49. (George Seielstad, University of North Dakota)	Text removed
E-2-78	A	6	32			Is a "risk management framework" the same as a "risk management approach"? (Julie Winkler, Michigan State Univeristy)	No, but text highly modified
E-2-79	A	6	40			set' is wrong. Need to reword the sentence as it doesn't read well (Clair Hanson, IPCC TSU)	Text removed
E-2-80	A	6	45	6	46	"the many factors listed in the previous section". Awkward. (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-81	A	7	1	7	1	Adaptation can also mean increased opportunities (see Scheraga, J.D., Furlow, J., 2001.) for example in terms of increased agricultural output in northern latitudes (Suraje Dessai, Tyndall Centre for Climate Change Research)	This is pointed out in the section on adaptation
E-2-82	A	7	2	7	3	Mitigation will set the upper bounds, and adaptation will certainly be a way of addressing the lower bounds of changing climate hazards (for some). But the way this is phrased suggests that adaptation won't be necessary to address the upper bounds of potential climate change. Given that climate variability will also change, it will be hard to distinguish between what is upper bounds and lower bounds for adaptation. Emphasizing that there are limits to adaptation (see Chapter 17) supports the argument that mitigation and adaptation are complementary responses. (Karen O'Brien, University of Oslo)	A sentence has been added to clarify this.
E-2-83	A	7	2	7	2	"also" is confusing and unnecessary. I would also add, at the end of the line: "… will at least have to cope with…" (Barrie Pittock, CSIRO retired)	Word removed and see above point
E-2-84	A	7	3	7	4	"whereas adaptation will have to cope with the lower bounds". I am unclear on exactly what is meant here, especially by "will have to". (Julie Winkler, Michigan State Univeristy)	See above point – this is also clarified by the diagram
E-2-85	A	7	7			"they"? The benefits? Or do you mean adaptation and mitigation? (Julie Winkler, Michigan State Univeristy)	Clarified
E-2-86	A	7	10			Table 2.1 is a useful tracing of developments, but are all the iterations really risk assessments, as the title indicates? I would argue that only the third is, as indicated in the fourth column. The scenario "requirement" for the third iteration seems	Table omitted

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						highly idealized; either label it as such or describe a more realistic scenario requirement, for example, "Scenarios that include policy or management variables as well as environmental variables." Finally, "Model derived" is not quite correct in the last column, last two cells. Scenarios are really inputs to models; that is, the scenario must be constructed before the model runs. (Elizabeth Malone, Joint Global Change Research Institute)	
E-2-87	A	7	10			In regard to the Third Integration, I think this is an overly optimistic conclusion. I doubt if there is much "integration of scenarios at varying scales" in the literature cited in the following regional and sector chapters. (Julie Winkler, Michigan State Univeristy)	Table omitted
E-2-88	A	7	13	7	25	This paragraph finally gets to the point of the chapter. (George Seielstad, University of North Dakota)	That said, the changes in response to other comments mean that this point is still in Section 2.2.6
E-2-89	A	7	16	7	19	You could add here: "and asssessing the limits to adaptation as a response to climate change" (Karen O'Brien, University of Oslo)	Text added
E-2-90	A	7	17	7	17	Awkward/ambiguous language, with "… linking …. to …with…". Reword. (Barrie Pittock, CSIRO retired)	Text altered
E-2-91	A	7	19	7	20	Can you provide a reference for the following statement "Risk management has been …." (Suraje Dessai, Tyndall Centre for Climate Change Research)	References added
E-2-92	A	7	21			I would argue that it is a "different" lexicon rather than a "new" lexicon. (Julie Winkler, Michigan State Univeristy)	Text removed
E-2-93	A	7	23			What is meant by "mainstream activities"? (Julie Winkler, Michigan State Univeristy)	Text removed here, mainstreaming clarified above
E-2-94	A	7	29	7	32	Repetitive. (Julie Winkler, Michigan State Univeristy)	Paragraph removed
E-2-95	A	7	36			Bottom up and top down approaches have already been defined (although I like this description better). (Julie Winkler, Michigan State Univeristy)	This text was moved up and combined with the earlier points in the beginning of 2.2.6
E-2-96	A	8	1	8	2	But can't top-down only or bottom-up only "approaches" [is this the right word?] also involve stakeholders and employ multidisciplinary approaches? I don't think that the involvement of stakeholders or a multidisciplinary approach are unique to a combined bottom-up/top-down "approach". (Julie Winkler, Michigan State Univeristy)	The top-down bottom-up description in 2.2.1 no longer conatins this level of detail
E-2-97	A	8	14			You cannot use the same words in the definition of the term: acceptable risk is acceptable risk.	This box has been deleted and the definition will not be kept

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Alan Robock, Rutgers University)	
E-2-98	A	8	14			"acceptably controlled"? (Julie Winkler, Michigan State Univeristy)	This box has been deleted and the definition will not be kept
E-2-99	A	8	17	8	19	Again, you cannot use the same words in the definition of the term: A coping range is a range in which you can cope. (Alan Robock, Rutgers University)	This box has been deleted and the definition will in the IPCC glossary and will not retain this wording
E-2-100	A	8	17			"derived variable"? (Julie Winkler, Michigan State Univeristy)	This box has been deleted and the definition will be in the IPCC glossary and will not retain this wording
E-2-101	A	8	24	8	26	Are you attempting to distinguish between "likelihood" and "probability"? If so, the distinction is not clear. (Julie Winkler, Michigan State Univeristy)	This box has been deleted and the definition will not be kept
E-2-102	A	8	28	8	29	It should be noted here that risk is also often measured as hazard x vulnerability (perhaps moreso than as likelihood times consequence). (Karen O'Brien, University of Oslo)	We acknowledge this, but feel that our definition is still appropriate. It is now found in Figure 2.1.
E-2-103	A	8	30			Awkwardly worded. (Julie Winkler, Michigan State Univeristy)	This box has been deleted and the definition will not be kept – this is from the IEC definition, though
E-2-104	A	8	34			"weighing up"? (Julie Winkler, Michigan State Univeristy)	This box has been deleted and the definition will in the IPCC glossary and will not retain this wording
E-2-105	A	9	1	9	1	Qualitative and quantitative need to be swaped (Suraje Dessai, Tyndall Centre for Climate Change Research)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-106	A	9	1			The meaning of "downside" and "upside' in this table is not clear. (Julie Winkler, Michigan State Univeristy)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-107	A	9	1			Table 2.2: Work on the definition of resilience. It is not an end outcome or state but the ability to provide for human well-being under changing and changed conditions. A static state can be the downfall of a society if conditions change. (Elizabeth Malone, Joint Global Change Research Institute)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-108	A	9	1			Table 2.2: It looks like you have mixed up the descriptions of qualitative and quantitative. (Alan Robock, Rutgers University)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-109	A	9	1			Table 2.2 - the table is a little confusing. Is the left column supposed to correspond to the descriptions on the right. Under research methods, qualitative and quantitative are switched. Quantitative can also include statistical approaches. (Karen O'Brien, University of Oslo)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-	A	9	1			Mathematical modeling is a "qualitative" approach and "narrative approaches" is a	This table has been merged with 2.3 (new

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
110						"quantitative" approach? (Julie Winkler, Michigan State Univeristy)	Table 2.1) and these definitions clarified
E-2-111	A	9	1			Comment on Table 2.2.: the 'qualitative' and 'quantitative' labels need to be swapped round (mathematical modelling is quantiative, not qualitative). I would also suggest deleting 'data collection' from the quantitative element, as data collection can be both qualitative and quantitative. Similarly, I would delete 'risk perception' from the qualitative element, as this can be elicited both through qualitative as well and quantitative methods. (Irene Lorenzoni, University of East Anglia)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-112	A	9	1			Another comment on Table 2.2.: add perhaps the descriptors 'back-casting' and 'forecasting' to the temporal element, as this nomenclature is often used in the literature? (Irene Lorenzoni, University of East Anglia)	This table has been merged with 2.3 (new Table 2.1) and the temporal element has been removed
E-2-113	A	9	1			"Subject matter" is not the correct term here, especially since in the next table (2.3) Natural Hazard-, Vulnerability-, and Policy-driven are referred to as "approaches". To me the subject matter of an assessment would be "agriculture" or "North America" or something similar. (Julie Winkler, Michigan State Univeristy)	This table has been merged with 2.3 (new Table 2.1) and this heading is no longer present
E-2-114	A	9	1			"learned" is probably better than "learnt" (Julie Winkler, Michigan State Univeristy)	This text has been deleted
E-2-115	A	9	6			"will take place". This seems an overly strong and exact statement to me. It does not give enough credit to ingenuity and invention. In other words, there may be adaptations that are different from what we see today for current climate. (Julie Winkler, Michigan State Univeristy)	This comment misses the point – even if new adaptations are implemented, the anchor is still experience. In any case, the wording of the sentence has been revised.
E-2-116	A	9	8	9	8	It is not at all clear where the three major approaches are described above. They are clear in Table 2.3 and a cross-reference to that would be helpful. Figure 2.1 which is being discussed here is quite confusing and unhelpful to me, especially what the arrows mean. (Barrie Pittock, CSIRO retired)	These definitions have been clarified in the new Table 2.1
E-2-117	A	9	10	9	12	This statement could be qualified with the caveat that research suggests that future climate change may not be similar to past conditions (reference to literature on thresholds and rates, magnitudes, etc.) (Karen O'Brien, University of Oslo)	This text has been removed and these points made elsewhere
E-2-118	A	9	14	9	26	I am confused here also. Is this equating "top-down" with a natural hazards approach, and "bottom-up" with a vulnerability-based approach? I am not convinced this is always the case, but maybe. (Barrie Pittock, CSIRO retired)	This text has been removed and the approaches clarified in section 2.2.1

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-119	A	9	14			Here the phrase “standard approach” is used differently than previously in the chapter. Or are you saying that the “natural hazards approach” is the same as the “climate scenario-driven approach”? (Julie Winkler, Michigan State Univeristy)	These definitions have been clarified in Section 2.2.1.
E-2-120	A	9	20	9	22	I don't think this generalization holds true - much vulnerability research focuses on adaptation and adaptive capacity as well (perhaps emphasizing the factors that limit them) (Karen O'Brien, University of Oslo)	This links are made more explicit in new Table 2.1 and sections 2.2.3 and 2.2.4
E-2-121	A	9				Table 2.2: In the Research methods row: swap the order of 'Qualitative' and 'Quantitative'. (Stephen John Hawkins, The Marine Biological Association of the United Kingdom)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-122	A	9				Table 2.2, entry "Research methods". The two entries seem to be reversed. (Barrie Pittock, CSIRO retired)	This table has been merged with 2.3 (new Table 2.1) and these definitions clarified
E-2-123	A	9				Table 2.2 last entry. Where are the policy-makers in this? (Barrie Pittock, CSIRO retired)	This table has been merged with 2.3 (new Table 2.1) and these roles clarified
E-2-124	A	10	1	10	22	This figure is difficult to interpret. Would it be possible to highlight the different pathways in arrows of different weights? (Karen O'Brien, University of Oslo)	The figure has been removed for reasons of space
E-2-125	A	10	1			If Figure 2.1 is retained (which I question), it would be better after Table 2.3, as that helps to understand the Figure a bit. (Barrie Pittock, CSIRO retired)	The figure has been removed for reasons of space
E-2-126	A	10	6			Figure 2.1: Why are there no arrows from "Natural hazards based" to current and future impacts? (Elizabeth Malone, Joint Global Change Research Institute)	The figure has been removed for reasons of space
E-2-127	A	10	18			Why isn’t “Mitigation,” which is included in Figure 2.1, also included in Table 2.2 and Table 2.3? Also note that there is no arrow going out of the residual risk box on the figure. Does this tell us that the mitigation “approach” is confined to only residual risk and the other boxes in the figure are not part of the mitigation “approach”? There also isn’t an arrow out of the residual risk box to Mitigation which suggests that a “downwards flow” to Mitigation is not possible. Obviously, I am having some difficulty interpreting this figure. (Julie Winkler, Michigan State Univeristy)	The figure has been removed for reasons of space. The role of mitigation is explained in 2.2.5 and Figure 2.1.
E-2-128	A	10	18			Comment: it is not clear to me why the last box of the diagram suggests that mitigation relates to *residual* risk after various adaptation efforts. I would suggest that, as mitigation will influence affect different facets of adaptation in the long-run, it could it could be directly linked to the right-most arrow rather than to policy-	The figure has been removed for reasons of space

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						based adaptation exclusively. (Irene Lorenzoni, University of East Anglia)	
E-2-129	A	10	24			Table 2.3, entry on "Scenario types". Under "policy-driven" is only "unmanaged climate change impacts and vulnerability". I understand that to mean no climate change policy. Surely what is far more important are climate change policy-driven scenarios, such as the one cited in my general comments, that is the AP6 scenario, which explores the emissions resulting from the global adoption of certain emissions reductions policies and technologies by the AP6 countries, out to 2050. As I said in the general comment, this results in a doubling of global emissions by 2050 relative to 2000, and is thus a salutary exploration of the likely result of a major policy response by the world's major emitters. (Barrie Pittock, CSIRO retired)	This table has been merged with 2.2 (new Table 2.1) and these definitions clarified. However, this scenario is not relevant here – it is a WG III matter
E-2-130	A	10	26			If "Natural hazard-driven, Vulnerability/Resilience-driven, and Policy-driven" are "approaches" then the word "Approach" needs to be moved to a single line immediately above "Natural hazard-driven, Vulnerability/Resilience-driven, and Policy-driven". Also, why isn't "Mitigation" included as an approach in this table? (Julie Winkler, Michigan State Univeristy)	This table has been merged with 2.2 (new Table 2.1) and these definitions clarified
E-2-131	A	10	37			"fitter"? (Julie Winkler, Michigan State Univeristy)	This term has been removed
E-2-132	A	10				Tabel 2.3 is much more useful than Fig. 2.1 for explaining different assessment approaches. (George Seielstad, University of North Dakota)	This table has been merged with 2.2 (new Table 2.1) and Figure 2.1 removed
E-2-133	A	11	4		6	this is the insurance mathematics definition of risk. However, to be used effectively, it has two preconditions: On the one hand, probabilities must be quantifiable (which means that according to the definition without quantification no risk is defined, as will be the case in many situations of uncertainty). On the other hand, it must be possible to quantify and aggregate the consequences. For an insurance that's easy: the measurement unit is the damage they have to cover. But for overall scenarios, the incommensurability of many of the consequences to be taken into account will cause serious problems. Whereas part of the first concern is addressed later (with reference to stochastic models), the second is not discussed. As a consequence, I suggest using the concept of risk management without reference to the overly simplistic formula. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	This text has been edited so it does not suggest a mathematical formulation is being suggested
E-2-134	A	11	5	11	6	As mentioned earlier, in the hazards literature risk is often measured as hazard x vulnerability. (Karen O'Brien, University of Oslo)	This text has been removed, though it is retained in Figure 2.1. Relevant to the above comment, a range of formulations are possible

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							and we don't want to discuss the minutiae of these.
E-2-135	A	11	7	11	9	This is a very confusing sentence. For example, what is meant by "event"? (Julie Winkler, Michigan State Univeristy)	Text has been clarified. The "event" refers back to the previous sentence that describes risk as a combination of the probability of an event and its consequences.
E-2-136	A	11	11	11	15	If there are any limitations to risk management they should be mentioned here. (Suraje Dessai, Tyndall Centre for Climate Change Research)	Probably the biggest drawbacks are the many different versions, structures and terminologies being used in different fields, requiring standardisation. The FoD and SoD carried many recent definitions framed to try and overcome this, but they have been removed due to space limitations
E-2-137	A	11	14	11	14	The Figure 2.2b for the UNDP Adaptation Policy Framework makes little sense to me. It is not clear what the big upwards arrow at the left signifies. Is it that the sequenece of actions flows up? I see no such logical order in the second column of boxes under "APF Components". And the third column of boxes are all the same lables as the second, and are apparently chapters or something from the "User's Guidebook". Is the Figure describing a process or a Guidebook or the logical flow of actions, or is it a fancy contents list? At the very least it needs some explanation, but my suggestion is drop it. (Barrie Pittock, CSIRO retired)	Figure has been removed
E-2-138	A	11	14	11	15	Are the UNDP and UKCIP frameworks referred to because they are particularly insightful and useful frameworks? Or because they are widely used? What are you trying to highlight by referring to these frameworks and by including a figure with a schematic of the two frameworks? (Julie Winkler, Michigan State Univeristy)	Figure has been removed
E-2-139	A	11	14			UKCIP is not defined until p. 27. Define it here, the first time it is used. (Alan Robock, Rutgers University)	Text has been removed
E-2-140	A	11	17			"parallel"? (Julie Winkler, Michigan State Univeristy)	Text edited to improve clarity
E-2-141	A	11	22		24	Risk identification should include a description that answers the question, "Risk of what?" Climate change? Some impact, such as sea level rise? Etc. (Elizabeth Malone, Joint Global Change Research Institute)	Text edited to improve clarity (but already said this anyway)
E-2-142	A	11	25		26	Similarly, this element needs to answer the question, "Risk to whom/what?" This may be identified under the second bullet, but that bullet seems to imply a physical system, whereas risks can include societies, e.g., subsistence farmers.	Text edited to improve clarity

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Elizabeth Malone, Joint Global Change Research Institute)	
E-2-143	A	11	31			"two overarching activities" Of risk management? (Julie Winkler, Michigan State Univeristy)	Text edited to improve clarity
E-2-144	A	11	43			"literature in the CCIAV field and methods of characterizing the future". Awkward and perhaps obvious(?). (Julie Winkler, Michigan State Univeristy)	Text edited to improve clarity.
E-2-145	A	12	1			What is the message that this figure is meant to convey? It is occupying valuable space and I question whether this figure is necessary. Also, I find the UNDP figure rather strange, as most of what is in the white boxes is repeated verbatim in the gray boxes. "APF" needs to be defined. (Julie Winkler, Michigan State Univeristy)	Figure has been removed
E-2-146	A	13	2			I generally like this figure and would recommend that a section on characterizing the future be organized around the figure. One question, though – How did you decide how far into each of the three sections on the graph (i.e., implausible, plausible, and plausible with ascribed likelihood) to extend the different boxes (i.e., artificial experiments, sensitivity analysis, etc.)? (Julie Winkler, Michigan State Univeristy)	The section on methods of characterizing the future is now even more explicitly organized around the figure. Sizes of the boxes are based on judgments of the authors about the definitions of the different characterizations of the future we adopted for this chapter.
E-2-147	A	13	8			While I think Figure B2.2.1 is a brave attempt at summarising the issue, I just think it doesn't work. There are many sensitivity analysis that are extremely comprehensive (see e.g., Dessai and HuLMe submitted) but are not so according to the figure. Also, the issue of with and wihout liklihood is rather confusing in the figure. I suggest dropping it or redrawing. (Suraje Dessai, Tyndall Centre for Climate Change Research)	In our assessment, the figure is more helpful than not, and we have decided to keep it. Regarding sensitivity analyses, while the reference case may indeed be quite comprehensive, such as in the cited paper, the sensitivity case typically only changes one or two variables at a time, and thus by defnition cannot be comprehensive. Regarding the categories of plausibility/likelihood, we believe the distinction between with and without ascribed likelihood is important to include since it is useful to reflect a movement in the literature to greater use of ascribed likelihoods. We have redrawn the category labels to make clearer the distinction between plausiblity and ascribed likelihood.
E-2-148	A	13	24			Figure B2.2.1 Maybe it is that I am looking at a black and white printout, but this Figure is also poor and confusing. I presume there is an implicit x-axis that should be labelled "plausibility", although why ascribing likelihood to a scenario makes it necessarily more plausible I do not know (it depends on the likelihood). Which	The "x-axis" is not an axis but three categories of characterisations. Within the set of plausible characterisations of the future, those to the right are not more plausible than those

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						label refers to which box is not clear in black and white (and may or may not be in colour), but it should be as many readers will be viewing black and white photocopies. (Barrie Pittock, CSIRO retired)	to the left, they are only more explicit about what the likelihood is (whether high or low). We have added text to indicate this, and revised the category labels to make them clearer. Regarding colours. these have been revised to clarify the domains of each characterisation.
E-2-149	A	13	26	13	28	"Comprehensiveness" seems out of place here as this term is not included in the figure. (Julie Winkler, Michigan State Univeristy)	It is in the figure, but not located in a very visible place. We have moved it to be parallel to the y-axis to be more prominent.
E-2-150	A	13	31		31	I do not fully understand the definitions. Plausibility, in common language an expression of logical coherence and convincing argument (that's the subjective part), is then a question if a certain "if" has a plausible, i.e. convincing or even logically deductible "then". In your definition, it seems to be the latter in a few cases, but mainly the semi-quantitative statement that the probability of the "if" is rather low (which then is the subjective element). Is that really what you mean, plausibility as a term for a certain probability? Why then use an extra term, and not just "sufficient" or "high probability"? I find this confusing. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	The text already explicitly defines plausibility: "*Plausibility* is a subjective measure of whether a characterisation of the future is possible. Implausible futures are assumed to have zero or negligible likelihood." We use an extra term, likelihood, in order to further distinguish whether characterizations indicate a specific degree of probability to a plausible future.
E-2-151	A	13	48	14	20	From my experience stakeholders and scientists from other disciplines find the usage of the terms "scenario" and "projection" within the climate change community and literature to be confusing. As an example -- Recently, I gave a presentation on some regional climate change scenarios that I developed to a group of faculty at my university (a number of whom are involved in risk assessment research). After I finished my standard spiel that scenarios are not predictions and forecasts, several faculty remarked that climate change researchers need to stop making these "inane" (their words) distinctions between "scenarios", "projections", and "predictions", and that what we (the climate change community) call a "scenario" is considered a "prediction" by most other disciplines (including the risk management field). Furthermore, they argued that the climate change community uses scenarios in the assessment process as if they were predictions. I think that more is needed in this chapter to sort out this confusion, especially if climate change assessment is to be placed into the framework of risk assessment. The authors make an excellent point earlier in the chapter that the lexicon used in different fields needs to be jointly understood and, if possible, standardized. They could make a considerable contribution by sorting out the different disciplinary meanings of the terms scenarios, projections, and predictions.	We agree that sorting out the definitions of these various terms would be useful, and in the case of this chapter, it is essential so that readers know what we mean when we use them. The box already clearly defines scenarios and projections, and it has now been edited to indicate that we use prediction and forecast to mean characterizations of the future that are considered the most likely.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Julie Winkler, Michigan State Univeristy)	
E-2-152	A	14	25			What do you mean by "assigned probabilities may be partial"? (Julie Winkler, Michigan State Univeristy)	Text edited to clarify that probabilities can be imprecise.
E-2-153	A	14	33			This is the start of 13 subsections all at the same level. Why are these subsections all at the same level in the chapter outline? Shouldn't the descriptions of the different types of scenarios (sea level pressure scenarios, etc.) be at a lower level as they are examples of different types of scenarios? Also, why isn't there a subsection on "projections". "Projections" are at the same level as "scenarios" in Figure B2.2.1. Or is it not possible to distinguish between a scenario and a projection? (Julie Winkler, Michigan State Univeristy)	Section reorganized to have scenarios as major heading and types of scenarios minor. Projections are not treated separately since for use in impact assessment they typically are an element of another characterization such as a scenario or a probabilistic future.
E-2-154	A	14	33			Section 2.2.2.2 contains an important point: even if human climate forcing stays the same as now, it is too late to stop future changes. (George Seielstad, University of North Dakota)	No response necessary.
E-2-155	A	14	38	14	40	Awkward sentence. (Julie Winkler, Michigan State Univeristy)	Text edited for clarity.
E-2-156	A	14	42	14	44	Sentence needs to be rewritten. It could possibly be read to say that warming of 0.5 C will occur every year between 2000 and 2100. If it's annual forcing in 2100, the unit should be 0.5 C/y. (George Seielstad, University of North Dakota)	Text edited for clarity.
E-2-157	A	15	7	15	8	reference to material later in the chapter. (Julie Winkler, Michigan State Univeristy)	Detail noted
E-2-158	A	15	11			You could also include Dessai and HuLMe (submitted to Global Environmental Change) as an example of a sensitivity analysis of water supply decisions under climate change uncertainty (Suraje Dessai, Tyndall Centre for Climate Change Research)	The reference has been added.
E-2-159	A	15	15	15	26	Analogues are very usable at impact models testing, but it must be stressed that analogues are usually based on exceptional weather in some small region. Future climate change will cause significant shift of general atmosphre circulation patterns to the state never existed in the last 1000 years. The same weather as during historical analogues will have in the future probably completely different circulation conditions and different preceding and folowing weather. (Milan Lapin, Faculty of Mathematics, Physics and Informatics, Comenius University)	What the reviewer states about circulation conditions is possible, but by no means certain. However, we accept that extreme events in the future of a similar character to present-day events, are likely to occur in the context of an altered mean climate, which may either ease or exacerbate the need for adaptation responses relative to those today. We have added text to make this point.
E-2-160	A	15	18	15	22	Awkward sentence structure. I doubt if the European 2003 heatwave is likely by the end of the century; but I suspect that events SIMILAR TO the European 2003	We have reworded the sentence.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						heatwave are likely by the end of the century. (Julie Winkler, Michigan State Univeristy)	
E-2-161	A	15	19	15	19	I cannot find any reference to the European heatwave in Box 2.2. (Barrie Pittock, CSIRO retired)	This should be Box 12.2 (in Chapter 12 of the WGII volume)
E-2-162	A	15	19			why is Box 2.2 referred to after the Euro 2003 heatwave? (Clair Hanson, IPCC TSU)	This should be Box 12.2 (in Chapter 12 of the WGII volume)
E-2-163	A	15	22	15	26	Very vague sentence. And what do these analogues tell us? What is their contribution? (Julie Winkler, Michigan State Univeristy)	The sentence has been revised to indicate that some analogues are used speculatively and possibly erroneously
E-2-164	A	15	30			How are “analogue cities” identified and/or defined? (Julie Winkler, Michigan State Univeristy)	An explanation has been added
E-2-165	A	15	33	15	37	Disappearing climate is a misnomer, since there will always be a climate. (George Seielstad, University of North Dakota)	Text has been revised.
E-2-166	A	15	34			what is a 'novel' climate? (Clair Hanson, IPCC TSU)	This is explained 2 sentences earlier.
E-2-167	A	15	37			“disappearing climates” probably can’t be “found’. (Julie Winkler, Michigan State Univeristy)	Text revised
E-2-168	A	15	40			I would recommend separating storylines from scenarios. (Julie Winkler, Michigan State Univeristy)	Done
E-2-169	A	16	11			More background is needed on the SAS approach for readers to understand this paragraph. (Julie Winkler, Michigan State Univeristy)	This part has been rewritten to clarify the SAS approach
E-2-170	A	16	14			Parameters for what? Models? (Julie Winkler, Michigan State Univeristy)	Revised to clarify ‘model parameter’
E-2-171	A	16	16			“given long-term scenario framework”? What is meant by this? (Julie Winkler, Michigan State Univeristy)	Sentence has been changed to clarify
E-2-172	A	16	20	16	25	This paragraph is out of place here. I recommend putting it in a separate subsection on scenarios. (Julie Winkler, Michigan State Univeristy)	Done
E-2-173	A	16	27			Section 2.2.2.6 discusses uncertainties in scenarios using different spatial dimensions. However, it does not consider the time dimension. Projections into the future obviously are more accurate the closer they are to the present. A section somewhere in the chapter needs to comment on the plausibility of scenarios on different timescales. (George Seielstad, University of North Dakota)	Some lines have been added on this in Box 2.3 (comparing TAR projections to recent projections) which comments on the fact that near-term projections of global warming are insensitive to the choice across the SRES scenarios.
E-2-174	A	16	29	16	35	It is not clear whether this paragraph is about only regional climate models or if it also is referring to finer-scale global models.	It refers to regional models – we have clarified this in the text.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Julie Winkler, Michigan State Univeristy)	
E-2-175	A	16	32			"direct GCM outputs" awkward (Julie Winkler, Michigan State Univeristy)	We have revised the sentence
E-2-176	A	16	37	17	5	Scenario programs that try to assess dimensions <50km over times of multiple decades lack credibility. (George Seielstad, University of North Dakota)	We disagree. These programs are credible. Moreover we make no statement about such simulations being run over multiple decades.
E-2-177	A	16	40			I suggest listing the RCMs and AOGCM and AGCM used in PRUDENCE. (Julie Winkler, Michigan State Univeristy)	Space considerations preclude our listing these runs. However, we now reference WG1, Chap. 11 where these details may be found
E-2-178	A	16	42			Dessai and HuLMe (submitted to Global Environmental Change) have a also used PRUDENCE RCM simulations (Suraje Dessai, Tyndall Centre for Climate Change Research)	We have added the reference.
E-2-179	A	16	44			RCMS --> RCMs (Clair Hanson, IPCC TSU)	Corrected
E-2-180	A	16	45			"range of … GCMs"? It was earlier stated that just two GCMs were considered. (Julie Winkler, Michigan State Univeristy)	There were essentially two main GCMs used, but they also used a variable resolution model as a third (Arpege). Outputs from other GCMs not used in downscaling were also analysed. We now describe this, but in a much shorter section.
E-2-181	A	16	48			references needed after "impact studies". (Julie Winkler, Michigan State Univeristy)	We now refer to references listed above
E-2-182	A	16	50			"one GCM". This is confusing as line 40 stated that two were used. Also, perhaps need to make a distinction between AOGCM and AGCM for those readers who may not be familiar with these acronyms. (Julie Winkler, Michigan State Univeristy)	We have clarified the sentence. While some used two AOGCMs, most could only use one.
E-2-183	A	16	51			What was the "other AOGCM"? (Julie Winkler, Michigan State Univeristy)	This has been specified
E-2-184	A	16	51			"relatively small" Compared to? Other GCMs? (Julie Winkler, Michigan State Univeristy)	We have clarified this
E-2-185	A	17	5			Is this citation peer reviewed? (Julie Winkler, Michigan State Univeristy)	Citation removed
E-2-186	A	17	18			"directly to (physically based) impacts". Awkward. Also, what is "greater variety" referring to? A greater variety compared to RCM scenarios? (Julie Winkler, Michigan State Univeristy)	We have revised the text to clarify these points
E-2-187	A	17	29	17	29	It should be noted that statistial downscaling cannot take account of small-scale processes with strong time-dependency, eg: the effects of changes in land use with	Good point but this effect of small-scale processes with time-dependence is not only an

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						time, or changes in urban area. These may affect local processes which are important for impacts. (Richard Betts, Met Office Hadley Centre)	issue of downscaling, but with the GCMs as well, perhaps more profoundly. We have added the following sentence: "Statistical downscaling does have some limitations, for example, it cannot take account of small scale processes with strong time scale dependencies (e.g., land cover change)."
E-2-188	A	17	36	17	48	This table could be generalized beyond sea-level scenarios to most types of scenarios. (Julie Winkler, Michigan State Univeristy)	Table and relevant text removed.
E-2-189	A	18	5			Reference to material later in the chapter. (Julie Winkler, Michigan State Univeristy)	Addressed
E-2-190	A	18	23	18	25	What is the verb in this sentence? Also, is this sentence explaining the CLIMsystems tool? Does the Santer et al reference only refer to the pattern scaling technique? (Julie Winkler, Michigan State Univeristy)	"are combined" has been added. The sentence is about CLIMsystems. The Santer et al reference only refers to the pattern scaling technique.
E-2-191	A	18	23	18	26	The sentence beggining with "Spatial patterns of…" is not clear or incomplete. (Silvina SoLMan, CONICET - UBA)	"are combined" has been added to complete the sentence.
E-2-192	A	18	29			By "constrained" do you mean unknown? (Julie Winkler, Michigan State Univeristy)	"Constrained" has now been replaced by "characterised".
E-2-193	A	18	32			"several recent studies"? About what? Detectable trends in extreme sea levels? (Julie Winkler, Michigan State Univeristy)	Text has been removed.
E-2-194	A	18	34	18	35	"downscaled regional climate predictions from global climate models". Is "predictions" the right word here? Are you referring to simulations from RCMs that are driven by GCM output? (Julie Winkler, Michigan State Univeristy)	"Predictions" is now replaced by "simulations". "Downscaled regional climate…" refers to outputs from GCM, rather than RCM experiments.
E-2-195	A	18	39			The trouble with socio-economic scenarios is they are non-linear. Climate change alters human behavior; human behavior alters climate change. Knowing how people will react to changes is not predictable with great accuracy. These facts argue against highly detailed scenarios, especially if they are projected far into the future. They won't be believed. (George Seielstad, University of North Dakota)	No response necessary. The text already makes clear (see section 2.4.1) that scenarios are not intended to be predictions.
E-2-196	A	19	1	19	2	Indicators should also include Waste/Pollution and Technology. Beware of forecasting the latter, however. (George Seielstad, University of North Dakota)	Indicators listed in this text are from the Malone and Rovere paper cited, and thus additional indicators can't be added in this context.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-197	A	19	1	19	3	"Analysis" is not an "indicator". (Julie Winkler, Michigan State Univeristy)	References to "analysis" have been removed from this list.
E-2-198	A	19	5	19	21	Note that SRES scenarios are discussed here, even though there is a later section specific to SRES scenarios. (Julie Winkler, Michigan State Univeristy)	SRES appears here in the context of new developments in the use of scenarios in impact assessment. The content and current status of the SRES scenarios are described separately (in Boxes).
E-2-199	A	19	6	19	6	Is this Parry's Table 2.4 or this chapter's? (Barrie Pittock, CSIRO retired)	The table is a combination from several papers, as noted in revised caption.
E-2-200	A	19	7			the first two': which first two? The forst two Parry papers in the list? Or assessments in T2.4. Please clarify (Clair Hanson, IPCC TSU)	Text edited for clarity. References to which the "two assessments" refer are given at the end of the sentence.
E-2-201	A	19	9	19	10	reference to material later in the text. (Julie Winkler, Michigan State Univeristy)	No response necessary.
E-2-202	A	19	17	19	17	Add?: Impacts are a result of exposure, which varies with socio-economic development, as well as stress, so both are relevant and their effects are synergistic. (Barrie Pittock, CSIRO retired)	We agree with this statement but believe the paragraph already makes the point sufficiently.
E-2-203	A	19	20			What is "S750" and "S550" in Table 2.4? (Julie Winkler, Michigan State Univeristy)	Abbreviations have now been spelled out.
E-2-204	A	19	23	19	23	to which scenarios, climate? (Barrie Pittock, CSIRO retired)	Edited to clarify that linkage is to "global scenarios"
E-2-205	A	19	23	19	35	SRES scenarios are discussed here. (Julie Winkler, Michigan State Univeristy)	SRES appears here in the context of a new development in methods. Later section (which is now in a series of boxes) is on SRES information.
E-2-206	A	19	23	19	24	"link regional socio-economic futures to scenarios and storylines". Wouldn't a "future" also be a "scenario"? And by "scenarios and storylines" are you referring to SRES storylines and emission scenarios? (Julie Winkler, Michigan State Univeristy)	As described in section 2.4.1, not all characterizations of the future are scenarios. Also, text has been edited to clarify that we mean linking to "global" scenarios, not only SRES.
E-2-207	A	19				T2.4: this table is based on 2 Parry and 1 Arnell reference yet the reference list it refers to (line 6 p19) includes only Parry papers. Should Arnell also be here? (Clair Hanson, IPCC TSU)	This is correct. The Parry papers are introductory papers to the three impact assessments, whereas the Table refers to scenarios used in the assessments, which are reported by Parry in two papers and by Arnell et al. in a third.
E-2-	A	20	3			"methods of regional differentiation"?	Text edited for clarity.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
208						(Julie Winkler, Michigan State Univeristy)	
E-2-209	A	20	7	20	8	"scenario dependent algorithms"? (Julie Winkler, Michigan State Univeristy)	Text edited for clarity.
E-2-210	A	20	7			"grid cell level"? What size of a grid cell? (Julie Winkler, Michigan State Univeristy)	Text edited for clarity.
E-2-211	A	20	13			"scenario-dependent convergence assumptions"? (Julie Winkler, Michigan State Univeristy)	Text edited for clarity.
E-2-212	A	20	15			"grid level"? (Julie Winkler, Michigan State Univeristy)	Text edited for clarity.
E-2-213	A	20	17			"scenario dependent sub-national algorithms"? (Julie Winkler, Michigan State Univeristy)	Text edited for clarity.
E-2-214	A	20	27			"to analyze forcing to the climate system". Awkward. (Julie Winkler, Michigan State Univeristy)	'Forcing' changed to 'feedback'.
E-2-215	A	20	31			and lines 39 and 44. IAMS --> IAMs (Clair Hanson, IPCC TSU)	Done
E-2-216	A	20	32			Why are integrated assessment models the most appropriate method for developing land use scenarios for global scale studies? (Julie Winkler, Michigan State Univeristy)	Clarification added
E-2-217	A	20	34			"across similar scenarios"? What type of scenarios? Land use scenarios? (Julie Winkler, Michigan State Univeristy)	Sentence has been changed
E-2-218	A	20	37			What type of exogenous input variables? (Julie Winkler, Michigan State Univeristy)	The sentence has been rewitten and an example given of exogenous variables
E-2-219	A	20	37			reference to material elsewhere in this chapter. (Julie Winkler, Michigan State Univeristy)	Noted – no action required
E-2-220	A	20	45			Will readers know what is meant here by "input/output approaches"? (Julie Winkler, Michigan State Univeristy)	Yes, as much as they will know the other model types given. If no, references are provided for the inquisitive reader.
E-2-221	A	21	2			"decision processes of adaptation and vulnerability assessment" Awkward. (Julie Winkler, Michigan State Univeristy)	Sentence has been revised.
E-2-222	A	21	5	21	7	Using mean trends in assessments builds in what the future will be, a straightforward extrapolation of the past. The magnitude of the climate and other environmental changes makes that unlikely. (George Seielstad, University of North Dakota)	For clarification, the word 'mean' has been replaced by 'gradual' and 'baseline' replaced with 'conditions'.
E-2-223	A	21	5	21	6	Is it possible to have a trend in a "baseline'? (Julie Winkler, Michigan State Univeristy)	Text has been rewritten as in the previous point
E-2-224	A	21	5			"mean trends"? Trend in the mean or average value? (Julie Winkler, Michigan State Univeristy)	As above

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-225	A	21	8			"land use futures"? (Julie Winkler, Michigan State Univeristy)	Term has been deleted
E-2-226	A	21	16			Section 2.2.2.10 is a crucial section. Technology development is unpredictable. The uncertainty it introduces into scenarios is enormous. The question about whether technology is exogenous or endogenous to the economic and political systems might be reversed. In many respects, those social systems are driven by technology, not vice versa. (George Seielstad, University of North Dakota)	No changes required
E-2-227	A	21	18		27	Mitigation will require behavioural change of citizens and consumers (which may be the same persons, but do follow a different logic of decision making according to their role). This applies to consumption (climate sensitive consumption patterns) and technology use alike (new technologies need new behavioural patterns to be come effective). Unfortunately, consumers and citizens are no logically acting entities; they follow simplifying mental maps (as do decision makers at all levels), react too late and in the context of diverse framings, the revise their plans due to motivations which have nothing to do with the model reality. In other words: they are a permanent source of uncertainty and non-linear behaviour. In the mean time, modern consumer research can describe many of these characteristics, but no way model them quantatively. This will be an additional source of uncertainty in future models which try to integrate mitigation and adaptation strategies into the model world, and it might be worth mentioning here. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	This supports points already made in the text about the large uncertainties associated with technology change scenarios. Further additions seem unnecessary.
E-2-228	A	22	4		15	These are within-sector adaptations, but adaptation could also mean moving from agriculture to industry or services as economic activities, or perhaps growing biomass crops for fuel. (Elizabeth Malone, Joint Global Change Research Institute)	A point has been added by land use change as an adaptation strategy.
E-2-229	A	22	15	22	15	Add: It is often argued that increased wealth will lead to increased adaptive capacity, for example to sea-level rise, but where are the limits, and how can we predict them: are there critical thresholds beyond which adaptation becomes too expensive and fails? Can we "adapt" to a 5m SL rise, or does it threaten civilisation when there are 9 billion people alive? (Barrie Pittock, CSIRO retired)	This may well be correct, but the point refers more generally to the issue of adaptation rather than adaptation scenarios.
E-2-230	A	22	42	22	43	Reference to material later in the chapter. (Julie Winkler, Michigan State Univeristy)	Noted – no action required
E-2-231	A	22	42	23	8	This material is about SRES scenarios. Why is it here and not in the section on SRES scenarios? (Julie Winkler, Michigan State Univeristy)	The two sections have now been merged.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-232	A	23	2	23	5	Too vague. (Julie Winkler, Michigan State Univeristy)	We have added text to clarify the point
E-2-233	A	24	6			Note that within the AQUATERRA FP6 project we are also producing regional probabilities of change in Europe but linking these to downscaling methods to assess hydrological impacts (Fowler et al., submitted to IJC) (Hayley Fowler, Newcastle University)	We have added this reference.
E-2-234	A	23	11	23	11	SAS has not been defined previously. (Silvina SoLMan, CONICET - UBA)	This was described in Section 2.4.5
E-2-235	A	23	11			Reference to material later in the chapter. (Julie Winkler, Michigan State Univeristy)	Noted – no action required
E-2-236	A	23	31	23	33	Are you saying here that although pdfs for global emissions can be constructed (line 23) that pdfs for emissions at a regional scale cannot be constructed? (Julie Winkler, Michigan State Univeristy)	Text has been removed.
E-2-237	A	23	31			Downscaling (both dynamical and statistical) and aerosol forcing (this is scenario dependent though) are also imporant uncertainties (see, evidence in Dessai and HuLMe submitted; or Wilby and Harris, 2006) (Suraje Dessai, Tyndall Centre for Climate Change Research)	We agree with this statement, and have added reference to these factors.
E-2-238	A	23	32			"socio-economic futures" – do you mean "scenarios"? (Julie Winkler, Michigan State Univeristy)	Text has been removed.
E-2-239	A	23	33	23	34	I don't understand "although integrated methods contain implicit distributions". (Julie Winkler, Michigan State Univeristy)	Text has been removed, and clarified later in the section where this point now appears.
E-2-240	A	23	35			"All these studies refer back to the SRES emissions scenarios" … If so, then shouldn't they be discussed in Section 2.3 rather than here? (Julie Winkler, Michigan State Univeristy)	Text has been removed. However, the point is retained later in the section, because it referes to a particular method of developing probabilistic scenarios, which draws on SRES. In contrast, section 2.3 describes the SRES scenarios and their current status, not new methodologies.
E-2-241	A	23	39	23	41	In what way is this literature challenging the IPCC estimate? Does this new literature suggest a wider or narrower range? Also, what methods were used in this literature? This sentence is much too vague. (Julie Winkler, Michigan State Univeristy)	The main difference is that the range from the TAR was not probabilistic at all. So new methods have been used. It is not possbile to directly compare the 'widths' (ranges) from the TAR and the AR4 since the range in the TAR was not defined probabilistically. We have clarified how the methods differed.
E-2-	A	23	43	23	44	The early work needs to be briefly summarized here to provide a context for new	Space limitations preclude repeating the

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
242						developments. (Julie Winkler, Michigan State Univeristy)	material in the TAR here.
E-2-243	A	23	44	23	49	The work on trying to assess the "correctness" of GCMs has also been addressed by other authors than Giorgi, Mearns and Tebaldi. I think the writer of this section should also consider the work presented in these two papers (1) Stainforth, D.A., et al., Uncertainty in predictions of the climate response to rising levels of greenhouse gases. Nature, 2005. 433(7024): p. 403-406, and (2) Murphy, J.M., et al., Quantification of modelling uncertainties in a large ensemble of climate change simulations. Nature, 2004. 430: p. 768 - 772. (Marie Ekstrom, University of East Anglia)	There have been a number of papers addressing this issue, but the references suggested here do not present this on a regional scale. We are restricting the discussion to methods designed for the regional scale. We have added Greene et al., since they also use weighting based on a bias factor. We also refer the reader to Chapters 10 and 11 of WG1 for more details.
E-2-244	A	23	44	23	49	Awkward and rather vague sentence. (Julie Winkler, Michigan State Univeristy)	Text has been removed.
E-2-245	A	23	47			Current or future regional probabilities of precipitation? (Julie Winkler, Michigan State Univeristy)	Phrase has been eliminated.
E-2-246	A	23	49			Comment: correct reference to Dessai et al (2005) (Irene Lorenzoni, University of East Anglia)	We have corrected the reference
E-2-247	A	23	49			"wider range of uncertainty" compared to what? Why would scaling regional patterns by the global mean change from a simple model result in a wider range of uncertainty? (Julie Winkler, Michigan State Univeristy)	By using pattern scaling more scenarios can be considered which often results in a wider range of uncertainty.
E-2-248	A	24	22			Projections of what? (Julie Winkler, Michigan State Univeristy)	Text has been removed.
E-2-249	A	24	26	24	38	This discussion highlights reasons why sophisticated, detailed, longrange models that integrate individual and societal behavior and scientific outlooks are greeted skeptically--appropriately so. (George Seielstad, University of North Dakota)	No response necessary.
E-2-250	A	24	29			"communicate the results"? To whom? (Julie Winkler, Michigan State Univeristy)	Text removed.
E-2-251	A	24	33	24	42	Where costs and benefits of adaptation are critical to whether it is implemented, the probability of exceeding critical thresholds for adaptation may be important in making decisions. (Barrie Pittock, CSIRO retired)	A similar point is made in the section on thresholds (2.3.1), but they are more likely to be used in situation where CBA is <u>not</u> feasible
E-2-252	A	24	36			"model-based test beds"? (Julie Winkler, Michigan State Univeristy)	Text has been removed.
E-2-	A	24	41	24	42	I don't follow the connection between this sentence and the previous sentence.	Text has been removed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
253						(Julie Winkler, Michigan State Univeristy)	
E-2-254	A	24	45			The subtropics under 2.2.3 don't all seem to fit under the heading "Methods", in the hierarchy of approaches, methods, and results. (Julie Winkler, Michigan State Univeristy)	The list of topics in the approaches and methods sections make this distinction much clearer
E-2-255	A	25	3	25	3	"most significant" in what sense? (Barrie Pittock, CSIRO retired)	Text has been removed
E-2-256	A	25	4	25	4	insert "(DAI)" for later use. (Barrie Pittock, CSIRO retired)	Text has been removed
E-2-257	A	25	4			reference to material earlier in the chapter. (Julie Winkler, Michigan State Univeristy)	Referenced to chapter 19; most of the earlier material has been removed
E-2-258	A	25	5	25	6	If most criteria are for a particular activity and location, then how can they be "representative on all scales from local to global"? (Julie Winkler, Michigan State Univeristy)	Text has been removed
E-2-259	A	25	9	25	9	Surely this should be "the upper limit"? (Barrie Pittock, CSIRO retired)	Text has been removed
E-2-260	A	25	9			Is a threshold really a "response"? (Julie Winkler, Michigan State Univeristy)	Has been edited for clarity
E-2-261	A	25	26			Reference to material later in the chapter. (Julie Winkler, Michigan State Univeristy)	Done (to coping range
E-2-262	A	25	28	25	31	James Surowiecki, The Wisdom of Crowds, New York: Random House (2004), makes an argument that often large groups of stakeholders make better decisions than a few supposed experts. (George Seielstad, University of North Dakota)	This is a valid observation, but the sentence prompting the comment has been removed for reasons of space.
E-2-263	A	25	36	25	40	I don't understand what is being said in this sentence. (Julie Winkler, Michigan State Univeristy)	Text has been cut down and edited
E-2-264	A	25	37	23	37	Spell out DAI (Marie Ekstrom, University of East Anglia)	Term no longer remains
E-2-265	A	25	37	25	37	DAI has not been defined previously. (Silvina SoLMan, CONICET - UBA)	Term no longer remains
E-2-266	A	25	37			"DAI"? (Julie Winkler, Michigan State Univeristy)	Term no longer remains
E-2-267	A	25	42			Section 2.2.3.2 describes attempts to predict what people will do if certain things happen. This is not a predictable product. The best to hope for is some crude guesses. The world has experienced several natural disasters recently. Exactly how people react is different in each disaster and not always what is expected. (George Seielstad, University of North Dakota)	We've tried to show the limitations of the predictive approach and some of the methods that deal with this. The fact that uncertainty exists does not mean that the methods described therein are always useless.
E-2-	A	25	47			Reference to material earlier in the chapter.	Not applicable. Section flows in context to the

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
268						(Julie Winkler, Michigan State Univeristy)	previous sections.
E-2-269	A	25				A box defining (and distinguishing between) threshold, critical threshold, and coping range would be useful here. (Julie Winkler, Michigan State Univeristy)	No room – we've tried to do this concisely in the text.
E-2-270	A	26	1	26	2	"a range of studies … involving a range of impacts models" Awkward. (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-271	A	26	2			"levels of climate"? (Julie Winkler, Michigan State Univeristy)	Text has been modified
E-2-272	A	26	8	26	15	Is the Mendelsohn and Williams study described because it is an example of a meta-analysis? (Julie Winkler, Michigan State Univeristy)	Reference to this study has been moved to the integrated assessment section (2.2.5). It is not described as a meta-analysis.
E-2-273	A	26	11			What are "former" and "latter" referring to? (Julie Winkler, Michigan State Univeristy)	Text has been removed
E-2-274	A	26	12	26	15	Move "… gross world product …" from line 15 to 12 where it was first used in this section (perhaps it was used even earlier). (Marie Ekstrom, University of East Anglia)	Text has been improved for clarity
E-2-275	A	26	17	26	33	The relevance of this paragraph to this chapter is not clear. What is the relationship between the results presented here to methodological advances in CCIAV? (Julie Winkler, Michigan State Univeristy)	Paragraph has been completely recast to report new developments in dynamic economic modelling.
E-2-276	A	26	17			"processes models"? (Julie Winkler, Michigan State Univeristy)	Checked.
E-2-277	A	26	35	27	41	Another stakeholder issue that is being explored is the competence of people to participate. (Elizabeth Malone, Joint Global Change Research Institute)	Text has been improved for clarity
E-2-278	A	26	35			A reference pertinent to Section 2.2.3.3 is James Burke, The Knowledge Web, New York: Simon and Schuster (1999). It describes the often tortuous path via which new knowledge is created. It helps define the value of stakeholder participation. (George Seielstad, University of North Dakota)	We believe the references already cited are sufficient to capture the value of stakeholder participation specific to CCIAV assessment. This reference is more general.
E-2-279	A	27	30	27	32	"have a part to play" Vague. (Julie Winkler, Michigan State Univeristy)	Text has been improved for clarity
E-2-280	A	27	40	27	40	Are there no studies involving stakeholders in developing countries? (Barrie Pittock, CSIRO retired)	Several such references have now been added.
E-2-	A	28	14	28	32	Perhaps choose other colour combination than red and green (consider those who	Figure has been revised to use red and yellow

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
281						suffers from colour blindness). (Marie Ekstrom, University of East Anglia)	shades. These translate to dark and light, respectively, in greyscale.
E-2-282	A	28	47			Would a better heading for this subsection be “Evaluation of Adaptation Options”? This alternate heading highlights that methods are being discussed here rather than the “adaptation approach” referred to earlier in the chapter. (Julie Winkler, Michigan State University)	This section has been moved as part of the methods reformat,
E-2-283	A	28	47			Would a better heading for this subsection be “Evaluation of Adaptation Options”? This alternate heading highlights that methods are being discussed here rather than the “adaptation approach” referred to earlier in the chapter. (Julie Winkler, Michigan State Univeristy)	This section has been moved as part of the methods reformat
E-2-284	A	28	47			Section 2.2.3.4 assesses adaptations, but primarily from a cost perspective. Adaptation strategies are much more complex. For example, it's not cost effective to rebuild hurricane-destroyed houses on a coastal sandbar or destroyed houses in New Orleans; yet that is exactly what is done. (George Seielstad, University of North Dakota)	The new section on adaptation assessment (2.2.3) raises the issue of decision making for financing adaptation.
E-2-285	A	28				Fig. 2.5 is schematic only. It is not clear what either axis is. It is more cartoonish than informative. (George Seielstad, University of North Dakota)	That is so – the lack of axis ID is to show that many variables fit this schema
E-2-286	A	29	5	29	8	The impact summary is too sparse. It seems there is more to extract from section 4.4.5 (Knute Nadelhoffer, University of Michigan)	Has been modified
E-2-287	A	29	6	29	18	A fourth point could be added. There is usually a cost to doing nothing. It should be calculated for comparison with cost benefit analyses of various actions. (George Seielstad, University of North Dakota)	Not applicable
E-2-288	A	29	14			It is not clear what type of criteria would be considered. (Julie Winkler, Michigan State University)	Expanded further
E-2-289	A	29	23			"Econometrica" is spelt wrongly. It should be "Metroeconomica" (Richenda Connell, acclimatise)	Checked
E-2-290	A	29	28	29	28	"A coastal road in the Pacific" is funny, since Pacific conjures up "ocean"! If possible, specify the island or country. (Karen O'Brien, University of Oslo)	Checked
E-2-291	A	29	38			“such adjustments”? Adjustments for climate extremes? (Julie Winkler, Michigan State University)	Addressed
E-2-292	A	29	39	29	40	Reference to material earlier in this chapter. (Julie Winkler, Michigan State University)	Has been done
E-2-293	A	29	45			“remit of vulnerability assessments? (Julie Winkler, Michigan State University)	Checked

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-294	A	29	46	29	47	"depends on whether the risk has or has not been reduced" -- reduced from what? (Karen O'Brien, University of Oslo)	This sentence has been reworded.
E-2-295	A	29	46			Are you saying that "risk assessment" has challenged the definition of vulnerability? (Julie Winkler, Michigan State University)	This sentence has been reworded
E-2-296	A	29	46			"whole range'? (Julie Winkler, Michigan State University)	Text elaborated
E-2-297	A	30	26	30	28	Some confusion here. Line 26 says that vulnerability was assessed by downscaling global scenarios (what type of scenarios?) to a regional level, whereas line 27 says that stakeholder participation was used to assess vulnerability. (Julie Winkler, Michigan State University)	Text has been omitted for space reasons.
E-2-298	A	30	30			AIACC programme? (Julie Winkler, Michigan State University)	Text omitted.
E-2-299	A	30	31			one too many 'included' (Clair Hanson, IPCC TSU)	Text omitted.
E-2-300	A	30	36	30	41	Should this paragraph be in the subsection on stakeholder involvement? (Julie Winkler, Michigan State University)	We have retained the paragraph here, because use of traditional knowledge is a recent advance in vulnerability assessment. However, there is also reference to this in the stakeholder section (2.3.2).
E-2-301	A	30	43			Section 2.2.3.7 gives the reader several approaches to integrated assessments. However, no statements are made about which work better than others. The reader is left to make his or her own judgement. The only lasting message is that several different approaches are being tried. A reader can't even tell if the effort is worthwhile. (George Seielstad, University of North Dakota)	Section rewritten, but the intention is not to compare methods; rather to indicate advances in a number of approaches treating different aspects of integrated assessment.
E-2-302	A	31	2	31	3	Why do simpler models better represent uncertainty? (Julie Winkler, Michigan State University)	Text has been clarified.
E-2-303	A	31	6			"within a single entity"? (Julie Winkler, Michigan State University)	Text has been removed
E-2-304	A	31	8			"these scales"? It is not clear what scales are being referred to. Spatial scales? Temporal scales? Both? (Julie Winkler, Michigan State University)	Text has been removed
E-2-305	A	31	10	31	19	How does this paragraph differ from what was already discussed in 2.2.3.2? (Julie Winkler, Michigan State University)	Not applicable. This section builds on integrated assessments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-306	A	31	12			Comment: O'Brien et al (2006) have also recently argued that synergies among sectors should be more thoroughly studied to better assess adaptive capacity and practical adaptation, with a focus on non-linear and indirect effects. See O'Brien, K., Eriksen, S., Sygna, L. and Naess, L.O. (2006) Questioning complacency: climate change impacts, vulnerability and adaptation in Norway, Ambio, 35(2): 50-56. (Irene Lorenzoni, University of East Anglia)	Reference has been added, though in connection with interrelationships between assessment approaches regarding adaptive capacity in section 2.2.1.
E-2-307	A	31	28			remove one of the 'that's (Clair Hanson, IPCC TSU)	Addressed
E-2-308	A	31	28			I don't understand what is meant by "while the physical impacts were weakly coupled in the policy environment"? (Julie Winkler, Michigan State University)	Text has been revised
E-2-309	A	31	31	31	31	Add re synergistic effects of multiple stresses on vulnerability, e.g., increased population in exposed coastal zones increase vulnerability to enhanced storm surges. (Barrie Pittock, CSIRO retired)	Addressed
E-2-310	A	31	35			what is intermediate complexity? (Clair Hanson, IPCC TSU)	Don't see the need to explain – this is standard terminology also used in WG I.
E-2-311	A	31	35			I suggest defining "Earth Systems Models" and distinguishing them from coupled climate models. (Julie Winkler, Michigan State University)	Don't see the need to explain – this is standard terminology also used in WG I.
E-2-312	A	31	38	31	42	Awkward sentence. (Julie Winkler, Michigan State University)	The sentence has been shortened.
E-2-313	A	31	38			Reference to material earlier in the chapter. (Julie Winkler, Michigan State University)	Done
E-2-314	A	31	39	31	42	This is one of the few descriptions of a result. It is appreciated. Examples like this make the text far more understandable. (George Seielstad, University of North Dakota)	Acknowledged
E-2-315	A	31	42	31	42	The simulated "Amazon die-back" also feeds back on climate through biogeophysical processes, reducing evapotranspiration and hence suppressing the recycling of moisture which accelerates the drying of the climate and increases the local warming. (Richard Betts, Met Office Hadley Centre)	Noted but little room to expand
E-2-316	A	32	2			"impact damage functions"? (Julie Winkler, Michigan State University)	Text has been removed
E-2-317	A	32	3			"such models" Are you referring to impact damage functions? (Julie Winkler, Michigan State University)	Text has been removed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-318	A	32	4			"frameworks"? Are you also referring here to impact damage functions? (Julie Winkler, Michigan State University)	Text has been removed
E-2-319	A	32	10	32	10	This impact summary is also too brief. It does not do encapsulate the major points of section 4.4.6 (Knute Nadelhoffer, University of Michigan)	Text has been removed
E-2-320	A	32	12			"smaller local and regional thresholds"? Smaller in scale? Or do you mean lower thresholds? (Julie Winkler, Michigan State University)	Text has been removed
E-2-321	A	32	14			"such thresholds" Aggregated thresholds? Or thresholds for global mean temperature change? (Julie Winkler, Michigan State University)	Text has been removed
E-2-322	A	32	23			"potential"? (Julie Winkler, Michigan State University)	Text has been removed
E-2-323	A	32	24	32	26	Does the Webster et al reference use a probabilistic framework? (Julie Winkler, Michigan State University)	Text has been removed
E-2-324	A	32	24			Have IAMs been used before? If not please spell out. (Marie Ekstrom, University of East Anglia)	Text has been removed
E-2-325	A	32	28	33	9	This still reads too much like technical experts who have the "true knowledge" about risk transmitting their knowledge to lay people who not only know little but also have poor strategies for decision-making. Experts are faulty and prone to error, too -- even in their decision-making processes. The point is that each stakeholder, including researchers, has knowledge to share so that better decisions can be made. Tversky and Kahneman focus on individual decision-making, but research also consistently shows that groups make better decisions than individuals. (Elizabeth Malone, Joint Global Change Research Institute)	This criticism is correct, and represents a faulty emphasis in the earlier versions. In rewriting, we have attempted to point out the very different views towards decision-making in general, which in turn affects how one views the relative roles of experts and others.
E-2-326	A	32	35			Comment: in relation to errors of judgement, could also refer to Slovic, P., Finucane, M. L., Peters, E. and MacGregor, D. G. (2004) Risk as analysis and risk as feelings: some thoughts about affect, reason, risk and rationality, Risk Analysis, 24(2), pp. 311–322. (Irene Lorenzoni, University of East Anglia)	This has been added.
E-2-327	A	32	38	32	38	How does overestimation of the likelihood of low probability events increase exposure to harm? (Barrie Pittock, CSIRO retired)	Sentence has been revised.
E-2-328	A	32	40	32	46	Duplicative of information already presented in the stakeholder involvement subsection. (Julie Winkler, Michigan State University)	The discussion here is directed more and in greater depth towards the communication of risk and uncertainty.
E-2-	A	32	40		43	sentence is too long	The sentence has been shortened

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
329						(Clair Hanson, IPCC TSU)	
E-2-330	A	32	48			In this section, reference is made to stakeholder dialogues in risk assessment and threshold definition. It might be worth mentioning the decisive role of framing in presenting the alternatives: people tend to be risk-adverse, value what they have (like it or not) higher than what they might gain (see e.g. the divergence of willingness to pay versus to accept compensation, up to a factor of eight or ten). Depending on how the questions are asked and the information presented, different basic orientations will be mobilised, with divergent if not opposite outcomes. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	This is a useful suggestion, and has been incorporated in the revised draft, including a reference to a framing study.
E-2-331	A	33	4			Comment: reference could be made to Dempsey R and Fisher A (2005) Consortium for Atlantic Regional Assessment: information tools for community adapation to changes in climate or land use. Risk Analysis, 25(6):1495-1509 (see attached). This paper emphasises different requirements for climate change information by various decision makers on the east coast of the US, with emphasis on localised, short-term projections - amongst others- which this chapter also touches upon. (Irene Lorenzoni, University of East Anglia)	This is a useful suggestion, and has been incorporated.
E-2-332	A	33	8			give the chapter number (Clair Hanson, IPCC TSU)	Full reference has been given.
E-2-333	A	33	12	33	49	I found the section on data needs to be overly general and too brief. (Julie Winkler, Michigan State University)	This section has been reworked to include updated and extended information on grecent global datasets.
E-2-334	A	33	15			Peraps give example of one of these "ongoing programmes"? (Marie Ekstrom, University of East Anglia)	Extensively cross-referenced
E-2-335	A	33	15			“ongoing programmes”? such as? (Julie Winkler, Michigan State University)	Extensively cross-referenced
E-2-336	A	33	16			“for a project”? Do you mean for an assessment? (Julie Winkler, Michigan State University)	Text has been edited
E-2-337	A	33	24	33	28	Are these bullets data requirements? If so what types of data are you referring to by “the internal functions of the system”? What type of data is needed for the “interactions and resultant integrated behaviors”? (Julie Winkler, Michigan State University)	Bullets removed
E-2-338	A	33	24		28	the two lines before the bullted list don't refer to the bullet points. They need to be rephrased (Clair Hanson, IPCC TSU)	Bullets removed and text edited
E-2-339	A	33	30			What is “this” referring to? Also what is meant by “integrated data’? (Julie Winkler, Michigan State University)	Text has been removed
E-2-	A	33	44			“resources” is probably better than “resourcing”	Text has been edited

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
340						(Julie Winkler, Michigan State University)	
E-2-341	A	33	47	33	48	"climatic adverse events"? (Julie Winkler, Michigan State University)	Text has been revised
E-2-342	A	33	47			the recent history past climatic disasters in L.A.' This doesn't make sense (Clair Hanson, IPCC TSU)	Spelled out
E-2-343	A	33	47			"the recent history past climatic disasters"? (Julie Winkler, Michigan State University)	Text has been edited
E-2-344	A	34	4			"the coverage of different sectors is very different" Awkward sentence. (Julie Winkler, Michigan State University)	Text has been edited
E-2-345	A	34	13			reference to material earlier in this chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-346	A	34	23			reference to material later in this chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-347	A	34	26			reference to material later in this chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-348	A	34	50			Section 2.3.1.2 is the most useful in the chapter. It summarizes an enormous amount of information. It seems misplaced. It would be far more valuable at the beginning of the chapter. (George Seielstad, University of North Dakota)	This section has been moved forward in the chapter
E-2-349	A	35	1	35	4	Quite a number of the studies reported in this assessment did not use the SRES-based climate scenarios. I would agree that most current studies use climate scenarios that were developed from the SRES emission scenarios, but I question that many use regional-level socio-economic scenarios developed from the SRES storylines. (Julie Winkler, Michigan State University)	We have surveyed the chapters in this volume to determine the frequency of use of SRES-based scenarios, and we agree that fewer non-climate scenarios are based on SRES than climate scenarios. We have stated this in the text.
E-2-350	A	35	31	35	39	Is this paragraph necessary? (Julie Winkler, Michigan State University)	We have revised this paragraph to include the latest projections from WG I. It is retained because it frames some of the information in the SPM
E-2-351	A	35	39			reference to material earlier in the chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-352	A	35	41	35	49	This paragraph is duplicative of the one above on lines 1-4. (Julie Winkler, Michigan State University)	No, this contrasts recent and earlier SRES-based AOGCM runs; the earlier paragraph discusses SRES- and non-SRES-based projections
E-2-353	A	35				Figure 2.6 compresses the 4 options into such small bites of information that it is not a useful summary.	Space constraints force us to keep this concise. The SRES stroylines are described at

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(George Seielstad, University of North Dakota)	length in the TAR, so we feel that too much repetition of that material is unmerited.
E-2-354	A	36	2	36	44	This material does not seem appropriate for this chapter. It describes projected climate changes from global models rather than developments in assessment methods. Also Figure 2.7 and Table 2.5 do not fit with the theme of this chapter. (Julie Winkler, Michigan State University)	We disagree – we have been asked to introduce the climate scenario assumptions underpinning the report, and since these are largely based on pre-TAR AOGCM runs, we need to summarise these, briefly and compare them to the most recent AOGCM results summarised in WG I, but not applied in the studies reviewed in WG II.
E-2-355	A	36	2			DDC has not been defined. (Julie Winkler, Michigan State University)	It is defined in the previous paragraph
E-2-356	A	36	28	36	44	Note that Chapter 10 of WG1 also includes results from the Coupled Climate-Carbon Cycle Model Intercomparison Project (C4MIP), in which all the models show a positive feedback on climate change from the carbon cycle. At the recent WG1 LA4 meeting there was extensive discussion on how to reflect this in the "envelope" of projections - it will be included somehow. Best to check with the CLAs on the headline message from that - I think the implication of C-cycle feedbacks should be mentioned here. But NB. C-cycle feedbacks not included in Ch 11 because the RCMs have not been used in this context yet. (Richard Betts, Met Office Hadley Centre)	Carbon cycle feedback is now mentioned in the description of the global mean warming response.
E-2-357	A	36	41	36	42	I presume this is scaling in regard to different scenarios, but it is an assumption. (Barrie Pittock, CSIRO retired)	We have clarified the wording
E-2-358	A	36	47			"regionalization methods" Are you referring here to downscaling and scenario construction? If so, the terminology is not consistent with what was used earlier in the chapter. (Julie Winkler, Michigan State University)	Yes, this is consistent usage with TAR chapter 10, WG I, where it was introduced. We have added a footnoted explanation in the text, and have checked the usage throughout the chapter.
E-2-359	A	36	50			Reference to material earlier in the chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-360	A	37				Figure 2.7a is very powerful. It takes considerable study; on the other hand, it presents a wealth of information. (George Seielstad, University of North Dakota)	No action required
E-2-361	A	38				Likewise for Fig. 2.7b. It is somewhat more difficult to follow than 2.7 a, but nevertheless valuable. (George Seielstad, University of North Dakota)	We have simplified this somewhat to make it easier to interpret.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-362	A	39	12	40	10	This material also does not fit into a chapter on assessment methods. (Julie Winkler, Michigan State University)	Again, we are providing some background to the projected changes assumed in this report.
E-2-363	A	39	19	40	10	Extremely valuable to condense the key conclusions in such a handy form. (George Seielstad, University of North Dakota)	No action required
E-2-364	A	39				Table 2.5 is excellent. (George Seielstad, University of North Dakota)	No action required
E-2-365	A	40	12	40	34	This material could easily be incorporated into the previous section on sea-level scenarios. (Julie Winkler, Michigan State University)	We have retained this as a Box in the new sea-level section.
E-2-366	A	40	19	40	19	If WGI indeed only presents SL rise scenarios for the A1B emissions scenarios, this is a remarkable change from the TAR, and may lead to great confusion. Strong warning needed as to interpretation. See my comment on next paragraph also. (Barrie Pittock, CSIRO retired)	This paragraph has been revised on the basis of the revised WG I statements. Caveats are included in this explanation.
E-2-367	A	40	24	40	34	Again, if only A1B scenarios are used, and the latest results of observations of accelerated outlet glaciers in Greenland and Antarctica, and new mechanisms related to effects of surface meltwater penetration into glaciers and ice shelves are not included in ice flow modelling, then large caveats must be put on any SL rise scenarios. Actual SL rise by 2100 might be much larger. See my article in EOS, July 2006 for references. (Barrie Pittock, CSIRO retired)	Very valid points but they might be better addressed by Chapter 10 of WGI which treats projections of sea level rise. This section is intended to summarise SRES-based sea level rise scenarios. But reference material provided by reviewer is gratefully acknowledged and has been passed onto Chapter 10 of WGI CLAs.
E-2-368	A	40	36	40	51	This section is somewhat confusing as gas composition scenarios were not defined as a major scenario type earlier in the chapter. (Julie Winkler, Michigan State University)	We have added a new section on scenarios of atmospheric composition (section 2.4.6.2)
E-2-369	A	40	36			Section 2.3.1.4. There needs to be a much fuller discussion of scenarios of particulates (aerosol) since they have led to "global dimming" and this is decreasing. What assumptions are made in the SRES scenarios and how do they stand up now? Again, see my EOS article July 2006 for references. (Barrie Pittock, CSIRO retired)	This discussion would seem to be more appropriate in WG I, where it is treated at length in Chapter 3.
E-2-370	A	40	39			reference to material later in this chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-371	A	40	51	40	51	Was the 1,260 ppm actually used in the GCMs in the TAR? If not then that it worth mentioning here. (Richard Betts, Met Office Hadley Centre)	These values are now related to those commonly applied in impact studies (which is the reason for their inclusion in this chapter)..
E-2-372	A	41	1	41	1	Should mention that C4MIP (see my earlier comment) implies a faster rate of CO2 concentration rise for a given emissions scenario (Richard Betts, Met Office Hadley Centre)	This has been added

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-2-373	A	41	3	44	43	This material can be shortened and incorporated into the earlier discussion of scenarios. (Julie Winkler, Michigan State University)	We have decided to keep the material here (albeit in Boxes now), since the earlier discussion is of new developments in scenario methods, while the boxes summarise the current status of the SRES scenarios.
E-2-374	A	41	16		20	the SRES scenario figures remain credible – does that refer to all scenarios, or does it mean that the observable figures arte covered by at least one scenario? (Joachim H. Spangenberg, Sustainable Europe Research Institute)	The text has been clarified to indicate that "credible" means that SRES assumptions lie within the current range of projections.
E-2-375	A	41	22	41	37	Emphasise the agreement over S and E Asia, where most growth is occurring economically and in emissions. (Barrie Pittock, CSIRO retired)	Text was edited to include this point.
E-2-376	A	41	36	41	36	"both" what? (Barrie Pittock, CSIRO retired)	Both GDP metrics (PPP and MER). Original text has been revised for clarity.
E-2-377	A	42	10		16	This should include a referene to p. 19, lines 9-14. (Elizabeth Malone, Joint Global Change Research Institute)	Disagree: the discussion here concerns land use change; the earlier reference is to more general socio-economic scenarios.
E-2-378	A	43	8	43	8	"compares" in what way? Surely this is a very coarse grouping of similar types of scenarios, not a close comparison. (Barrie Pittock, CSIRO retired)	We have described this as comparing the scenario classifications. For the analysis done by Raskin and Westhoeck though, quite a number of features of the various exercises were compared to each other.
E-2-379	A	43	10			Reference to material earlier in this chapter. (Julie Winkler, Michigan State University)	Noted – no action required
E-2-380	A	43	12	43	13	Presume text references will be cleaned up. (Barrie Pittock, CSIRO retired)	Done
E-2-381	A	43	12		13	bracketed information doesn't make sense (Clair Hanson, IPCC TSU)	Done
E-2-382	A	43	21		22	SRES scenarios indeed discuss global integration, but I still do not see how the assumptions regarding the growth of GDP and population, technology development and governance are derived plausibly from these core storylines. If that is discussed in more detail in chapter 3 WG 1 (I didn't have the time to look it up), a cross-reference would be helpful. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	We do not have space to discuss the quantification of these scenarios (which is mentioned in the first paragraph.. The comparison is presented merely to indicate that there are other global scenarios than SRES available for application in CCIAV assessments.
E-2-383	A	43				T2.6: why is there an * after WBCSD and not after the others? (Clair Hanson, IPCC TSU)	This has been modified
E-2-	A	44	7	44	40	Perhaps less directed at this report than at the state of research: The use of	No response necessary.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
384						mitigation scenarios is not very well represented in the other chapters of this report (regionally specific chapters). (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	
E-2-385	A	44	17			Reference to material earlier in this chapter. (Julie Winkler, Michigan State University)	Noted. No response necessary.
E-2-386	A	44	19			This subheading does not describe the contents of section, which in fact fits better over the preceding paragraph. (Barrie Pittock, CSIRO retired)	Sub-headings have been dropped
E-2-387	A	44	29	44	43	There are several expressions such as "stabilisation at X ppm" in Section 2.3.2.2 and Table 2.7. While the reader might be able to guess that these do not refer to stabilisation levels of GHGs concentration (including non-CO2 gases as well as CO2; unit=ppm-CO2eq) but to stabilisation levels of CO2 concentration (excluding non-CO2 gases; unit=ppm), the meaning of "stabilisation at X ppm" should be clearly noted to avoid confusion. (Kiyoshi Takahashi, National Institute for Environmental Studies)	We have revised the text to make explicit reference to CO_2-only and CO_2-equivalent stabilisation
E-2-388	A	44	29		40	This section should perhaps note the tendency of researchers to move to radiative forcing instead of CO2 concentrations as a metric for stabilization. One example from the mitigation community is Weyant, J.P., and F. de la Chesnaye. 2005. Multigas scenarios to stabilize radiative forcing. Energy Journal, Special Edition on Multi-gas Scenarios and Climate Change. (Elizabeth Malone, Joint Global Change Research Institute)	We have added references to radiative forcing
E-2-389	A	45	3	45	50	I found there to be a “disconnect” between what the authors list as the key conclusions and what was actually discussed in the chapter. (Julie Winkler, Michigan State University)	This section has been rewritten to be better supported by the main text of the chapter.
E-2-390	A	45	6	45	8	This sentence is unnecessary. (Julie Winkler, Michigan State University)	We have revised the sentence, but still believe it to be a true reflection of early impact assessments.
E-2-391	A	45	6	45	8	It is fine to say that climate change is already underway and that the natural environment and human societies are adapting to its consequences, but it should also be pointed out that some losses are also being incurred (lives lost, damage to infrastructure, decline of species, etc.). Not everyone is adapting successfully to the climate change that is already underway.. (Karen O'Brien, University of Oslo)	The text has been revised to offer a more neutral perspective of recent impacts and adaptation.
E-2-392	A	45	11	45	16	These two headings appear contradictory, maybe on purpose. It would be better to change each to "Some aspects of uncertainty has …" (Barrie Pittock, CSIRO retired)	Bullet points have been redrafted into a single paragraph.
E-2-	A	45	11	45	16	The use of the key conclusions:"Uncertainty has been reduced" followed by	Bullet points have been redrafted into a single

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
393						"Uncertainty has increased" is confusing and contradicting, which way is it, you need to be clearer than this. I'm not sure that the IPCC should say that uncertainty has reduced anyway, considering the community is still trying to find robust methods to assess/compare models and their uncertanties. One of the titles should be renamed to something more appropriate. (Marie Ekstrom, University of East Anglia)	paragraph.
E-2-394	A	45	11	45	18	Readers may be baffled by two contradictory statements: "Uncertainty has been reduced", followed by "Uncertainty has increased." (George Seielstad, University of North Dakota)	Bullet points have been redrafted into a single paragraph.
E-2-395	A	45	11	45	15	But this conclusion wasn't really shown in this chapter. This seems like a key conclusion for a different chapter, perhaps a chapter in the WGI report. (Julie Winkler, Michigan State University)	Paragraph has been redrafted for clarity and related to text.
E-2-396	A	45	11	45	23	A summary of changes in uncertainty is valuable and important, but this presentation is too vague to be of use. Wherever possible, the changes in uncertainty should be quantified. For example, the range of climate sensitivity has been narrowed from 1.5 - 4.5 C, to 2 - 4.5 C, and for the first time, WG I has been willing to provide a best estimate, 3 C. It would be valuable to provide this type of quantification to policymakers. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	Paragraph has been redrafted for clarity and related to text.. However, quantification of the uncertainties in impacts, adaptation and vulnerability seems to be an intractable task, as there are multiple metrics that might be used at varying scales. No equivalent metric to global mean temperature change can readily be identified or would make much sense in the context of this report.
E-2-397	A	45	16	45	18	Here you say that uncertainty has increased but the previous bullet says that uncertainty has been reduced. Very confusing. (Julie Winkler, Michigan State University)	Bullet points have been redrafted into a single paragraph.
E-2-398	A	45	19	45	19	I think that uncertainties in translating emissions to concentrations (due to carbon cycle feedbacks) should be included here. (Richard Betts, Met Office Hadley Centre)	This is really a WG I issue. Our two examples relate to WG II-oriented issues..
E-2-399	A	45	20	45	23	Has this bullet point been sufficiently demonstrated (proven) in this chapter? (Julie Winkler, Michigan State University)	Yes, we believe it has been well demonstrated at several points in the chapter (relating to economic assessments, socio-economic scenarios and land use change scenarios)
E-2-400	A	45	29	45	42	This paragraph and bullet points seem like a good lead in to the conclusion sections. This list of needs could then be followed by summary points on the progress to date in developing methods to meet these needs. (Julie Winkler, Michigan State University)	Text has been revised to reflect this point.
E-2-401	A	45	29	46	50	Understandably, this assessment is from a researcher perspective, with policy-makers falling into a some broad category of stakeholders. As a policy-maker I find	We have referenced some of this work elsewhere in the text and have made our

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						the assertions here somewhat annoying, as they fail to reflect the reality that decisions are being made every day, at a range of levels, and do not necessarily reflect the priorities of decision-makers, or what needs to happen next. Decision-makers and researchers priorities are not necessarily the same. I am sending in three documents to the TSU (two of which I referred to in my last review of this chapter. If it is too late to refer to these, the points they make can be identified elsewhere in the literature. (Merylyn Hedger, Environment Agency)	observations in this section about decision makers less prescriptive.
E-2-402	A	45	29		42	see comment on page 21 (Joachim H. Spangenberg, Sustainable Europe Research Institute)	The connection between comment on Pg21 and the sentence here is not clear. The original text has been revised.
E-2-403	A	45	34			“reliable estimates of impacts to be expected” Awkward. (Julie Winkler, Michigan State University)	Text has been revised
E-2-404	A	45	37	45	37	Replace "quantification" with "estimation". (George Seielstad, University of North Dakota)	Revised as suggested.
E-2-405	A	45	40	45	40	Add costing of doing nothing in the face of future change. (George Seielstad, University of North Dakota)	This has been implied in “outcomes”.
E-2-406	A	45				The statement 'uncertainty reduced' followed by the next statement 'uncertainty increased' is confusing. (Clair Hanson, IPCC TSU)	Bullet points have been redrafted into a single paragraph.
E-2-407	A	46	5		5	At the national level, but also include the future of global trade and financial flows. (Joachim H. Spangenberg, Sustainable Europe Research Institute)	We have added this point.
E-2-408	A	46	18	46	21	This still reads too much like technical experts who have the "true knowledge" about risk transmitting their knowledge to lay people who not only know little but also have poor strategies for decision-making. Experts are faulty and prone to error, too -- even in their decision-making processes. The point is that each stakeholder, including researchers, has knowledge to share so that better decisions can be made. Tversky and Kahneman focus on individual decision-making, but research also consistently shows that groups make better decisions than individuals. (Elizabeth Malone, Joint Global Change Research Institute)	The bullet point has been revised to account for this and other comments.
E-2-409	A	46	18	46	21	This misses the essential aspect of communicating risk, which is that uncertainties do not obviate risk. Risk is probability by consequences, so even small probability impacts may be important risks. This is what many critics tend to ignore when they argue that CC is so uncertain that we had better not act but just do more research. (Barrie Pittock, CSIRO retired)	The bullet point has been revised to account for this and other comments.
E-2-410	A	46	18			This bullet point talks about "Effective communication of the risks and opportunities of CC". I consider it should also say that uncertainties need to be	The bullet point has been revised to account for this and other comments.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						effectively communicated. (Richenda Connell, acclimatise)	
E-2-411	A	46	18			Comment: in relation to this bullet point, I would also propose emphasising that communication of climate change needs to be tailored to the audience, as studies of publics and stakeholders have many times pointed out that different personal and social contexts will affect the way people understand, assimilate and use information. This is acknowledged in most communication documents about climate change. See for instance, Moser & Dilling (2004) in Environment, and the Futerra 'Rules of the Game' document to the UK Department of the Environment, Food and Rural Affairs (DEFRA) see http://www.futerracom.org/downloads/RulesOfTheGame.pdf (Irene Lorenzoni, University of East Anglia)	The bullet point has been revised to account for this and other comments.
E-2-412	A	46	50	46	50	I would add an important extra dot point: The risk from singular events may be catastrophic, so the likelihood and consequences of such events merits special attention, e.g., that the Greenland Ice Sheet might disintegrate rapidly, or major changes in ocean circulation might disrupt surface climate. (Barrie Pittock, CSIRO retired)	The Executive Summary already mentions that singular events have begun to be considered in CCIAV studies.