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**IPCC Synthesis Report  
Fourth Assessment Report**

*Formal Government and Expert Review of First Order Draft*

**EXPERT and GOVERNMENT COMMENTS – TOPIC 2**

**All Batches (July 27, 2007)**

**Review Editors:**  
Roxana Bojariu, Romania  
David Hawkins, USA

**IPCC Synthesis Report - Fourth Assessment Report (All comments – Topic 2 – July 27, 2007)**

Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-1	E-2-1	A	0				no Comment (Ian Church, Yukon Government)	Noted
2-2	E-2-2	A	0				message is clear. It is fine with the draft (Hisayoshi Morisugi, Japan Research Institute)	Noted
2-3	E-2-3	A	0				It seems more logical to me to start with current section 2.2 (drivers of climate change), and then give more details on greenhouse gases (current section 2.1), which are of course the most important drivers. (Zoltán Somogyi, Hungarian Forest Research Institute)	Rational for the ordering is included
2-4	E-2-4	A	0				In is not made absolutely clear to the average reader that other greenhouse gases than CO2 have a higher radiative forcing per emission unit, e.g. CH4 and N2O (this can be calculated from the figures, but should be made more obvious). (Ulf Molau, Göteborg University)	Space limitations prevent this.
2-5	E-2-5	A	0				Comment. This topic gives great weight to the changes in emissions of CO2 and related greenhouse gases but hardly makes any comment about aerosols and their negative contribution to the warming signal, and in particular to the time variations aerosols have had on the temperature record. I believe this balance could be addressed by the inclusion of one more dot point on aerosols in section 2.2 and a slight addition to the opening words in this section about contribution of aerosols to the overall temperature record. (Nathaniel Bindoff, CSIRO MAR and University of Tasmania)	Impact of aerosols is included in 2.2.
2-6	E-2-6	A	0				Causes of change are clearly presented - no specific comments (Michael Brady, Natural Resources Canada - Canadian Forest Service)	Noted
2-7	G-2-1	A	0				We suggest the topic would be easier to read if its scope and structure were set out briefly in introductory text, before section 2.1, e.g.: "In this topic, we consider the emissions of greenhouse gases that have been occurring, how these and other factors have affected the atmosphere, and the resulting effects on climate." (Government of New Zealand)	Rational for the ordering is included
2-8	G-2-2	A	0				Topic 2: A table should be provided to make the emission and concentration data easier to assimilate being in a less textual format. (Government of Colombia)	Rejected because of space limitations
2-9	G-2-3	A	0				The concepts of radiative forcing and global warming potential/CO2 equivalent are somewhat mixed up in the text. These important concepts need to be presented clearly and logically in the context of the report. (Government of Ireland)	See glossary and Box2.1
2-10	G-2-4	A	0				It seems more logical to start with current section 2.2 (drivers of climate change), and then give more details on greenhouse gases (current section 2.1) which are of course the most important drivers.	Rational for the ordering is included

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of Hungary)	
2-11	G-2-5	A	0				It is suggested to include under topic 2 the following very policy relevant and robust finding: Impacts due to altered frequencies and intensities of extreme weather, climate and sea-level events are very likely to change. (WG II Table SPM-2) (Government of Austria)	Belongs in topic 3
2-12	G-2-6	A	0				In this topic, natural forcing, such as solar activity, cloud effect etc., should be considered. (Government of China)	Is included in 2.2
2-13	G-2-7	A	0				General comment. To include the terms "forcing" and "driver" in the Glossary (Government of Russian Federation)	Forcing included in the glossary. Driver defined in the text.
2-14	G-2-8	A	0				Add some descriptions to the calculation method and meaning of the confidence. (Government of China)	Is included in glossary
2-15	E-2-7	A	1	1	1	1	using "understanding and attributing changes" to replace "causes of change" (Zong-Ci Zhao, China Meteorological Administration)	Rejected because plenary approved titles cannot be changed
2-16	E-2-9	A	1	1	1	1	"causes of change" should include both natural and human-made changes. This topic only concentrates to anthropogenic cause. Suggestion is to add some paragraphs to talk about natural cause. (Zong-Ci Zhao, China Meteorological Administration)	Natural causes are discussed in 2.2.
2-17	E-2-10	A	1	1	1	1	"Cause of CLIMATE change" ?? (Keith Shine, University of Reading)	Rejected because plenary approved titles cannot be changed
2-18	G-2-9	A	1	1	1	1	Please expand on the title of this topic, so that it can stand alone, and also so that it is consistent in style with the following topic title. We suggest: "Causes of observed change, up to the present day" (Government of New Zealand)	Rejected because plenary approved titles cannot be changed
2-19	E-2-8	A	1	1			Suggest title change to 'Causes and attribution of climate change'. Suggest that this topic start with Section 2.2 Drivers of climate change because it is the more general aspect. Section 2.1 Emissions of greenhouse gases is a subtopic of Section 2.2. (David Fahey, NOAA Earth Science Research Laboratory)	Rejected because plenary approved titles cannot be changed. Rationale for ordering given at start of section.
2-20	E-2-12	A	1	5	1	5	Change title to "Recent emissions of greenhouse gases" (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected because "recent" is an ill defined term.
2-21	G-2-13	A	1	5	1	5	Change title to "Recent emissions of greenhouse gases" (Government of Hungary)	Rejected because "recent" is an ill defined term

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2-22	E-2-11	A	1	5			Section 2.1: In this section some explanation of the CO2 sources from forestry and agriculture is required, which constitute a large fraction of the overall amount (cf. Fig. 2.1). Also, their temporal variability may be briefly portrayed in Section 2.2. (Dieter Gerten, Potsdam Institute for Climate Impact Research)	We don't explain any sectors in detail; thus cannot discuss forestry and agriculture in more detail; see full reports
2-23	G-2-10	A	1	5			The term emission, is one of the key terms. We propose to add this term into Glossary (Government of Russian Federation)	Rejected; is not a technical term
2-24	G-2-11	A	1	5			The authors should consider whether section 2.1 would be better placed after section 2.2. Logically discussion of the broad drivers of climate change should come before the more specific topic of emissions of greenhouse and how they relate to climate change. (Government of Australia)	Rational for the ordering is included
2-25	G-2-12	A	1	5			Given the short time scale considered in Section 2.1 (1970) and focus on anthropogenic emissions, suggest moving the section to the end of Topic 2, or lengthening the time scale to 1750 and including natural emissions. In either case, carbon uptake needs to be added to the discussion. As is, the section does not provide all the necessary information required to properly inform Section 2.2. (Government of United States)	No consistent dataset for all the gases is available prior to 1970  Sentence added to start of section 2.2 discussing emissions versus uptake. Uptake is also mentioned in section 2.3
2-26	G-2-16	A	1	7	1	8	For the opening heading of a new Topic, the first sentence needs to be more expository. General readers will not be able to place the 0.69 GtCO <sub>2</sub> -e figure in context. More useful is the 70% increase statistic included at line 14 and, as such the authors should consider replacing the sentence on lines 7-8 with that at lines 13-15. The authors should also consider providing more of the raw figures of greenhouse gases in the atmosphere. (Government of Australia)	Accepted
2-27	E-2-15	A	1	7	1	11	The first sentence relates to all GHGs, the second switches to CO <sub>2</sub> , and the third is back to all GHGs again. The "dominant factors" cited in the second sentence are different from those cited on page 2, lines 9 & 10, for the same time period, and on page 3, lines 20 & 21, although the latter is for a much longer time period. The term "carbon intensity" does not appear in the glossary. The entire bold faced beginning paragraph should be eliminated. This would be a considerable improvement, for the next two paragraphs, altered and corrected as noted below, would make the beginning text of this Topic much stronger and more helpful to the reader. (Richard Soulen, None)	Taken into account
2-28	E-2-16	A	1	7	1	11	How the anthropogenic emissions of greenhouse gases have increased and the countrywise distribution is a very useful information and finding. The differences between developed and developing nations in terms of greenhouse gas emissions are brought out clearly. (Ramachandran Srikanthan, Physical Research Laboratory)	Noted

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2-29	G-2-14	A	1	7	1	11	The ongoing consumption of fossil fuels is a key driver of CO2 emissions which is not mentioned here, and should be. (Government of Australia)	The dominance of fossil fuels is noted in section 2.2.
2-30	G-2-15	A	1	7	1	17	Note lack of certainty language. Also lines 37-40. (Government of Australia)	No certainty language in original document
2-31	E-2-14	A	1	7	1	40	This page is deficient in several ways and should be rewritten. Flow of information is interrupted in several ways making the important content less easy for the reader to grasp. There is inconsistency between material on this page and subsequent material. There are inconsistencies among some of the numerical data presented on this page. One term that is used is not defined. Specific comments follow. (Richard Soulen, None)	Noted. Text has been revised.
2-32	E-2-13	A	1	7	7	26	To add "(GHGs)" after "greenhouse gases" and then elsewhere in the text of this Topic to replace "greenhouse gas(es)" with "GHG(s)" (moreover, the term "Greenhouse gas (GHG)" is included in the Glossary, p. 13) (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Accepted
2-33	E-2-19	A	1	8	1	8	Insert "per capita" before the word "GDP". (Kenneth Ruffing, N/A)	Comment no longer relevant since text has been revised to improve clarity of text.
2-34	G-2-18	A	1	8	1	8	It would help to include a footnote or box in the Glossary to explain "Gt" and other units. (Government of Australia)	Rejected. Standard units.
2-35	E-2-17	A	1	8	1	9	This is actually an assumption of the models. It is really the case that population and GDP growth without very much in the way of attempts to control emissions that have led to increased emissions. If we really believe that population and GDP growth lead inevitably to increased emissions, we may as well give up mitigation attempts. (Elizabeth L Malone, Pacific Northwest National Laboratory)	Taken into account. This sentence deleted.
2-36	G-2-17	A	1	8	1	9	The sentence on population and GDP growth is too aggregate and general, and implies that reducing CO2 emissions requires reducing population and/or GDP growth. (Government of United States)	Taken into account. Sentence deleted.
2-37	E-2-18	A	1	8	1	11	Population and GDP growth as dominant factors contributing to observed CO2 emission growth is followed by a more accurate clarification that "developed" countries have higher per capita emissions with lower carbon intensity than "developing" countries. This important recognition, again, may be necessary to emphasize in the SPM. (Peter Liotta, Pell Center for International Relations and Public Policy)	Noted. This point now made at end of section 2.1 and in Fig 2.2.
2-38	G-2-19	A	1	8	1	11	For the lay audience, define CO2-equivalent by referring to Box 2.1 and define carbon intensity of GDP. The authors should also provide a footnote as to what Annex I countries are.	Taken into account; terms are defined in glossary

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							(Government of Australia)	
2-39	G-2-21	A	1	10	1	10	Replace "(Annex I)" by "(UNFCCC Annex I)" (Government of Republic of Benin)	Accepted
2-40	E-2-20	A	1	10	1	11	It would be useful to specify in full "Annex I UNFCCC" since this is the reference used in page 2 line 24. In addition, a footnote defining "carbon intensity of GDP" and "per-capita emissions" would make this document more accessible to non-specialists. (Annarita Mariotti, ENEA)	Taken into account; terms are defined in glossary
2-41	E-2-21	A	1	10	1	11	Could add "UNFCCC" to the "Annex I" and "non-Annex I" specifiers here. (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Accepted
2-42	G-2-20	A	1	10	1	11	The term "carbon intensity" needs to be explained here. (Government of European Community)	See glossary
2-43	G-2-22	A	1	10	1	11	Mention if this is for GDP at MER rates or PPP. (Government of Canada)	It's PPP and this is made explicit in the text and figure 2.2.
2-44	E-2-23	A	1	11	1	11	"carbon intensity" may be explained in the glossary (Harald Pauli, University of Vienna & Austrian Academy of Sciences)	Accepted
2-45	G-2-23	A	1	11	1	11	Please clarify, whenever used, whether referring to carbon or total greenhouse gas intensity (e.g., shouldn't "lower carbon intensity" be "lower greenhouse gas intensity"?). (Government of United States)	The term carbon intensity is defined in the glossary.
2-46	E-2-22	A	1	11			rather than "lower carbon intensity" don't you mean "lower greenhouse gas intensity" (Bruce McCarl, Texas A&M University)	Sentence deleted.
2-47	G-2-24	A	1	13	1	13	Presumably the glossary will define CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> (Government of Australia)	Included in glossary
2-386	E-2-1	D	1	13	1	13	Put words CO <sub>2</sub> , CH <sub>4</sub> etc. with chemical abbreviations in brackets. Then use CO <sub>2</sub> etc. abbreviations subsequently in the text. (Stephen Hawkins, Marine Biological Association of the UK)	Included in glossary
2-48	E-2-25	A	1	13	1	17	In addition to the numerical problems noted above, the insertion of information about the later time period 1990-2004 into the information for the period 1970-2004 makes grasping the information more difficult for the reader. I would eliminate the 1990-2004 information from this paragraph. The point that there have been greater increases in the more recent years is much more clearly brought out in the following paragraph. Further, it seems strange that HFCs, PFCs and SF <sub>6</sub> are included among the GHGs, but CFCs and HCFCs, which I believe contribute much more to warming than the F-compounds included, are not. The rationale for the omissions of CFCs and HCFCs should be explained. (Richard Soulen, None)	Accepted. Now makes clear section considers gases whose emissions are controlled by the UNFCCC.

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2-49	E-2-26	A	1	13	1	17	I question the 70% and 24% numbers. The 29 to 49 Gt growth implies 20 Gt growth 1970-2004. I calculate 20/29 to be 0.6896 and believe 69% would be more correct than 70%. Regarding the 1990-2004 growth I estimate the 1990 amount to be 40 Gt implying a 9 Gt growth to 2004. I calculate 9/40 to be 0.225 and suggest that 22% or 23% would be more correct than 24%. (Richard Soulen, None)	Taken into account and made consistent with the language from WGIII
2-50	E-2-24	A	1	13	1	40	the proportions of greenhouse gas emission increase and CO2 emission increase indicated for the period 1990-2004 is rather low compared to 1970-2004! This appears to contradict with lines 37-40, where a very high rate of growth for 1995-2004 is indicated ?! (Harald Pauli, University of Vienna & Austrian Academy of Sciences)	Text revised and now clearer.
2-51	E-2-27	A	1	14	1	14	It would be important to mention the time-frame considered in the evaluation of the GWP whenever it appears in the report – 100 years? (Marcos Gomes, Pontifical Catholic University of Rio de Janeiro)	Accepted. Text revised.
2-52	E-2-28	A	1	14	1	14	Insert "100-year" before GWP (Keith Shine, University of Reading)	Accepted. Text revised.
2-53	E-2-29	A	1	14	1	14	include "(Box 2.1)" after "Global Warming Potentials" (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected The text has been revised to include the time period over which the GWP are calculated and GWP is defined in the glossary.
2-54	G-2-26	A	1	14	1	14	Specify which global warming potentials (GWPs) were used: SAR or TAR, and 100-year or other? (Government of United States)	Accepted
2-55	G-2-27	A	1	14	1	14	It would be useful to include a short footnote (a) referring readers to the glossary for a description of Global Warming Potential and (b) stating which GWP has been used (e.g. IPCC 1995 100yr) (Government of New Zealand)	Accepted
2-56	G-2-28	A	1	14	1	14	include "(Box 2.1)" after "Global Warming Potentials" (Government of Hungary)	Rejected. The text has been revised to include the time period over which the GWP are calculated and GWP is defined in the glossary.
2-57	G-2-1	C	1	14	1	14	" Should give a definition of global warming potential " (Government of Belgium)	In glossary.

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2-58	G-2-25	A	1	14	1	15	The authors should consider whether there is a need for a footnote to define GWP. (Government of Australia)	In glossary.
2-59	G-2-29	A	1	15	1	15	GHG emissions, 29, is rounded from the original value of 28.7. To be more precise, the original value 28.7 should be maintained. The new sentence now reads, "...from 28.7 to 49 Gt CO <sub>2</sub> -eq." (Government of Japan)	Accepted
2-60	G-2-30	A	1	15	1	16	Change "29" to "28.7" and delete the words "it is the dominant gas accounting for" and insert "represented". These changes conform the sentences (lines 13-17) to the WG3 SPM, second bullet under B.2 (p. 3). In general, use language consistent with the WG3 SPM. (Government of United States)	Accepted
2-61	G-2-31	A	1	16	1	16	Insert actual value of CO <sub>2</sub> emissions after "(28% between 1990 to 2004)" for more convenient use by policy makers. The new sentence now reads, "...about 80% (28% between 1990 and 2004), from *** Gt-GO <sub>2</sub> to *** Gt-CO <sub>2</sub> ." (Government of Japan)	Accepted
2-62	G-2-32	A	1	17	1	17	Add information on absolute figures for CO <sub>2</sub> emissions. (Government of Germany)	Accepted
2-63	E-2-30	A	1	19	1	34	The definitions given in Box 2.1 are correct but open-ended, since they don't define the time scale or GWP values used for the calculation of CO <sub>2</sub> -eq. The box need to state that CO <sub>2</sub> -eq is calculated using the 100-year values of GWP given in the Second Assessment Report (SAR). The use of the 100-year timeframe is documented in the WG III Glossary definition of GWP. The use of the SAR values is not explicitly documented, but a check of the values used, e.g. in WG III, Chapter 7, indicates that they come from the SAR, not from WG I's subsequent updates. Many other values of GWP exist (for other timeframes or from other references), but the 100-year time frame and SAR values of GWP are the ones used by nations for the inventory reports that they submit to the UNFCCC process. It is important that policymakers be able to connect the information in the Synthesis Report to their inventory data, and that an explicit statement is made about the source and timeframe of GWP values. (Robert Siveter, IPIECA)	Accepted
2-64	E-2-31	A	1	19	1	35	In Box 2.1 it may be useful to mention that different greenhouse gases stay in the atmosphere for different lengths of time. (Dáithí Stone, University of Oxford)	Timescale of GWP now defined.
2-65	E-2-32	A	1	19	1	35	I think Box 2.1 is very useful for policy maker. However, I should point out that there is large difference of definition of CO <sub>2</sub> equivalent concentration between WG1 and WG3. In WG1, all GHGs such as SO <sub>x</sub> aerosol (cooling effect) and Ozone are taken into consider for calculation of CO <sub>2</sub> equivalent concentration. On the other hand, WG3 people consider only six kinds of GHGs describer in UNFCCC when they calculate CO <sub>2</sub> equivalent concentration. Because this	Taken into account. Box 2.1 revised.



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							difference of definition among IPCC WG1 and WG3 will confuse many policy makers, I recommend more appropriate description of Box.2.1. (Koki Maruyama, Central Research Institute of Electric Power Industry (CRIEPI))	
2-66	G-2-33	A	1	19	1	35	In interest of brevity, move the Box 2.1 definitions to the glossary. If it stays in the report proper, include text on the limitations of CO2-equivalent metrics and the implications of different choice of metric. (Government of United States)	Rejected because the box is necessary for the understanding of this topic.
2-67	E-2-1	B	1	19			Definitions of "CO2 equivalent emission" and "CO2 equivalent concentration" are unclear. Need to be put into layman terms or provide an example. (Kevin Grandia, DeSmogBlog)	Taken into account. Box revised.
2-68	G-2-34	A	1	21	1	35	The term 'well mixed greenhouse gas' is not clear to non-scientists. We suggest removing the term from the bulleted text and including instead an extra sentence immediately before the bullet points, along the lines of: "In all cases it is assumed that the gases are well-mixed throughout the atmosphere." (Government of New Zealand)	Well-mixed has been replaced by long-lived
2-69	G-2-2	C	1	24	1	32	" Should give the time horizon used in the calculations (100 years?)" (Government of Belgium)	Accepted
2-70	E-2-34	A	1	25	1	25	"TIME-integrated" (Keith Shine, University of Reading)	Accepted
2-71	E-2-35	A	1	25	1	25	"given time horizon" - indeed, but you must give the time horizon you use! (Keith Shine, University of Reading)	Accepted
2-72	E-2-33	A	1	25	1	27	I am not sure why "well-mixed greenhouse gas" is repeated here so often - the concept can be applied to non well-mixed greenhouse gases - indeed, some of the HFCs in SAR are so short lived, that they wouldn't be well-mixed (Keith Shine, University of Reading)	Well-mixed has been replaced by long-lived
2-73	G-2-35	A	1	25	1	28	"over a given time horizon"? How about "over a given period following emission [to the atmosphere]." (Government of New Zealand)	Rejected for purposes of brevity of text.
2-74	E-2-36	A	1	26	1	26	To avoid confusion statement Please drop .."or a mixture of well mixed greenhouse gases" . (Joyashree Roy, Jadavpur University)	Rejected as rider is useful.
2-75	G-2-37	A	1	26	1	26	Add the sentence " Unless otherwise indicated, the time horizon is taken as 100 years." (Government of France)	Taken into account
2-76	G-2-36	A	1	26	1	32	The authors should consider whether it is necessary to go into this level of detail in explaining CO2-e. The first sentence of the description is useful, however, the following	Boxes seems to be appreciated (see 2-65). Glossary and box have been made consistent and

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							three sentences are overly technical and not broadly relevant for policy readers. (Government of Australia)	clarified
2-77	E-2-37	A	1	29	1	31	Sentence starting with "Equivalent CO2 emission is a standard.... Corresponding climate change resposnes" may be droppedas it is too confusing. (Joyashree Roy, Jadavpur University)	Taken into account. Text revised.
2-78	E-2-38	A	1	33	1	35	May be for this bullet point what will be useful is to highlight differemce between concentration and emission so may be here if explanantion is given on the ratio of which two variables yield concentration i.e emission per volume or what is used to measure concentration will be useful. what is written now is almost given in first bullet point. (Joyashree Roy, Jadavpur University)	Level of detail required is not possible given the space limitation
2-79	E-2-39	A	1	35	1	35	the concept of CO2 equivalence is not necessarily restricted to just greenhouse gases - indeed, the SPM (page 18, line 7) uses it more broadly (Keith Shine, University of Reading)	Accepted
2-80	E-2-50	A	1	37	1	37	Add "on average" after "Global greenhouse gas emissions grew". This is especially important in view of the sentence that follows, on lines 38-40. (Claire Parkinson, NASA Goddard Space Flight Center)	Taken into account. Text revised.
2-81	G-2-42	A	1	37	1	37	1970-2004 is a 35-year period, not 25. More importantly, why give the 35-year growth rate? Instead, just focus on the comparison of the 1970-1994 with the 1995-2004 rates. (Government of United States)	Taken into account. Text revised.
2-82	E-2-40	A	1	37	1	38	This sentence is redundant to the sentence on lines 7-8 above. (Robert Siveter, IPIECA)	Accepted
2-83	E-2-41	A	1	37	1	38	This repeats lines 7-8 on same page (Michel Rixen, NATO Undersea Research Center)	Accepted
2-84	G-2-40	A	1	37	1	38	Delete this sentence as it repeats the bolded heading text to this section. If it is to be retained the authors need to clarify that these are AVERAGE annual growth rates. (Government of Australia)	Accepted
2-85	E-2-42	A	1	37	1	39	The units of rate of change of greenhouse gas emissions should be GtCO2-eq yr <sup>-2</sup> (or GtCO2-eq per year per year). GtCO2-eq annually looks like an amount of carbon per year, which is an emission rate. (Nathan Gillett, University of East Anglia)	Accepted. Text revised.
2-86	E-2-45	A	1	37	1	39	Isnt "per year" clearer than "annually"? (Keith Shine, University of Reading)	Accepted
2-87	E-2-44	A	1	37	1	40	My arithmetic does not agree with the numbers in this paragraph. 0.69 Gt/y x 25 y = 17.25 Gt, not the 20 Gt. implied by an increase from 29 to 49 Gt. Also, 0.45 Gt/y x 15 y = 6.75 Gt and 0.92 GT/y x 10 y = 9.2 Gt and 6.75 Gt + 9.2 Gt = 15.95 Gt, not the 20 Gt implied by an	Accepted. Text revised.

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							increase from 29 to 49 Gt or the 17.25 calculated here by multiplying the stated average annual increase by the total number of years. (Richard Soulen, None)	
2-88	E-2-46	A	1	37	1	40	I think it needs to be made clear that these figures refer not to greenhouse gases per se, but the subset of greenhouse gases included within Kyoto. As Velders et al have shown, the changing emissions of CFCs have led to a reduction of around 0.5 GtC/year, which isnt small beer. (Keith Shine, University of Reading)	Accepted
2-89	E-2-47	A	1	37	1	40	deleting them, because line 13-17 have given the similar meaning that is easier to understand than line 37-40 for policy-makers (Zong-Ci Zhao, China Meteorological Administration)	Taken into account
2-90	E-2-49	A	1	37	1	40	Consider to simplify the text by saying e.g. "Global greenhouse gas emissions grew by 0.45 Gt CO2-eq annually during the period of 1970-1994, but increased to grow at 0.92 Gt CO2-eq annually by 1995-2004" (Zoltán Somogyi, Hungarian Forest Research Institute)	Taken into account
2-91	G-2-38	A	1	37	1	40	Move this section directly to below the paragraph of line 7-11 (first sentence can be removed). (Government of European Community)	Accepted
2-92	G-2-39	A	1	37	1	40	It is suggested to delete this paragraph, because lines 13-17 of the same page already give the similar meaning that is easier to be understood. (Government of China)	Taken into account
2-93	G-2-41	A	1	37	1	40	Consider to simplify the text by saying e.g. "Global greenhouse gas emissions grew by 0.45 Gt CO2-eq annually during the period of 1970-1994, but increased to grow at 0.92 Gt CO2-eq annually by 1995-2004" (Government of Hungary)	Taken into account
2-94	E-2-48	A	1	37		38	data redundant to that in lines 7 and 8 (Bruce McCarl, Texas A&M Univesity)	Taken into account
2-95	E-2-43	A	1	37			The comment 25 years is not correct for the period 1970-2004. (Sergio Alonso, University of the Balearic Islands)	Taken into account
2-96	E-2-51	A	1	38	1	38	Change "very high" to "much higher". Very high is a value judgment that is inappropriate for this text. Compared to annual emission rates projected in the SRES scenarios, 0.92 Gt CO2-eq would look low. (Robert Siveter, IPIECA)	Taken into account
2-97	G-2-43	A	1	38	1	38	Delete "very high" and replace with "much higher" to avoid any implication of policy prescription.	Taken into account

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of Australia)	
2-98	G-2-44	A	1	38	1	38	Change “very high” to “much higher”. Very high is a value judgment that is inappropriate for this text. Compared to annual emission rates projected in the SRES scenarios, 0.92 Gt CO <sub>2</sub> -eq would look low. Actually, this sentence needs to be rewritten as the English is poor and one gets lost in the multiple periods. You could say the emission rate increased over 1990-2004 with it being xx in first half and yy later. (Government of United States)	Taken into account
2-99	E-2-52	A	1	38			"very high" is a value judgment how about "higher". Actually this sentence needs to be rewritten as the English is poor and one gets lost in the multiple periods. You could say the emission rate increased over 1990-2004 with it being xx in first half and yy later (Bruce McCarl, Texas A&M Univesity)	Taken into account
2-100	E-2-53	A	1	41	1	41	Somewhere around here the point should be made that impact depends on GHG concentrations and that these respond asymmetrically to emissions. The concentration increases immediately the GHG is emitted but falls back only slowly as the GHG is removed. Even for a relatively short lived GHG such as methane, almost 50 years would elapse before its concentration had fallen to pre-emission levels. This was covered in previous assessments but needs to be reiterated, it is difficult for non-scientists to grasp but is fundamental to any policy decisions. (Archie McCulloch, University of Bristol)	Rejected due to lack of space.
2-101	E-2-54	A	1				Second para refers to Global Warming Potential without explaining what this means. Box 2.1 talks about time horizons without explaining what was used in Figure 2.1. (Joanna Haigh, Imperial College)	Accepted
2-102	E-2-55	A	1				Figure SPM-3, panels (b) and (c), please use decimal points instead of commas. Possibly also remove the references to notes 1-7 in panel (c). (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Accepted
2-103	E-2-2	B	1				Write Causes of Climate Change (Ibouraïma Yabi, LECREDE/DGAT/FLASH/UAC)	Titles cannot be changed as they were approved by the IPCC panel for the SYR
2-104	E-2-56	A	2	1	2	1	please adding "estimated" before "Global...." (Zong-Ci Zhao, China Meteorological Administration)	Rejected, consistent with SPM
2-105	E-2-57	A	2	1	2	1	Add the Notes referred to different numbers of each source in Figure 2.1 (C), that is(1),(2),(3),(4),(5),(6),(7) (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Superscripts are deleted
2-106	G-2-45	A	2	1	2	2	Is uptake accounted for in Figure 2.1? If not, it should be. If it is, it should be noted. Also, the footnotes on part (c) should be brought forward as well.	Superscripts are deleted. These are trends in emissions, that does not include uptake.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of United States)	
2-107	G-2-46	A	2	3	2	3	The authors should explain what F-gases are. (Government of Australia)	Explained in glossary
2-108	E-2-58	A	2	3	2	4	The text at Page 1, Lines 13-14 says that the emissions have been weighted by their GWPs. This should also be stated in the caption for this figure, as should the rationale for not including CFCs and HCFCs. (Richard Soulen, None)	Taken into account
2-109	G-2-47	A	2	8	2	8	'forestry' instead of 'forest' (Government of European Community)	Accepted
2-110	E-2-60	A	2	9	2	10	Comment: for industry , and also residential and commercial sectors a major part of CO2 emissions are due to the end use of energy, the emissions of which are here attributed to energy generation while the growth is mostly due to the growth of the consumption of these end use sectors. This should be pointed out clearly to ensure that there won't be any misunderstanding. (Jacques Rilling , CSTB)	Is beyond the scope of SYR, please refer to the WGIII report
2-111	E-2-59	A	2	9	2	11	This sentence is hard to digest, and the final phrase (line 11) has to be re-written (akward). (Ulf Molau, Göteborg University)	Taken into account
2-112	G-2-48	A	2	9	2	11	The sentence would be easier to understand if it was cut in two: The largest growth ... and industry. The residential and commercial buildings ... lower rate. (Government of United States)	Clarified
2-113	G-2-49	A	2	9	2	14	The definition of sectors may be confusing. Perhaps it would help to add: "Most of the emissions from industry, buildings, and transport are carbon dioxide from fossil fuels." It would be valuable and informative to add numbers on regional emission trends (from the WG III report) here but unfortunately it may generate too many debates? (Government of Sweden)	Clarified, see Figure 2.2.
2-114	G-2-50	A	2	9	2	14	Instead of duplicating the information already presented in the graph, one could present growth rates for each sector (%/yr). (Government of European Community)	Taken into account
2-115	G-2-51	A	2	9	2	14	How does energy supply differ from transportation, and commercial and residential buildings? Perhaps define these terms in the glossary as well. (Government of United States)	Taken into account. Text revised.
2-116	E-2-61	A	2	9			CO2 only or 'CO2-eq ' emissions? (Michel Rixen, NATO Undersea Research Center)	Clarified

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-117	E-2-62	A	2	10			Given recent publicity, and political initiatives, how much does air transport contribute relative to these? (Peter Convey, British Antarctic Survey)	Please refer to full report
2-118	G-2-52	A	2	11	2	12	The 'in 2004' needs to be moved. The sentence should read: "When the sectoral sources of greenhouse gases in 2004 are considered (Figure 2.1c), energy supply ..." (Government of New Zealand)	Taken into account. Now refer to figure.
2-119	E-2-63	A	2	11	2	14	This sentence can be removed because repeats textual and quantitative information contained in the preceding sentence and Figure 2.1. (Roman Corobov, Modern institute for humanities)	Accepted
2-120	G-2-3	C	2	11	2	14	" Does this sentence add any information that is not in the graph? " (Government of Belgium)	Accepted
2-121	E-2-65	A	2	13	2	13	reference to forests may not be correct in this form. It may refer to forestry as well as deforestation (mainly in developing countries). Please check and correct if needed. (Zoltán Somogyi, Hungarian Forest Research Institute)	Clarified
2-122	E-2-66	A	2	13	2	13	Change 'forest' to 'forestry' (David White, ASIT Consulting)	Not relevant any longer as this sentence has been deleted
2-123	E-2-67	A	2	13	2	13	"forest" => "forestry" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Not relevant any longer as this sentence has been deleted
2-124	G-2-53	A	2	13	2	13	The authors should change "forest" to "forestry". (Government of Australia)	Not relevant any longer as this sentence has been deleted
2-125	G-2-54	A	2	13	2	13	Should 'forest' be 'land use, land-use change and forestry' ? (Government of New Zealand)	Not relevant any longer as this sentence has been deleted
2-126	G-2-55	A	2	13	2	13	reference to forests may not be correct in this form. It may refer to forestry as well as deforestation (mainly in developing countries). Please check and correct if needed. (Government of Hungary)	Clarified
2-127	E-2-64	A	2	13	2	14	See comment #1. [TSU note: See Comment E-SPM-430-A] (Dáithí Stone, University of Oxford)	This comments refers to page 7 lines 13-17 and has been taken into account by including footnote 6.
2-128	G-2-56	A	2	16			"Total primary energy supply* may need explanation (Government of Ireland)	Sentence deleted.
2-129	E-2-70	A	2	17	2	17	Need to explain "global energy intensity" (James Crampton, GNS Science)	Explained in glossary

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-130	G-2-58	A	2	17	2	17	The authors need to define global energy intensity. (Government of Australia)	Explained in glossary
2-131	G-2-59	A	2	17	2	17	Editorial suggestion. "The effect on global emissions of decreases in (i.e. improvements in) global energy intensity....." This is often confusing and adding the brief explanation in the brackets that a decrease in energy intensity is equivalent to an improvement in energy intensity would be helpful. (Government of Canada)	Rejected, because it could add confusion and is not in-line with approved SPM text.
2-132	E-2-69	A	2	17	2	18	put "on global emissions" after "2004" (Michel J. Rossi, Ecole Polytechnique Fédérale de Lausanne)	Rejected, because it's approved SPM text
2-133	E-2-68	A	2	17	2	20	The second sentence in the paragraph should be rephrased for greater clarity and to add information as follows: "The effect on global emissions during the period 1970 to 2004 of growth in worldwide per capita income (77%) and population (69%) was greater than the effect of the decrease in global emissions intensity (-43%), most of which was due to a decrease in energy intensity (-33%)." (Kenneth Ruffing, N/A)	Rejected, because it's approved SPM text
2-134	G-2-57	A	2	17	2	21	The sentence is not clear. (Government of United States)	Rejected, because it's approved SPM text
2-135	E-2-71	A	2	18			Replace '1970 to 2004' by 'this period' (see line 17). (Roman Corobov, Modern institute for humanities)	Redundant because the first sentence has vanished
2-136	G-2-60	A	2	19	2	20	Suggest changing to: "...the combined effect of global income growth (77%) and global population growth (69%); both of which are drivers of increasing energy-related CO2 emissions." (Government of Canada)	Rejected, because it's approved SPM text
2-137	E-2-73	A	2	20	2	20	"carbon intensity" is not defined in the glossary. (Richard Soulen, None)	Included in glossary
2-138	G-2-62	A	2	20	2	20	Add definition of 'carbon intensity' to the glossary. (Government of European Community)	Accepted
2-139	E-2-72	A	2	20	2	21	It should be indicated why the trend reversed after 2000. (Dieter Gerten, Potsdam Institute for Climate Impact Research)	Rejected, because it's approved SPM text
2-140	G-2-61	A	2	20	2	21	Very important information. Please add: "Investments today are again more carbon intensive than before 2000." (Government of Germany)	Rejected because it's not in the approved SPM
2-141	E-2-74	A	2	21			Add after "2000" the sentence "due to increased use of coal" to agree with corresponding statement in SPM of WGIII (page 3).	Rejected because it's not in the approved SPM

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Mustafa Babiker, Saudi Aramco)	
2-142	G-2-63	A	2	21			add after “2000” the sentence “due to increased use of coal” to conform to the corresponding statement in SPM of WGIII (page 3). (Government of Kingdom of Saudi Arabia)	Rejected because it’s not in the approved SPM
2-143	E-2-75	A	2	23	2	26	This statement has to be qualified - as it stands, it might be misleading. It is important to note that this describes the current position, but that this position is also changing particularly rapidly. China is now the world's largest consumer of coal, second largest consumer of oil, and may have just become the worlds largest aggregate emitter of CO2. This growth in energy use will eventually moderate, as China's economy matures, but India's economy might overtake that of China by perhaps 2060, so the large emerging economies are going to be the primary drivers of carbon emissions for most of this century. (Anthony Clayton, University of the West Indies)	Rejected, because we do not discuss future issues here
2-144	E-2-76	A	2	24	2	24	A reminder in parenthesis of where the definition of the technical term "Annex I countries" is given would be helpful. (Jon Egill Kristjansson, University of Oslo)	Defined in glossary
2-145	G-2-64	A	2	25	2	26	For more precise explanation, insert a footnote to the word "Gross Domestic Products based on Purchasing Power Parity (GDPPPP)" as it is in the WG3-SPM (See p3, footnote 6 "The GDPPPP metric is used for illustrative purpose only for this report. For an explanation of PPP and Market Exchange Rate (MER) GDP calculations, see footnote 12"). (Government of Japan)	Defined in glossary
2-146	E-2-77	A	2				Remove text from above the figure (it only refers to (a) of hte figure anyway) (Zoltán Somogyi, Hungarian Forest Research Institute)	Figure title revised but figure titles retained for all figures.
2-147	E-2-78	A	2				refers to Figure 2.1 c: numbers in supercript at the various sectors are not explained; contribution of "transport" is surprisingly low !? (Harald Pauli, University of Vienna & Austrian Academy of Sciences)	Superscripts are deleted
2-148	E-2-79	A	2				Figure 2.1. The term 'F-gases' does not appear to be defined anywhere including the Glossary. (George Walker, Aon Re Asia Pacific)	F-gases are defined in glossary
2-149	E-2-80	A	2				Figure 2.1, Panel c. I think that it is misleading to use the word “Forestry” in the pie graph. In Panel b, the term “deforestation” is used. If this is the intent in Panel c, then “deforestation” should be used. Or is “forestry” in the true sense, such a large source? This may be clear in the WGIII document, but it is confusing in the Summary. It either needs to be clarified or different words used. Further to this, line 13 on the same page says “forest” when I think that “forestry” is meant to describe panel c. (Brian Amiro, University of Manitoba)	Clarification has been made



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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-150	E-2-81	A	2				Figure (c): footnotes should be either removed, or explained. (Zoltán Somogyi, Hungarian Forest Research Institute)	Accepted
2-151	E-2-82	A	2				delete Figure 2.1. Previous text describes increases of co2 (Hugo Beltrami, St. Francis Xavier University)	Rejected. Text has been shortened to provide most essential information with deletion in text of some numbers provided in Fig 2.1., Together, revised text and figures provide most efficient presentation of important information and is therefore retained.
2-152	G-2-65	A	2				Remove text from above the figure (it only refers to (a) of hte figure anyway) (Government of Hungary)	Figure title revised but figure titles retained for all figures.
2-153	G-2-66	A	2				Figure 2.1(c): The authors need to either explain or delete the footnotes on each of the sectors included in the Figure. (Government of Australia)	Accepted
2-154	G-2-67	A	2				Figure 2.1(b): The authors need to recalibrate this figure as the pie chart currently equals 102.9%. Is it possible that the "CO2 (other)" component has been double counted? (Government of Australia)	Accepted
2-155	G-2-68	A	2				Figure 2.1 Include more information (maybe in table) on absolute figures of emissions, both global and sectoral, as this is often needed by policymakers and not easily found in WG reports. (Government of Germany)	Rejected because of lack of space
2-156	G-2-69	A	2				Figure 2.1 comment: This is an important and useful figure, which we believe should be retained. (Government of New Zealand)	Noted
2-157	G-2-70	A	2				Figure 2.1 (c): The references for "1)"-"7)" are not mentioned in the caption. Please delete these numbers or add the explanations. (Government of Japan)	Accepted
2-158	G-2-71	A	2				Figure (c): footnotes should be either removed, or explained. (Government of Hungary)	Accepted
2-159	G-2-72	A	3	3	3	3	These country groupings are poorly defined in the glossary. JANZ is not defined at all. Is "Annex II" a typo for "Annex I"? (Government of United States)	Standard country groupings are employed as in WGIII SPM. Groupings are defined in the appendix in final report.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-160	G-2-73	A	3	4	3	4	It is suggested to add the footnote 6 of WGIII SPM for "GDPppp" to the "GDPppp" in Figure 2.2. (Government of China)	See glossary
2-161	E-2-83	A	3	8	5	27	Global land use practices have also been changed obviously as a result of human activities since 1750 and they have affected seriously climatic change through dynamic and thermal parameters. This point should be emphasized in this part due to its direct and indirect functions on climatic change. (Guangsheng Zhou, Institute of Botany, The Chinese Academy of Sciences)	Is included in figure 2.4.
2-162	E-2-84	A	3	10	3	12	Consider to simplify the text by saying e.g. "The main drivers of climate change are changes in the atmospheric concentration of greenhouse gases and aerosols, in solar radiation and in land surface properties affect the absorption, scattering and emission of radiation within the atmosphere and at the Earth's surface." (Zoltán Somogyi, Hungarian Forest Research Institute)	Taken into account
2-163	G-2-76	A	3	10	3	12	Consider to simplify the text by saying e.g. "The main drivers of climate change are changes in the atmospheric concentration of greenhouse gases and aerosols, in solar radiation and in land surface properties affect the absorption, scattering and emission of radiation within the atmosphere and at the Earth's surface." (Government of Hungary)	Taken into account
2-164	G-2-75	A	3	10	3	15	It is not clear whether the second sentence, the statement "These are the drivers of climate change", refers to the absorption, scattering, etc or to the greenhouse gases and aerosols, etc. Also, the link between the drivers and radiative forcing is perhaps not as clear as in e.g. the WG1 SPM text. We suggest: "Changes in the atmospheric concentration of greenhouse gases and aerosols, in solar radiation and in land surface properties, are drivers of climate change. They affect the absorption, scattering and emission of radiation within the atmosphere and at the Earth's surface. By doing this they change the energy balance of the climate system. The effect of each of them on the energy balance, the resulting positive or negative changes, are expressed as radiative forcing. The radiative forcing effect of each factor is used to compare their warming or cooling influences on global climate." (Government of New Zealand)	Taken into account. Text revised.
2-165	G-2-74	A	3	10	3	32	The term "pre-industrial" is not consistent with the lines from 17 to 22. Better to use "pre-anthropogenic". (Government of Russian Federation)	Rejected, because pre-industrial is defined in the glossary
2-166	G-2-77	A	3	11	3	11	It is unclear why the SYR authors have moved to use "radiation" rather than "energy" as is done in this context in the WG1 report. Suggest that radiation, which can have a number of connotations is replaced with "solar energy". (Government of Australia)	Rejected, radiation is the right word in this context

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-167	E-2-85	A	3	12	3	12	These are the drivers of ANTHROPOGENIC climate change. Climate change in general is driven by changes in the earth's orbital. (Bram Bregman, Netherlands Organisation of Applied Research)	Rejected because it includes natural drivers
2-168	G-2-78	A	3	13	3	13	To be clear, modify the text to read "negative changes in the Earth-atmosphere energy balance" (Government of United States)	Specific suggestion rejected but relevant text has been revised and it is now clearer what "energy balance" refers to.
2-169	E-2-86	A	3	14	3	14	Add a reference to current Fig. 2.4 at the end of the sentence (Zoltán Somogyi, Hungarian Forest Research Institute)	Accepted
2-170	G-2-79	A	3	14	3	14	Add a reference to current Fig. 2.4 at the end of the sentence (Government of Hungary)	Accepted
2-171	G-2-80	A	3	17	3	20	The temporal reference "many thousand years" is too weak, given that WG1 TS.2.1.1 refers to the last 650,000 years. The text should be added to reflect the full length of the historical record from ice cores. (Government of European Community)	Rejected for this sentence, because nitrous oxide concentrations don't go back that long and because it's approved SPM text. Added sentence referring to CO2 only and 650,000 years.
2-172	E-2-88	A	3	17	3	21	...'carbon dioxide, methane and nitrous oxide' - in the text above there were used abbreviations of these gases. Uniformity in using the abbreviations is desirable. (Roman Corobov, Modern institute for humanities)	Accepted
2-173	E-2-87	A	3	17	3	22	The hypothesis of W.F. Ruddiman that land use change (forest clearing and agriculture) reversed the decline in atmospheric CO2 8,000 years ago and atmospheric CH4 5,000 ago is very compelling [W.F. Ruddiman (2005) "Plows, plagues and petroleum. How humans took control of climate" Princeton University Press] (David White, ASIT Consulting)	Noted
2-174	E-2-89	A	3	22	3	22	"agriculture" => "agricultural activities" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Rejected because it's approved SPM text
2-175	E-2-90	A	3	24	3	30	If the rate from 1995-2005 has been 1.9 ppm/yr and the rate for 1960-2005 has been 1.4 ppm/yr, then it would seem that the rate from 1960-1994 is about 1.2 ppm/yr, and it seems to me this is the other trend that should be given, indicating that there has been a really large jump in the rate of rise of concentration. (Michael MacCracken, Climate Institute)	Rejected to be as consistent as possible with the approved SPM
2-176	G-2-81	A	3	25	3	25	The authors need to define ppm and ppb (line 33). (Government of Australia)	Rejected. Standard terms.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-177	E-2-91	A	3	28	3	29	Delete the sentence starting: "This increase in concentration ..." While not directly comparable, the numbers for increase in CO2 concentration do not appear to be broadly comparable with the emission values given in Topic 2, Pg. 1, lines 38-40. The emission data is for CO2-eq., but CO2 is by far its major component. Annual CO2-eq emissions were twice as large in 1995-2004 as in 1970-1994, but the rate of CO2 concentration increase was only a third larger in 1995-2005 than for the whole period 1960-2005. The two sections of the underlying reports that are cited as support for this paragraph provide voluminous data on the increase in GHG emissions and radiative forcing, but do not explicitly come to the conclusion that increase in CO2 emissions and concentrations are broadly comparable. If a statement about comparability is made, it would be helpful to have some directly comparable numbers. (Robert Siveter, IPIECA)	Taken into account. Sentence deleted.
2-178	G-2-82	A	3	28	3	29	Delete the sentence starting "This increase in concentration ..." While not directly comparable, the numbers for increase in CO2 concentration do not appear to be broadly comparable with the emission values given in Topic 2, p. 1, lines 38-40. The emission data is for CO2-eq, but CO2 is by far its major component. Annual CO2-eq emissions were twice as large in 1995-2004 as in 1970-1994, but the rate of CO2 concentration increase was only a third larger in 1995-2005 than for the whole period 1960-2005. The two sections of the underlying reports that are cited as support for this paragraph provide voluminous data on the increase in GHG emissions and radiative forcing, but do not explicitly come to the conclusion that increase in CO2 emissions and concentrations are broadly comparable. If a statement about comparability is made, it should be based on directly comparable numbers. (Government of United States)	Taken into account. Sentence deleted.
2-179	E-2-93	A	3	29	3	29	"rate in CO2" => "rate of CO2" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Sentence deleted
2-180	G-2-83	A	3	29	3	29	The authors should provide more detail around the phrase "broadly consistent" (i.e. is the increase in concentrations and that of emission rates, simply the same magnitude, or is there a closer correlation?). (Government of Australia)	Sentence deleted
2-181	E-2-92	A	3	29			Remove the firth 'in CO2'. (Roman Corobov, Modern institute for humanities)	Sentence deleted
2-182	G-2-84	A	3	32	4	2	This paragraph could use further explanation because an increase in methane from 1732 ppb to 1774 ppb does not necessarily imply a growth decline. It is if one considers that the decadal growth rate for methane from 1750 to 1990 (24 decades) is 42.4 ppb and the decadal growth after 1990 is between 28 ppb and 42 ppb. Also, if total emissions are nearly constant from the early 1990s to 2005, why is there a decadal growth of at least 28 ppb (more than half of the earlier period growth). Has there been an increase in the atmospheric methane lifetime?	Wording changed to just refer to declining growth rates.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of United States)	
2-183	E-2-95	A	3	33	3	33	replace "is" with "was" (Zoltán Somogyi, Hungarian Forest Research Institute)	Accepted
2-184	E-2-96	A	3	33	3	33	"Growth rates of emissions have..." (Michel J. Rossi, Ecole Polytechnique Fédérale de Lausanne)	Rejected, because it refers to concentration growth rates
2-185	G-2-85	A	3	33	3	33	replace "is" with "was" (Government of Hungary)	Accepted
2-186	G-2-86	A	3	33	3	33	Change "is 1774" to "was 1774". (Government of United States)	Accepted
2-187	E-2-94	A	3	33	4	2	The reader also needs to be told that methane has a relatively short atmospheric lifetime in order to see that a declining rate of growth is consistent with nearly constant emissions. (If it had a long lifetime, the rate of growth would be constant if emissions were stable). (Nathan Gillett, University of East Anglia)	Noted, but wording is consistent with WGI SPM
2-188	G-2-87	A	3	34	3	34	In Footnote 1, it would be helpful to go a bit further and explain in lay terms what W m-2 means. Some possibilities follow: the watt is the SI derived unit of power, equal to one joule per second, a typical household incandescent light bulb uses electrical energy at a rate of 40 to 100 watts, a human climbing a flight of stairs is doing work at the rate of about 200 watts, a first class athlete can work at up to approximately 500 watts for 30 minutes, and an automobile engine produces mechanical energy at a rate of 25,000 watts (approximately 30 horsepower) while cruising. (Government of United States)	Rejected due to space limitations.
2-189	E-2-97	A	3				Footnote. Line 3. Following the recommendations from Bureau International des Poids et Mesures, <a href="http://www.bipm.fr/en/si/si_brochure/chapter5/5-2.html">http://www.bipm.fr/en/si/si_brochure/chapter5/5-2.html</a> , about the SI units ["Unit names are normally printed in roman (upright) type, and they are treated like ordinary nouns. In English, the names of units start with a lower-case letter (even when the symbol for the unit begins with a capital letter), except at the beginning of a sentence or in capitalized material such as a title."], the name Watts should be changed to watts (lower-case). I don't know whether there are other similar cases in the report. (Sergio Alonso, University of the Balearic Islands)	Accepted
2-190	E-2-98	A	3				Figure 2.2: text is too small (Michel Rixen, NATO Undersea Research Center)	Noted --> TSU
2-191	E-2-99	A	3				Figure 2.2: In the legend and in the text 2004 year is discussed, in the text to x-axis (Cumulative GDP) - 2000. (Roman Corobov, Modern institute for humanities)	Noted, but consistent with WGIII SPM

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2-192	E-2-100	A	3				Figure 2.2 the two parts should be enlarged and placed below each other to enable better readability. (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected due to lack of space. However figure has been revised to enable better clarity.
2-193	E-2-101	A	3				Figure 2.2 I suggest the use of a line instead of a bar for the "Average Annex I" and for the "Average non- Annex I", to specify that there is no horizontal dimension in the bar. (Stefano Caserini, Politecnico di Milano)	Taken into account
2-194	E-2-102	A	3				Figure 2.2 I believe that this is a very important graph. All efforts have to be done to improve the clarity of this graph. Thus it is not easy for everybody to understand the meaning of "Europe AnnexII" or "JanZ" or "Non Annex I east Asia" or "South Asia". As an example could be specified if Non Annex I east Asia is only China or not. I suggest to include in a footnote the list of country included in each bar. (Stefano Caserini, Politecnico di Milano)	Relevant terms are defined in glossary. Standard country groupings are employed as in WGIII SPM. Groupings are defined in the appendix in final report
2-195	E-2-103	A	3				Figure 2.2 (a): the two averages at the rightmost part should rather be displayed as horizontal lines, and not be placed to the population number of close to 7 billion. (Zoltán Somogyi, Hungarian Forest Research Institute)	Taken into account
2-196	E-2-104	A	3				Figure 2.2 - more explanation (Andreas Matzarakis, Meteorological Institute, University of Freiburg)	Rejected due to space limitation
2-197	E-2-105	A	3				Fig. 2.2: correct legend in figures "Annex II" to "Annex I" (Hartmut Grassl, Max Planck Institute for Meteorology)	Rejected. Incorrect.
2-198	E-2-106	A	3				Add. Footnote about ppm, ppb, .... (Andreas Matzarakis, Meteorological Institute, University of Freiburg)	Rejected These are standard terms and defined in appendix
2-199	G-2-88	A	3				Figure 2.2. If the underlying reports and literature permit, it would be helpful for Canada to be included with JANZ group or merge the JANZ and Canada/US data. It is not helpful that Canada is included with the US in contributing over 25% of global GHGs when Canada contributes between 2-2.5%. (Government of Canada)	Rejected, because this figure has been approved in WGIII SPM
2-200	G-2-89	A	3				Figure 2.2 the two parts should be enlarged and placed below each other to enable better readability. (Government of Hungary)	Rejected due to lack of space. However figure has been revised to enable better clarity.
2-201	G-2-90	A	3				Figure 2.2 comment: The two figures, (a) and (b), are identified in the caption but not on the figure itself (Government of New Zealand)	Accepted
2-202	G-2-91	A	3				Figure 2.2 and its legend are not clearly explained. Figures should be standalone. What is Annex 1? Non-Annex 1? The reader should not be expected to consult a glossary to understand an illustration that may in future be used elsewhere.	Rejected due to space limitations. Information in glossary.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of United States)	
2-203	G-2-92	A	3				Figure 2.2 (b) comment: The table in the top right corner of this figure is confusing. It is not immediately clear whether it is a table in its own right or if it is labelling for the bar chart (as is the text on the top left of the same figure). It would be better boxed off within the figure, and without the horizontal line continuing through it. (Government of New Zealand)	Accepted
2-204	G-2-93	A	3				Figure 2.2 (a): the two averages at the rightmost part should rather be displayed as horizontal lines, and not be placed to the population number of close to 7 billion. (Government of Hungary)	Taken into account
2-205	E-2-108	A	4	1	4	1	I disagree (strongly!) with the implication that WG1 2.3 states that the slowing of growth of CH4 is due to constant emissions. Of course it is one explanation, but it is not chosen as a favourite and the whole puzzle is referred to as "not understood". This levelling off of methane may be a big deal, and I think that it should be stated here that it is "not understood", rather than implying that it is understood. (Keith Shine, University of Reading)	Sentence amended to just refer to declining growth rates without giving a reason.
2-206	E-2-109	A	4	1	4	1	Change "declined since the early 1990s" to "declined to close to zero towards the end of the 1990s". The text of this paragraph is a direct quote of WG I's SPM, but it is a poor reflection of the discussion in WG I, Chapter 2.3.2, which provides significant data about the near zero rate of increase of CH4 concentration in the 1999-2005 period, including some measurements that indicated negative growth rates for CH4 concentration in 2001, 2004 and 2005. It is important that policymakers be given positive news whenever it is available. (Robert Siveter, IPIECA)	Sentence amended to just refer to declining growth rates without giving a reason.
2-207	G-2-94	A	4	1	4	1	Change "declined since the early 1990s" to "declined to close to zero towards the end of the 1990s". The text of this paragraph is a direct quote of WG1's SPM, but it is a poor reflection of the discussion in WG1 Chapter 2.3.2, which provides significant data about the near zero rate of increase of CH4 concentration in the 1999-2005 period, including some measurements that indicated negative growth rates for CH4 concentration in 2001, 2004, and 2005. (Government of United States)	Sentence amended to just refer to declining growth rates without giving a reason.
2-208	G-2-95	A	4	1	4	1	After "total emissions," insert "(sum of anthropogenic and natural sources)". The sentence appears to be derived from the first bulleted paragraph, third sentence of WG1 SPM (p. 4), which includes this parenthetical. (Government of United States)	Text deleted.
2-209	E-2-107	A	4	1			I do not understand this: even if growth rates decline, it doesn't necessarily imply that total emissions are constant (Michel Rixen, NATO Undersea Research Center)	Text deleted.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-210	E-2-110	A	4	4	4	5	Increase of NO <sub>2</sub> is mentioned here, but there is nothing said about halocarbons. But Fig 2.4 shows the radiative forcing from the halocarbons to be larger than that from NO <sub>2</sub> . (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	A statement regarding halocarbons has been added.
2-211	G-2-96	A	4	4	4	5	For balance with the gas specific paragraphs before this, an additional sentence is needed on the N <sub>2</sub> O emissions trend. (Government of United States)	Rejected because it is not done for methane either
2-212	E-2-111	A	4	12	4	12	The caption needs to say that the forcings are "relative to 1750" - otherwise it can confuse the reader as to why the zero point of the forcing axis is where it is. (Keith Shine, University of Reading)	Accepted
2-213	G-2-97	A	4	33	4	33	It is suggested to amend the heading as follows: Causes of changes in climate. The addition of "in climate" would provide a much better linkage of topic 2 to the topic 1 which has the title "Observed changes in climate and its effects". Furthermore the use of singular for the word changes for topic 2 contrary to the use of the plural in the heading of topic 1 would be avoided. (Government of Austria)	Rejected because plenary approved titles cannot be changed
2-214	E-2-112	A	4				remove text from above the figure (Zoltán Somogyi, Hungarian Forest Research Institute)	Noted; layout of text and figures will be revised in final version
2-215	E-2-113	A	4				Legend of figure 2.3 - it would be interesting to mention the reference year for radiative forcing - ... The corresponding radiative forcings "with respect to 1750" are shown ... (Marcos Gomes, Pontifical Catholic University of Rio de Janeiro)	Accepted
2-216	E-2-114	A	4				Figure 2.3: the size of the small figures inside each panel can be increased (Michel Rixen, NATO Undersea Research Center)	Rejected, because figure has been taken from WGI SPM
2-217	G-2-98	A	4				remove text from above the figure (Government of Hungary)	Rejected. Figure titles retained.
2-218	G-2-99	A	5	0			The significant improvement of understanding and reduction in uncertainty relative to the TAR should be noted (Government of Ireland)	Noted, but not sufficiently relevant for SYR
2-219	G-2-4	C	5	1			" Why not combine the increases in RF with increases in temperature in one section and show how they connect" (Government of Belgium)	Introductory sentence to topic helps to explain the linkage
2-220	E-2-115	A	5	3			W/m <sup>**2</sup> should be placed in the context of a physical variable that policymakers can relate to such as what would a change in radiative forcing of 2 W/m <sup>**2</sup> cause in global atmospheric temperature. (Robert Molinari, University of Miami)	Rejected due to lack of space



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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-221	E-2-116	A	5	3			of drivers' is omitted. '...one of drivers of warming' (Roman Corobov, Modern institute for humanities)	Rejected, sentence is right as is
2-222	E-2-117	A	5	6			Somewhere in this section it would be appropriate to point out that the net anthropogenic RF is almost exactly equal the forcing of CO2 alone. This means that all of the other positive terms (largely other GHGs) and negative terms (largely aerosol effects) offset one another to a large extent. However, the uncertainties associated with aerosol effects is substantially larger leaving us with a large uncertainty in the net anthropogenic RF as shown by the uncertainty in the associated bar at the bottom of the figure. (David Fahey, NOAA Earth Science Research Laboratory)	Rejected due to space limitations
2-223	E-2-118	A	5	7			Same as above. [TSU note: See Comment E-SPM-420-A] (Knute Nadelhoffer, University of Michigan)	Noted. WGI SPM approved language used.
2-224	E-2-119	A	5	8	5	8	change 'Figures 2.3 and 2.4' to 'Figure 2.3' (Suam Kim, Pukyong National University)	Rejected. Each Figure provides different and important information.
2-225	G-2-100	A	5	12	5	12	The phrase "Anthropogenic contribution to aerosols" is quite technical, suggest that the authors either use less jargon, or explain in a footnote how human activities produce aerosols. (Government of Australia)	Rejected because text is approved WGI SPM text
2-226	E-2-121	A	5	12	5	15	In contrast to IPCC 2001 in the current report radiative forcing due to different agents that influence climate are distinguished as due to natural and anthropogenic. The contribution due to aerosols, considering only anthropogenic emissions is again a new and a useful concept. (Ramachandran Srikanthan, Physical Research Laboratory)	Noted
2-227	E-2-120	A	5	12	6	18	The cloud albedo forcing error is the weakest part of the forcing story and where the skeptics find comfort. I suggest that you say why the errors are still large and what is being done to make them smaller. (David Fisher, NRCan)	Rejected due to lack of space; please refer to WGI report
2-228	G-2-101	A	5	14	5	15	This reason for including this line about aerosols also influencing cloud lifetime and precipitation is not clear to the reader (i.e. how does influencing precip affect radiative forcing, which is the point of this paragraph.) The message is in fact clearer in the Technical Summary of WGI (page TS-10 lines 42-43) which make very clear that other aerosol effects are part of the climate system response and are not considered a feedback. Therefore, either delete this sentence from this report (info not relevant to discussion of RF), or use lines 42-43 of page TS-10 which explain the information better. (Government of Canada)	Taken into account
2-229	G-2-102	A	5	14	5	15	Noting that aerosols also affect cloud lifetime and precipitation, without further noting what the influence is (i.e. increased cloud lifetime) is not particularly helpful for policy readers. The authors should expand upon this point.	Taken into account

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of Australia)	
2-230	E-2-122	A	5	15	5	15	"and precipitation" => "and precipitation pattern" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Rejected It is not just the pattern that is affected but also the global mean. Text is retained as it incorporates both global mean and pattern.
2-231	E-2-123	A	5	17	5	19	Solar irradiance is considered a minor contribution to climate change. However, there is still scientific debate about this aspect. In the Figure 2.4 it is indicated that our level of scientific understanding (LOSU) is low for solar irradiance. This poses the question how confident the scientific community is with regard to the importance of solar activity. I would suggest to explain why on the one hand we can be very confident that CC is forced by anthropogenic factors, while on the other hand we still have a low understanding of the solar forcing. (Marcel Marchand, Delft Hydraulics)	Noted, please refer to the underlying WGI report for details
2-232	E-2-124	A	5	17	5	19	It would be useful to give some indication as to why the radiative forcing estimate for solar irradiance in AR4 is less than half that given in the TAR. (Robert Siveter, IPIECA)	Noted, please refer to the underlying WGI report for details
2-233	G-2-103	A	5	17	5	19	The authors need to note at this point that the solar forcing is about 20 times smaller than that from greenhouse gases, and that the science on solar irradiance and its effect on the climate has also been strengthened since the TAR. (Government of Australia)	Noted, please refer to the underlying WGI report for details
2-234	G-2-104	A	5	17	5	19	It would be useful to give some indication as to why the radiative forcing estimate for solar irradiance in AR4 is less than half that given in the TAR. (Government of United States)	Noted, please refer to the underlying WGI report for details
2-235	E-2-126	A	5	20	5	26	There is the potential for confusion between the Halocarbons of the second stacked bar and the F-gases that are excluded from Figure 2.1 because they amount to less than 1% of the total. It should be made clear that "Halocarbons" in this context refers principally to Ozone Depleting Substances. (Archie McCulloch, University of Bristol)	Distinction is made clear in the glossary
2-236	E-2-125	A	5	20	5	27	Too much information in figure 2.4. As RF values and ranges are mentioned in the text and they are also drawn maybe the corresponding column could be eliminated. (María Isabel Travasso, Instituto Nacional de Tecnología Agropecuaria)	Rejected, WGI approved figure
2-387	G-2-1	D	5	20	5	27	Too much information in Figure 2.4. As RF values and ranges are mentioned in the text and they are also drawn maybe the corresponding column could be eliminated. (Government of Argentina)	Rejected, WGI approved figure
2-388	E-2-2	D	5	21	5	21	Explain "contrails" perhas in the figure legend.	Rejected Contrails is a standard term.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Stephen Hawkins, Marine Biological Association of the UK)	
2-237	G-2-105	A	5	22			This is very important figure and may be of use in the SPM (Government of Ireland)	Noted
2-238	E-2-127	A	5	25	5	26	"can cool the climate" sounds a bit 'much'. Please revise, by writing e.g.: "...an additional episodic cooling term for a few years following an eruption." (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Accepted
2-239	E-2-128	A	5	26	5	26	Comment: "...can cool the climate for a few years". Comment: If possible an approximate quantification of "few" would be desirable. (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	Taken into account. Text has been clarified to indicate that cooling follows after an eruption but it is not possible to provide a precise quantification of number of years since this varies depending on eruption.
2-240	G-2-106	A	5	30	5	31	This last sentence (Difficulties remain in reliably simulating and attributing observed temperature ..) does not explain the nature of the remaining difficulties. Some additional remark (or footnote) including some further explanation on the nature of the remaining difficulties would be very much appreciated. The Technical Summary includes such language on page 7, lines 25 to 27. (Government of Austria)	Taken into account
2-241	E-2-129	A	5				Figure 2.4: remove text from above the figure (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected. Figure title retained.
2-242	E-2-130	A	5				Figure 2.4: given the errors on total aerosols, it seems that the probability of negative radiative forcing is not zero... (Michel Rixen, NATO Undersea Research Center)	Noted
2-243	E-2-131	A	5				Figure 2.4 should be Figure 2.3 and vice versa. The section is about the drivers, so the summary figure comes first from a logical point of view. (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected, explanation of order is added at start of section.
2-244	E-2-132	A	5				Figure 2.4 is a very good synthesis of large amount of information - really good! (Jouni Paavola, University of Leeds)	Thanks
2-245	E-2-133	A	5				Figure 2.4- If tropospheric ozone has a radiative forcing of 0.35 watts/m <sup>2</sup> , why is it not represented in Topic 2 Fig 2.1 and in SPM-3? (Knute Nadelhoffer, University of Michigan)	It's not a long-lived GHG
2-246	E-2-134	A	5				Fig 2.4 Level of Scientific Understanding: there is a need to clarify whether "Low" means low understanding of the phenomena or low understanding in the "RF values". This ambiguity is already being abused.	Beyond the scope of SYR

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							(Leonard Allen Smith, London School of Economics)	
2-247	E-2-135	A	5				delete Figure 2.4 (Suam Kim, Pukyong National University)	Rejected because other comments are to the contrary
2-248	G-2-107	A	5				Figure 2.4: remove text from above the figure (Government of Hungary)	Rejected. Figure titles retained.
2-249	G-2-108	A	5				Figure 2.4 should be Figure 2.3 and vice versa. The section is about the drivers, so the summary figure comes first from a logical point of view. (Government of Hungary)	Rejected, explanation of order is added
2-250	E-2-137	A	6	1	6	1	Replace "Feedbacks" with "Climate system feedbacks" (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected to retain shortness of title which has been revised to reflect ordering of subjects in section. Feedbacks are defined within the section.
2-251	G-2-111	A	6	1	6	1	Replace "Feedbacks" with "Climate system feedbacks" (Government of Hungary)	Rejected Rejected to retain shortness of title which has been revised to reflect ordering of subjects in section. Feedbacks are defined within the section.
2-252	E-2-136	A	6	1	6	24	There is no bold-faced text, a sort of message, here like under other sections. Suggest to include at least one sentence. Such a sentence could be: "The global average surface warming following a doubling of CO2 concentrations is likely to stabilize as a temperature change from now in the range of 2 to 4.5°C with a best estimate of about 3°C, and with a very unlikely event to be less than 1.5°C". (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected. It isn't possible to bring forward one particular headline from this subsection.
2-253	E-2-138	A	6	1	6	24	I am missing in this section 2.3 a broader discussion of the risks associated with biotic feedbacks, such as a diminishing carbon sequestration service from land ecosystems or even terrestrial biosphere becoming a net C source. All of these effects amplify climate change and are of key relevance. Compare WGII SPM, p. 6, first par., bullet 2 in TS (FGD, p. 20, section "Ecosystems" in TS.4.1), bullet 2 of ES of WGII chapter 4, and section 4.4.1 (Fig. 4.2), 4.4.10, and 4.4.11. While it is true that we discuss this point on SPM p. 8, lines 10-15, this is merely done in the manner this topic has been treated by WGI in chapter 7, but this text ignores entirely what WGII chapter 4 has contributed. Notably chapter 4 has considered more literature than just the Friedlingstein et al., 2006 study and discusses in its assessment also the role of other factors, such as land-use change, which tend to be neglected in the studies WGI chapter 7 discusses. The divergent model results are of lesser relevance if other likely factors such as current trends of land-use change are considered. This appears to be a major	Beyond the scope of SYR to add more detail (see underlying report) but reference to WGII 4.4 has been added.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							weakness of the SYR and I see much need for improvement. This comment does of course pertain particularly to lines 20-24. (Andreas Fischlin, Integrative Biology - Systems Ecology)	
2-254	G-2-109	A	6	1	6	24	There is no bold-faced text, a sort of message, here like under other sections. Suggest to include at least one sentence. Such a sentence could be: "The global average surface warming following a doubling of CO2 concentrations is likely to stabilize as a temperature change from now in the range of 2 to 4.5°C with a best estimate of about 3°C, and with a very unlikely event to be less than 1.5°C". (Government of Hungary)	Rejected There is no clear standout headline arising from this section equal in importance to headlines in other sections. Not all sections need to have the same number of headlines.
2-255	G-2-110	A	6	1			The title structure should reflect to content of the para ie. Climate sensitivity and feedbacks (Government of Ireland)	Accepted
2-389	E-2-3	D	6	1			It would be useful to have some comment on the cooling variation seen between the 1940s and 1980s, particularly in the Northern Hemisphere. (Stephen Hawkins, Marine Biological Association of the UK)	Beyond the scope of SYR, refer to WGI report
2-256	G-2-112	A	6	3	6	5	It is not clear what is meant by the phrase "it is not a projection". If it is not a projection, what is it? A stronger reframing of these two sentences would be "Equilibrium climate sensitivity is a measure of the climate system response, defined as the global average surface warming, to sustained radiative forcing. Following a doubling of CO2 concentrations, it is likely..." (Government of United States)	Accepted
2-257	G-2-113	A	6	3	6	8	For the broader readership the authors need to unpack this paragraph and provide more information about the importance of equilibrium climate sensitivity to the following findings and projections in the AR4. It should also be noted (as in WG1) rather than just stating "a doubling of CO2 concentrations" that it is "the equilibrium global average warming expected if CO2 concentrations were to be sustained at double their pre-industrial values (about 550 ppmv)". It should also be explained in the Glossary that it is a doubling from pre-industrial concentrations. (Government of Australia)	It's approved SPM WGI language
2-258	E-2-139	A	6	3	6	18	I think that these paragraphs should be reversed in order - not least because a non-expert reader might think that the feedbacks amplify or dampen (line 10) the response beyond the values that are given in the first paragraph - but also because it seems better to start with the generic explanation and then go to the quantitative effects (Keith Shine, University of Reading)	Rejected, because the carbon cycle feedback is not included in climate sensitivity estimated
2-259	G-2-5	C	6	4	2	4	" This remark about the climate sensitivity being not a projection seems displaced. Simply say 'It is defined as the global average surface...'"	Accepted

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of Belgium)	
2-260	E-2-140	A	6	4	6	4	"EQUILIBRIUM global average surface warming" (Keith Shine, University of Reading)	Accepted
2-261	E-2-142	A	6	5	6	5	It would be useful to specify that the doubling of CO2 is relative to the pre-industrial period (1750). (Annarita Mariotti, ENEA)	Rejected, because it's a doubling relative to any base period
2-262	E-2-143	A	6	5	6	5	Consider replacing "It is likely to be" with "It is likely that this surface warming will be" (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected. Text is clear as it is, that "it" refers to "climate sensitivity". Also, thjis text is plenary approved text from WGI SPM.
2-263	E-2-144	A	6	5	6	5	Change to say "doubling of the CO2 concentration"--there is only one that is doubled. (Michael MacCracken, Climate Institute)	Accepted
2-264	E-2-145	A	6	5	6	5	Add after "following a doubling of CO2 concentrations" the starting point of the doubling. E.g., "following a doubling of CO2 concentrations from their pre-industrial value of ... W/m2". (Claire Parkinson, NASA Goddard Space Flight Center)	Rejected, because it's a doubling relative to any base period
2-265	G-2-114	A	6	5	6	5	Consider replacing "It is likely to be" with "It is likely that this surface warming will be" (Government of Hungary)	Rejected Text is clear as it is, that "it" refers to "climate sensitivity". Also, thjis text is plenary approved text from WGI SPM.
2-266	E-2-141	A	6	5	6	6	You should attach a year to the statement "It is likely to be in the range 2 to 4.5°C with a best estimate of about 3°C, and is very unlikely to be less than 1.5°C" (Bruce McCarl, Texas A&M Univesity)	Rejected, because it's a doubling relative to any base period
2-267	G-2-115	A	6	6	6	8	Re: " Values substantially higher than 4.5 degrees C cannot be excluded, but agreement of models with observations is not as good for those values." This should have uncertainty language attached to it eg: values substantially higher than 4.5 degrees C are 'extremely unlikely/ very unlikely' but cannot be excluded. Agreement of models with observations is not as good for those values." (Government of Australia)	Rejected, because of approved SPM WGI text
2-268	G-2-116	A	6	6	6	8	Is it not more correct to replace the wording "cannot be excluded" with "are unlikely"? (Government of European Community)	Rejected, because of approved SPM WGI text
2-269	G-2-117	A	6	6	6	8	Can authors provide the likelihood of values higher than 4.5. (Government of United States)	Rejected, because of approved SPM WGI text

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-270	E-2-148	A	6	7	6	7	(at the end of this line) "as" => "so" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Rejected, because of approved SPM WGI text
2-271	E-2-146	A	6	7	6	8	What is meant by "agreement of models with observations is not as good for these values"? The paragraph is talking about values which are "defined as the global average surface warming following a doubling of CO2 concentrations". What "observations" do we have of this? Is it that those models that show equilibrium climate sensitivities higher than 4.5K are also models that do not reproduce current climate as well as other models? Or is something else intended? (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Rejected, because of approved SPM WGI text
2-272	E-2-147	A	6	7	6	8	Text "but agreement of models with observations is not as good for those values." is not appropriate here as it is about projections where there are no observations (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected, because of approved SPM WGI text
2-273	G-2-118	A	6	7	6	8	Text "but agreement of models with observations is not as good for those values." is not appropriate here as it is about projections where there are no observations (Government of Hungary)	Rejected, because of approved SPM WGI text
2-274	G-2-119	A	6	8	6	8	What is meant by "those" values? The range of 2-4.5°C? (Government of Germany)	T > 4.5 C are meant
2-275	E-2-149	A	6	8			Nothing is said about air traffic producing artificial clouds in the lowermost stratosphere. The cessation of domestic air traffic in the US after Sept 11 had a significant increasing effect on the difference between day and night temperatures (Science ? paper). This is a well-known study that many policymakers have heard of. (Ulf Molau, Göteborg University)	Contrails are included in figure 2.4.
2-276	G-2-120	A	6	10	6	10	The authors need to provide a linking statement between the first two sentences of this paragraph, suggest that the second sentence begins "Water vapour is a greenhouse gas, however, direct emission of...." (Government of Australia)	Taken into account
2-277	E-2-150	A	6	10	6	15	water vapour increase: There should be numbers (e.g. % increase on global average), please show numbers to make the issue more clear; same for clouds if available (Markus Erhard, European Environment Agency)	Beyond the scope, please see underlying report
2-278	E-2-151	A	6	12	6	12	Change to "mean temperature increases"--there is only one global mean temperature. (Michael MacCracken, Climate Institute)	Accepted
2-279	G-2-6	C	6	12	6	12	" Should state that increased water vapour also induces more cloudiness: 'water vapour changes increase, as well as cloudiness, and this...' " (Government of Belgium)	Wrong statement, an increase in water vapor does not necessarily lead to more clouds

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-280	E-2-152	A	6	13	6	16	Given the large amount of discussion in the past about the importance of the water vapour feedback, some amplification is needed for the statement that it is better understood than in the TAR. Has the range of uncertainty been narrowed, if so by how much, or is the better understanding limited to qualitative aspects? (Robert Siveter, IPIECA)	Statement is supported in underlying report (8.6, 9.6, box 10.2)
2-281	G-2-121	A	6	13	6	16	Given the large amount of discussion in the past about the importance of the water vapor feedback, some amplification is needed for the statement that it is better understood than in the TAR. Has the range of uncertainty been narrowed, if so by how much, or is the better understanding limited to qualitative aspects? (Government of United States)	Statement is supported in underlying report (8.6, 9.6, box 10.2)
2-282	E-2-153	A	6	16			Is the cloud feedback uncertainty high enough to change conclusions of the AR4? (Michel Rixen, NATO Undersea Research Center)	No
2-283	E-2-154	A	6	18	6	19	I suggest as cause of concern the emission of CO2 from tawned permafrost soils in the North of Asia and America, as well the acidification of the oceans that can reduce CO2 absorption by the oceans. (these last consideration could be related with the sentence on page 6 of topic 3, lines 38 and 40) (Ricardo Anadón, Universidad de Oviedo)	Rejected due to lack of space, please refer to the underlying report
2-284	E-2-157	A	6	20	6	20	The phrasing 'Warming TENDS to reduce....' is odd phrasing for something described elsewhere in the report as a "Robust Finding". (Steven Clemens, Brown University)	The "tends" refers to uncertainty in the magnitude of the feedback, not its sign.
2-285	G-2-122	A	6	20	6	21	The SYR so far has not dealt with the subject of retention/loss of greenhouse gas emissions in the atmosphere, so the discussion here will not have context for the general policy reader. The authors need to build in a prefacing discussion in sections 2.1 or 2.2. (Government of Australia)	Taken into account. Extra sentence inserted at start of 2.2 on sources and sinks of ghgs.
2-286	E-2-155	A	6	20	6	23	Warming reduces land and ocean uptake. This is true. However, increase in atmospheric CO2 concentration increase land and ocean uptake. The latter effect will be larger than the former one, according to TAR WGI Figure 3.10, for example. Only the description in this draft would make readers misunderstood. (Keigo Akimoto, Research Institute of Innovative Technology for the Earth)	Rejected, because it's approved SPM language
2-287	E-2-160	A	6	20	6	23	According to TAR WG1 Figure 3.10, it is clear that as CO2 concentration increases anthropogenic CO2 uptake increased as well. This information should be added to or combined with current descriptions. (Mitsutsune Yamaguchi, The University of Tokyo)	Rejected, because it's approved SPM language
2-288	E-2-156	A	6	20	6	24	Warming and increase in CO2 in the atmosphere enhance terrestrial ecosystem productivity, as long as they are moderate. As warming proceeds and changes climate greatly, the ecosystem does not keep up high productivity due to soil moisture reduction, and organic carbon in soil starts to decompose into CO2. This important shift is ignored.	Rejected due to lack of space, please refer to the underlying report



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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Motoyoshi Ikeda, Hokkaido University)	
2-289	E-2-158	A	6	20	6	24	it is more than just warming which affects natural carbon sinks - e.g. potential loss of the Amazon forest is due to drying, or reduction in southern ocean carbon uptake due to changes in winds. Better to say "climate change" than "warming" (Chris Jones, Met Office Hadley Centre)	Rejected due to lack of space, please refer to the underlying report
2-290	E-2-159	A	6	20	6	24	Add the following to the end of this paragraph: "However, there is yet no statistically significant trend in the CO2 growth rate as a fraction of fossil fuel plus cement emissions since routine atmospheric CO2 emissions began in 1958. This 'airborne fraction' has shown little variation over this period." This is a direct quote from the Executive Summary of WG I, Chapter 7. While the statement about warming tending to reduce land and ocean uptake of atmospheric CO2 may be theoretically correct, the warming experienced over the last 50 years has not had that impact. The actual data needs to be given as much prominence as the theoretical consideration. (Robert Siveter, IPIECA)	Rejected due to lack of space, please refer to the underlying report
2-291	G-2-123	A	6	20	6	24	Arctic terrestrial ecosystems (peat and permafrost soils) represent a main positive feedback mechanism due to methane emissions in a warmer climate (WII 15.4.2.3) (Government of Norway)	Noted
2-292	G-2-124	A	6	20	6	24	An important finding of the WG1 report is that all coupled carbon-climate cycle models indicate a positive feedback effect, leading to larger atmospheric CO2 concentrations and greater climate change. For the A2 scenario, this effect means that the projected increase in atmospheric CO2 concentration over the 21st century is likely between 10% and 25% higher than projections without this feedback, adding more than 1 °C to projected mean warming by 2100. (WG1 TS at page 45). This is an important finding that should be included at this point in the SYR. (Government of Australia)	See topic 3
2-293	G-2-125	A	6	21	6	21	Delete "anthropogenic" from line 21. State of science does not reveal what part of the CO2 dissolved in the oceans and remaining in the atmosphere is anthropogenic vs. natural, and it is never likely to know that. All we know is that warmer oceans leave more CO2 in the atmosphere, not which fraction came from humans vs. natural sources. In addition, the evidence that land and ocean uptake decreases should be at least outlined here. (Government of United States)	Rejected as this is WGI SPM approved language. Further explanations not possible due to lack of space, please refer to the underlying report
2-294	G-2-126	A	6	21	6	21	Add a footnote " This decrease in the CO2 uptake of the ocean comes in addition to the decrease caused by chemical reactions involving dissolved CO2, bicarbonate ions and carbpnate ions, as described in box 3.3 of the TAR." (Government of France)	Rejected due to lack of space, please refer to the underlying report

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-295	G-2-127	A	6	25	6	25	Add information on methane releases (from permafrost melting, wetlands, and from ocean hydrates) (Government of Germany)	Rejected due to lack of space, please refer to the underlying report
2-296	E-2-161	A	6	26	6	26	Add "to human activity" (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected because it's not limited to human activities
2-297	G-2-128	A	6	26	6	26	Add "to human activity" (Government of Hungary)	Rejected because it's not limited to human activities
2-298	E-2-162	A	6	28	6	30	This definition of attribution os awkward. Try this - 'Attribution is the process of quantitatively establishing the most likely causes for climate change using defined levels of confidence.' (Steven Clemens, Brown University)	Rejected in order to stick with WGI SPM language
2-299	G-2-129	A	6	28	6	30	The authors should consider expanding this point to highlight the advances in the science that have occurred on the attribution of climate change. Suggest that the italicised text in WG1 SPM (at page 10) is incorporated into this paragraph. (Government of Australia)	Rejected due to lack of space, please refer to the underlying report
2-300	E-2-163	A	6	34	6	34	Write "Third Assessment Report" instead of TAR, as elsewhere in SYR. (However, please note also the use in Topic 5, page 1 and onwards.) (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Changed to use TAR throughout
2-301	G-2-130	A	6	34	6	34	To make clear just what is meant by 'advance', please insert the words 'in confidence' following it, thus: "This is an advance in confidence since the TAR's conclusion ..." (Government of New Zealand)	Rejected in order to stick with WGI SPM language
2-302	E-2-164	A	6	36	6	36	change 'Figure 2.5' to 'Figure 2.4' (Suam Kim, Pukyong National University)	Rejected All figures are retained as they contain different and important information.
2-303	G-2-131	A	6	38	6	41	The term "external forcing" should be better explained. Does this mean anthropogenic forcing alone or anthropogenic plus solar and volcanic forcings? Radiative forcing is defined in footnote 1 (page 3 of Topic 2), but the term "external" is not. (Government of United States)	Taken into account by giving examples of external forcings.
2-304	E-2-165	A	6	38			Replace "ice mass loss" with "ice mass reduction" (Andreas Matzarakis, Meteorological Institute, University of Freiburg)	Rejected Text is clearer as is, and this is also plenary approved WGI SPM text.
2-305	G-2-132	A	6	39	6	39	Replace "temperature" with "climate" to match WG1 SPM language. (Government of United States)	Accepted
2-306	E-2-166	A	6	40	6	40	please replace "without external forcing" by "without anthropogenic forcing" to avoid misinterpretations (Markus Erhard, European Environment Agency)	Rejected because it's not true

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
2-307	E-2-167	A	6	40	6	40	Are you sure that the general reader will understand what you mean by "external forcing"? Wouldn't "anthropogenic radiative forcing" be better? (Keith Shine, University of Reading)	Explained earlier by referring to some example of external forcings.
2-308	E-2-168	A	6	40	6	40	...can be explained without external aththropogenic forcing, and...' (Steven Clemens, Brown University)	Rejected The suggestion would render the text incorrect as it should refer to both natural and anthropogenic external forcing.
2-309	E-2-169	A	6	41			Change "would be likely to have" to "likely have". (Katsumi Matsumoto, University of Minnesota)	Accepted
2-310	E-2-170	A	6	45	6	45	stratospheric cooling (has it been previously mentioned or discussed?) (Germán Poveda, Universidad Nacional de Colombia)	Rejected, see underlying report
2-311	G-2-133	A	6	45	6	45	The authors should explain in a footnote how stratospheric cooling is an indicator of greenhouse gas increases and climate change more generally. (Government of Australia)	Rejected, see underlying report
2-312	E-2-171	A	6	46	6	49	If you replace "greenhouse gas concentrations" by "greenhouse gas emissions" you can also mention CO2 storage by oceans (sink) which significantly reduces the greenhouse gas concentrations and therefore the warming effect of anthropogenic GhG emissions (in parallel 80% of heat is stored in oceans) (Markus Erhard, European Environment Agency)	Rejected, beyond the scope of SYR
2-313	G-2-134	A	6	47	6	47	For further clarity the authors should insert "of emissions of" between "because" and "volcanic". (Government of Australia)	Rejected, text is clear enough
2-314	E-2-172	A	6	48	6	48	I'm not pleased with the word 'some' in this conclusion. By reading this statement I get the impression that the potential importance of aerosols is weakened. Only few statements prior the report concludes that aerosols (direct and indirect) may be responsible for -1.2 W/m2 radiative forcing, which is almost equal to that from CO2 but of opposite sign! Of course the uncertainty is very large. But to my oponion this fact should not be summarised with wording like 'some warming'. The conclusion should be rephrased by stressing that although the uncertainty is very large, aerosols likely have reduced radiative forcing with almost a factor of two. One of the figures (WGI) clearly demonstrate this. (Bram Bregman, Netherlands Organisation of Applied Research)	Rejected in order to stick with WGI SPM language. Fraction of warming offset by aerosols is highly uncertain
2-315	G-2-135	A	6	48	6	48	Insert "partly" between "have" and "offset" (Government of Netherlands)	Rejected since we have word "some" in there.
2-316	E-2-173	A	6				Section 2.4. On the other hand, I think the relevance of the advances in attribution is not recognized in the sentences included in this section (perhaps only in the first one) with the confidence level "likely" (presumably it was political constrictions ...). It is difficult to my build	Rejected, it's correct as is.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							up more overwhelming sentences but, for instance, to change “However” in pag. 8, lin, 5 to “Actually”, put more weight on the evidence of observation of the change. (Sergio Alonso, University of the Balearic Islands)	
2-317	E-2-174	A	6				Section 2.4. In my opinion is better to use natural and/or anthropogenic forcings in all of this section (like in Fig 2.5). The use of external forcings can induce to error because of the term external is considered, sometimes, respect to Climate System. In this sense, astronomical would be extern and anthropogenic intern (?). (Sergio Alonso, University of the Balearic Islands)	Rejected in order to stick with WGI SPM language.
2-318	G-2-136	A	7	1	7	27	Antarctica and 1940-1970 temperature development may need explanation. (Government of Sweden)	1940-1970 is explained in underlying report. Antarctica is explained in footnote
2-319	E-2-175	A	7	4	7	4	change 'Figure 2.5' to 'Figure 2.4' (Suam Kim, Pukyong National University)	Rejected All figures retained as they contain different and important information.
2-320	E-2-176	A	7	7			About "Lines are dashed where spatial coverage is less than 50%." How many data (or observation points) are needed for "1% of coverage" ? Or the number of the observation points is taken into account? (Toshihiko Masui, National Institute for Environmental Studies)	Details are in the underlying report
2-321	G-2-138	A	7	13	7	13	Re: "It is 'likely' that there has been significant anthropogenic warming...." What does 'significant' mean? (Government of Australia)	Please refer to underlying report
2-322	E-2-177	A	7	13	7	14	The sentence "It is likely that ... except Antarctica" is ambiguous, in that the reader does not know whether it means that it is likely that there has not been significant anthropogenic warming over Antarctica or that we simply do not have the observational and modelling basis for expressing a likelihood. Would it be better to change "except Antarctica" to "with the possible exception of Antarctica"? Same comment has been made on SPM. (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Taken into account by including footnote 6.
2-323	G-2-137	A	7	13	7	16	The bold text (lines 13-14) are easily misunderstood. We would like the authors to consider combining in the following sentence (line 16), thus: "It is likely that there has been significant anthropogenic warming over the past 50 years averaged over each continent (except Antarctica, for which there is insufficient observational coverage to make a continent scale assessment) (Figure 2.5). {WGI 3.2, 9.4, SPM}" (Government of New Zealand)	Taken into account by including footnote 6.
2-324	E-2-178	A	7	13	7	21	I believe the argument for anthropogenic warming would be significantly enhanced if in addition to Figure 2.5 there was an additional figure contrasting the observed pattern of global warming shown in Figure 1.2 in Topic 1 with the predicted pattern of global warming - eg the map shown in Figure 3.1 of Topic 3 for Scenario A1B during 2020-2030. Many lay people	Rejected because of lack of space

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							have more trouble interpreting graphs than coloured diagrams like these maps, and the similarity is so striking it would have a bigger impact on those who are turned off by mathematical descriptions than the graphs shown in Figure SPM-4. (George Walker, Aon Re Asia Pacific)	
2-325	E-2-179	A	7	14	7	14	change 'Figure 2.5' to 'Figure 2.4' (Suam Kim, Pukyong National University)	Rejected All figures retained as they contain different and important information.
2-326	G-2-139	A	7	16	7	16	The first sentence of this paragraph is more properly a footnote to the bolded text, explaining why there is not sufficient observational evidence across Antarctica to make an assessment. (Government of Australia)	Accepted
2-327	G-2-140	A	7	16	7	16	Move first sentence ("Antarctica has insufficient...") to the end of the paragraph. (Government of United States)	Taken into account with footnote
2-328	E-2-182	A	7	16	7	17	"The observed patterns of warming..." - need to clarify that these patterns are global. From the previous sentence, it might be inferred that you're talking about Antarctica here (James Crampton, GNS Science)	Taken into account
2-329	E-2-180	A	7	16	7	21	That stratospheric ozone depletion is likely contributing to offsetting human induced warming should be mentioned--it is not that a GHG influence is absent, but it may be counterbalanced. (Michael MacCracken, Climate Institute)	By deleting first sentence we have avoided giving misleading impression that this para refers to Antarctica. In fact this para refers to global temperature changes. Space limitations mean that the reader should refer to the full report for consideration of the effects of stratospheric ozone depletion.
2-330	E-2-181	A	7	16	7	21	If possible please introduce graph showing climate model outcomes with and without anthropogenic forcing or refer to this graph (see also TAR) I see this as one of the key-messages to demonstrate the contribution of anthropogenic emission to the global climate system (Markus Erhard, European Environment Agency)	Noted, shown in figure 2.5.
2-390	E-2-4	D	7	16	7	21	Although it is difficult to make a continental-scale assessment for Antarctica, there is much evidence that the Western Antarctic Peninsula has undergone warming that exceeds anywhere else on the planet. This warming tends to get diluted when averaging over the entire Southern Ocean and there is thus a lot of regional variation in the models that cannot be accurately modeled at the present time. The rapid warming of the Western Antarctic Peninsula must be mentioned, however, otherwise the report presents a misleading view that Antarctica is not warming.	Taken into account, footnote has been added

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Stephen Hawkins, Marine Biological Association of the UK)	
2-331	G-2-141	A	7	18	7	18	To clarify this statement modify the sentence to read "...are consistent with simulations by models when they include anthropogenic forcing". (Government of Australia)	Taken into account. Sentence revised to include "only".
2-332	G-2-142	A	7	18	7	18	Insert "only" before "simulated by models" to be consistent with WG1 SPM. (Government of United States)	Accepted
2-333	E-2-184	A	7	19	7	19	To put commas before and after "that has used natural forcing only" in order to make more clear this quite a long sentence (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Taken into account
2-334	E-2-183	A	7	19	7	21	You should say why the models fail on specific geographic prognostication and how big the predictive errors are. Say at what geographic scale one loses agreement between model results. Say too what this means for the regional scenerio building community. Many juristictions need and use regional predictions and maybe they should be more aware of these limitations. (David Fisher, NRCan)	See underlying WGI report
2-335	E-2-185	A	7	20	7	20	Could leave out "(except Antarctica)". (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Footnote added
2-336	E-2-186	A	7	20			"except Antarctica" is confusing as written - it could be read as implying than non-forced models have been successful for Antarctica, which is not the case, rather than (as I assume intended) it not being possible to include Antarctica in this generalisation (Peter Convey, British Antarctic Survey)	Footnote added
2-337	E-2-187	A	7	24	7	24	"...relatively larger " than what? Probably compared to the global scale (Michel J. Rossi, Ecole Polytechnique Fédérale de Lausanne)	Rejected, statement is clear
2-338	G-2-143	A	7	24	7	24	The quantifier "smaller scales" needs to be explained. (Government of Australia)	Rejected, statement is clear
2-339	G-2-144	A	7	24	7	24	Please insert the word 'smaller' before 'scales' for clarity, thus: "On these smaller scales, natural climate variability ...". (Government of New Zealand)	Rejected, statement is clear
2-340	E-2-188	A	7				Delete text above graph. (Zoltán Somogyi, Hungarian Forest Research Institute)	Figure titles retained.
2-341	G-2-145	A	7				Figure 2.5 A small legend should be included denoting the meaning of the different coloured lines/bands in the graph. While these coloured representations are explained in text below the graphic, it would be helpful for policy makers to have this information summarized in a small 'legend' within the graphical area.	Accepted

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of Canada)	
2-342	G-2-146	A	7				Delete text above graph. (Government of Hungary)	Figure titles retained.
2-343	E-2-189	A	8	1	8	1	delete "now" (it is about a process that has lasted for decades) (Zoltán Somogyi, Hungarian Forest Research Institute)	Accepted
2-344	G-2-147	A	8	1	8	1	delete "now" (it is about a process that has lasted for decades) (Government of Hungary)	Accepted
2-345	E-2-190	A	8	4	8	10	In contrast to the SPM, there is no discussion here on the frequency of heat waves. On page 1 of the SPM it is stated that " heat waves vey likely increased in frequency" -- is this consistent with the statements here? (Rolf Mueller, Research Centre Juelich)	See topic 1, here we only discuss the attribution, being the risk of heat waves.
2-346	G-2-148	A	8	4	8	10	This paragraph would read more easily for a general policy reader if the last two sentences were placed first in the paragraph. (Government of Australia)	Accepted
2-347	E-2-191	A	8	4	8	17	Any mentioning of Nature's special issue on climate change (box including Hoyos et al, 2005) (Germán Poveda, Universidad Nacional de Colombia)	Beyond the scope of SYR
2-348	G-2-149	A	8	5	8	7	The authors need to provide more explanation on: what is meant by NH circulation; how NH circulation has changed; what this means; and what other "non-forcing" factors may be playing a role. (Government of Australia)	Beyond the scope of SYR, see underlying WGI report
2-349	G-2-150	A	8	6	8	6	Please insert the words 'by models' after 'simulated' for clarity, thus: "are larger than simulated by models in response to 20th century forcing ...". (Government of New Zealand)	Rejected in order to stick with WGI SPM language
2-350	E-2-192	A	8	7	8	8	Replace "...hot nights, cold nights and cold days ..." by "...warm nights, cool nights and cool days..." (Serhat Sensoy, Turkish State Meteorological Service)	Rejected in order to stick with WGI SPM language
2-351	E-2-193	A	8	8	8	10	Add at end: and reduced the risk of cold waves. (This is likely a bigger effect if equally studied) (John Everett, Ocean Associates, Inc.)	Rejected in order to stick with WGI SPM language
2-352	G-2-151	A	8	9	8	9	Does such a statement make sense if the magnitude of the increase in the risk of heat waves is not specified ? (Government of France)	Yes, see details in underlying WGI report
2-353	G-2-153	A	8	12	8	12	Does such a statement make sense if the share of the contribution to sea level rise is not specified ? It is virtually certain that its contribution was larger than 1 %.	Yes, it does. We stick with WGI SPM language

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of France)	
2-354	E-2-194	A	8	12	8	13	What response to anthropogenic forcing? (Dieter Gerten, Potsdam Institute for Climate Impact Research)	It's WGI SPM language
2-355	G-2-152	A	8	12	8	13	The first sentence of this paragraph needs to be separated from the rest of the paragraph, as currently structured it unhelpfully conflates general sea level rise with the hydrological cycle. (Government of Australia)	Taken into account
2-356	E-2-195	A	8	12			"the response to" could be deleted (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Rejected, text is accurate and SPM WGI language
2-357	E-2-196	A	8	15	8	17	deleting this setence, because it is difficult to say by anthropogenic forcing. (Zong-Ci Zhao, China Meteorological Administration)	Rejected, because it's approved WGI SPM text
2-358	G-2-154	A	8	15	8	17	Does such a statement make sense if the magnitude of the contribution to a global trend towards increases in drought is not specified ? (Government of France)	Yes
2-359	G-2-155	A	8	16	8	16	The authors need to define "drought". It is rainfall deficiency, soil moisture deficiency, run-off deficiency, PDSI intensity, etc? (Government of Australia)	See underlying report
2-360	E-2-197	A	8	16	8	17	Add at end: and contributed to greener earth since the 1970s, likely due to warmth, increased precip and CO2 fertilization ( <a href="http://www.nasa.gov/centers/goddard/news/topstory/2003/0530earthgreen.html">http://www.nasa.gov/centers/goddard/news/topstory/2003/0530earthgreen.html</a> and <a href="http://www.nature.com/news/2007/070528/full/070528-9.html">http://www.nature.com/news/2007/070528/full/070528-9.html</a> ) (John Everett, Ocean Associates, Inc.)	Rejected, no formal attribution study to that effect
2-361	E-2-198	A	8	18	8	18	Add this idea: IT IS VERY LIKELY THAT INCREASES IN MARINE WATER TEMPERATURES INFLUENCES OVER INTENSITY INCREASES OF HURRICANES (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	See topic 1
2-362	G-2-156	A	8	19	8	21	Please replace this bolded chapeau with the exact language from the WG2 SPM. (Government of United States)	We note the difference between this statement and the WGII statement but these words have been carefully drafted after deliberations between WG1 and WG2 authors in order to provide a careful synthetic statement that more fully reflects the assessments of both WGI and



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								WGII reports.
2-363	E-2-199	A	8	23	8	23	The word "small" here is too subjective, and I think there may be different decision from person to person whether the existed studies should be represented as "numbers of" ones or "small numbers of" ones, or even "limited numbers of" ones. I, therefore, think it better here to write down actual number of "studies," counted by WGII authors to lead them a words of "small numbers." (Tsuneo Ono, Hokkaido National Fisheries Research Institute, Fisheries Research Agency)	Taken into account. Text revised.
2-364	G-2-157	A	8	23	8	42	Agree that this text captures the relevant lines of evidence in support of the bolded statement; however, recommend pulling the exact language for these lines of evidence (3 and 4) from the WG2 SPM text. (Government of United States)	Taken into account
2-365	G-2-158	A	8	24			After "retreat" insert "permafrost thawing" (Government of Russian Federation)	Not applicable any longer
2-366	E-2-203	A	8	26	8	26	"... using climate, process, and statistical models ..." => not clear expression (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Removed
2-367	E-2-200	A	8	26	8	30	This is statistician jargon--fine in a scientific article, but this is a paper for policymakers. Say things straightforwardly--the changes can only be explained by including a substantial human influence and cannot be explained by natural factors alone. (Michael MacCracken, Climate Institute)	Taken into account. Text revised.
2-368	E-2-201	A	8	26	8	30	I have reservations about the statistical methods used in the assessment referred to here, although I haven't seen the latest version of the chapter this is based on to know whether these have been fully addressed. (Nathan Gillett, University of East Anglia)	Noted.
2-369	E-2-202	A	8	26			Add. Footnote about climate, process and statistical models (Andreas Matzarakis, Meteorological Institute, University of Freiburg)	That text has been deleted
2-370	G-2-159	A	8	29	8	29	Use of the word "confounding" in this context is confusing, suggest that it is unnecessary and can be deleted. (Government of Australia)	That text has been deleted
2-371	G-2-160	A	8	29	8	29	Suggest replacing "explained due to natural variability" with "explained by natural variability". (Government of Canada)	Text has been revised
2-372	E-2-204	A	8	29			Change "due to" to "by" (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Text has been revised

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2-373	G-2-161	A	8	30	8	32	This sentence is awkward as is, and much of the detail was already given in the section above on page 7. Therefore, suggest simplifying this sentence to read as follows: "Taken together with evidence of significant anthropogenic warming over all continents except Antarctica, it is likely that...etc." (Government of Canada)	Taken into account
2-374	E-2-205	A	8	31			Concerning the words "except Antarctica", see above comment on Topic 2, Page 7 lines 13 and 14 (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Footnote has been added
2-375	E-2-206	A	8	33	8	33	add WGI 4 (Georg Kaser, Geography)	Not relevant in revised text
2-376	E-2-207	A	8	35	8	35	to replace "prevent" with "do not permit" or "hinder" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Rejected in order to stick with approved WGII text
2-377	G-2-162	A	8	35	8	35	The phrase "limitations and gaps" is not explained - limitations and gaps in what? Suggest using the phrase: "Limitations and gaps in our knowledge and understanding". (Government of Canada)	See further below in this paragraph
2-378	E-2-208	A	8	35	8	42	This paragraph seems to understate what is being observed, putting off saying the obvious and inevitable because we have some statistical limitations. The vast fraction of changes is consistent with warming being the dominant influence and the warming is dominantly human-induced--while this may mean our evidence is circumstantial, that level of evidence counts as well. This paragraph should give the policymaker the findings in terms of relative likelihood--not awaiting full statistical proof. (Michael MacCracken, Climate Institute)	Taken into account
2-379	E-2-209	A	8	35	8	42	It may be useful to list some of the non-climate factors here. (Richard Anyah, Rutgers University)	Accepted
2-380	G-2-163	A	8	35	8	42	The authors need to explain what "limitations and gaps" relates to, (i.e. is it data and depth of studies?). (Government of Australia)	Explained in text
2-381	G-2-164	A	8	36	8	37	The sentence "There are few studies directly linking global climate model simulations with observed effects" does not seem adequate to describe what is meant. Perhaps the phrase 'double attribution' would help. It is a technical term, but if described properly, it is quite easy to grasp. For example, the sentence could read: "There are few studies that have shown 'double attribution', that is, that have been able to attribute regional climate change to anthropogenic warming and at least some of the observed effects to regional climate change rather than solely to other factors." (Government of Canada)	Reject because the concept is too complex to be described in the text available.

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2-382	E-2-210	A	8	38	8	40	Proposed: Many impact studies are limited to timescales shorter than 50 years, which is the minimum period required for the attribution of surface temperature changes. (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	Taken into account
2-383	E-2-211	A	8	39	8	39	"Many impact studies are..." (Michel J. Rossi, Ecole Polytechnique Fédérale de Lausanne)	Not relevant any longer
2-384	E-2-212	A	8	41	8	42	List 2-3 examples of some of the non-climate factors (Germán Poveda, Universidad Nacional de Colombia)	Accepted
2-385	G-2-7	C	8	41	8	42	" Could give some examples of these non-climatic changes '(such as land-use change, pollution, and invasive species) ' (WGII SPM)" (Government of Belgium)	Accepted