Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
AI-1	Atlas	0	1	0	70	It is time I gave an opinion on the entire Report. I have commented on every one of them. With AR1 my comments were collected by the Ministry of Energy and submitted as a consolidated kist from New Zealand. With AR2 mu comments were submitted by the Coal Research Association which was listed as a NGO. For AR3 and AR4 I submtted them as an independent consultant. I published critiques on every one of the Reports in peer reviewed Journals and many reports on the Internet. For AR3 it was a book, "The Greenhouse Delusion; A Critique of 'Climate Change 2001'" My actual comments and what happened to them were never published. but I had several acceptances despite my growing opposition to the entire enterprise.. For AR4 I submitted nearly 2000 comments, 16% of the total, all of which have been published as the esult of a request from the Official Information Act. [Vincent Gray, New Zealand]	Noted
AI-2	Atlas	0	1	0	70	In most of the Reports I recommended a change in the title. The Phrase "Climate Change" gives the impression that the Reports are to be entirely devoted to confirming the FCCC definition, which considers Climate Change to be caused by human chamges in trace gases, whereas natural changes were merely "variable". You always modified this, but merely in a footnote. Now in your Glossary you have defined Climate Change as any chage of climate, but the geberal public will still think from your title that you are biased in favour of the FCCA definition. Several times gefore I have suggested "Climate Science" as a peeferable Title and I will try it once more [Vincent Gray, New Zealand]	Rejected - outside of scope of Annex I. This material is covered in chapters 1 and 2.
AI-3	Atlas	0	1	0	70	You seem to have given up your attempts to impose targets and your future projections of temperature change seem to be confined to two Figures in the Technical Summary, TS13 and TFE8, which both give projections with maximum of over 4 degrees and minimum of 1.5 degrees rise by 2100. These Figures seem to be behind recent claims in the press and by the World Bank that you are forecasting the possibility of a rise of 4 degrees by 2100. This seems unlikely since Figures 1.4 and 1.5 of the same Tehnical Summary show that projections are making a poor job of recent temperature changes and show that high scenarios and projections are the least likely [Vincent Gray, New Zealand]	Rejected - outside of scope of Annex I. The comparison of observed and modelled trends is discussed in Chapter 10.
AI-4	Atlas	0	1	0	70	You have failed once more to show that the climate is influenced in any way by changes in emissons of trace gases. I have already shown that your model is defective. You have never subjected it to the necessary discipline of validation which requires successful prediction of a range of future climate properties. Mere simulation of past climate does not constitute evidence. Evaluation, Detection and Attribution is an excessively complex system of organised guesswork where the series of likelihoods and confidences are made by people who are paid to produce them and have a coflict of interest.. [Vincent Gray, New Zealand]	Rejected - outside of scope of Annex I. The comparsion of observed and modelled trends is discussed in Chapter 10. A verification of predictions of earlier IPCC reports is given in Chapter 1.
AI-5	Atlas	0				The colours of the time series figures could be chosen such that lines for the ensemble means can be distinguished from the thinner lines of the individual ensemble members (similar to how it has been done for the historic runs already). For example, use darkred for the RCP8.5 ensemble mean and a lighter red for the ensemble members. [Stefan Fronzek, Finland]	Accepted - the figures used originally used transparancy for this purpose, but this ran into a bug of Adobe Acrobat. Transparency is used in the final draft.
AI-6	Atlas	0				Why are the maps focused on RCP4.5? This scenario is most similar to SRES B1 used in AR4 which was the low emissions scenario. Furthermore, RCP4.5 presumes rather aggressive policy options regarding future emissions. Projected changes under RCP8.5 are more robust as well as being more reflective of the "no policy" option. [Government of United States of America]	Accepted. It is noted that maps for the other RCPs are presented in the supplementary material.
AI-7	Atlas	0				Definition for "solar irradiance":"Total solar irradiance" is in the glossary, but for people looking for "solar irradiance," which is not in the glossary, you could add an entry for "solar irradiance" and direct them to the entry for "total solar irradiance." [Government of United States of America]	Rejected - there is also an entry for "Solar radiation" that points to "Total solar irradiance".
AI-8	Atlas	0				The Atlas includes spatial maps for the 25th percentile and 75th percentile as a measure of the range of model projections from the multi-model ensemble. This metric on model uncertainty bears no relationship to the IPCC uncertainty guidance. It would be better to show the likely range, using the 17th percentile and the 83rd percentile, including 66% range from the model ensemble, rather than the 50% range. [David Karoly, Australia]	Rejected. We choose not to preesent maps associated with uncertainty guidance as we do not assume that the CMIP5 ensemble is representetive of the assessed ranges of regional climate change,
AI-9	Atlas	0				There is a colour coding for vary small changes (-0.5 to 0.5 °C and -10 to 10 %), this is not useful; the colour coding indicates that there might be a signal which is not there at all. Have a look at common good practice guide lines like the following: Kreienkamp et al. 2012: Good practice for the usage of climate model simulation results – A discussion Paper. Environmental Systems Research, 1:9 doi:10.1186/2193-2697-1-9 [Frank	Rejected. We choose to retain uniform contour intervals as this is common practice in presenting such maps. We indicate regions of small signal relative to natural variability using hatching.

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						Kreienkamp, Germany]	
AI-10	Atlas	0				The Atlas is using unequal spaced colour scales. Those scales are misleading. Please use equal spaced colour scales. Have a look at common good practice guide lines like the following: Kreienkamp et al. 2012: Good practice for the usage of climate model simulation results - A discussion Paper. Environmental Systems Research, 1:9 doi:10.1186/2193-2697-1-9 [Frank Kreienkamp, Germany]	Rejected. Due to the widely varying physical characteristics and hance amplitude of natural variability and climate change, we have to choose between using the same non-linear scale for all maps or different qual-step scales for different regions. We choose for uniformity of colour scales between different regions, which forces a non-linear colour scale.
AI-11	Atlas	0				The Hatching is an interesting and useful feature. But using black, those regions get more attraction. May be a white hatching would be more useful. [Frank Kreienkamp, Germany]	Rejected - This idea was also raised at the LA3; we tried white hatching and it made the maps significantly harder to read.
AI-12	Atlas	0				It would be helpful if the diagrams (top of the figures) for one region would have the same range for all seasons [Frank Kreienkamp, Germany]	Accepted - change implemented with some exceptions for regions with very dry seasons or very different spatial characteristics. The differences in scale are then noted in the caoption.
AI-13	Atlas	0				Having just 2 seasons for temperature can give a hint, but please provide all 4 seasons (at least for regions which separate 4 seasons like Europe) in the supplement material. [Frank Kreienkamp, Germany]	Rejected - given the time constraints we could not add these for some regions. Note that many hydrologists in Europe do use the two half-year seasons.
AI-14	Atlas	0				Using April to September as one season (Europe) for rainfall is not useful. Please provide all 4 seasons in the supplement material. [Frank Kreienkamp, Germany]	Rejected - given the time constraints we could not add these for some regions. Note that many hydrologists in Europe do use the two half-year seasons.
AI-15	Atlas	0				As I mentioned in the FOD, congratulations for the excellent work done by the Responsibles for doing the calculations and the drawing of figures, tables and maps of Annex I and Annex II. [Rubén D Piacentini, Argentina]	Noted
AI-16	Atlas	0				Using "atlas" as chapter head as your web page would not accept AIII as a chapter head. [Stephen E Schwartz, United States of America]	Noted
AI-17	Atlas	0				Annex III glossary. This is an excellent addition to the report. I hope there will be a systematic typographical device throughout the report that indicates when a term is defined in the glossary, and for the electronic version, a hyperlink. I have some technical suggestions detailed below. [Stephen E Schwartz, United States of America]	Noted
AI-18	Atlas	0				Atlas Supplementary Material: Please make sure to also correct errors/inconsistencies discovered in RCP4.5 and commented here in the three Atlas Supplementary Material files (2.6, 6.0, 8.5) as well. [Thomas Stocker/ WGI TSU, Switzerland]	Noted.
AI-19	Atlas	1	1	16	70	A significant number of these graphs show a definite probability that there will be little or no change in any property by 2100, so you are covered whatever happens. . [Vincent Gray, New Zealand]	Noted.
AI-20	Atlas	1	44	1	46	Status CMIP5 archive: "..based entirely on all available CMIP5 model output..." -- suggest to add detailed information on the status of the CMIP5 model archive (date/time etc.) as used for the production of the Atlas. [Thomas Stocker/ WGI TSU, Switzerland]	Accepted - date added.
AI-21	Atlas	1	45			Not quite, because some models are given zero weight in some cases. [Dáithí Stone, United States of America]	Rejected. This comment referred to FGOALS-s2 which was subsequently withdrawn.
AI-22	Atlas	1				Aerosol (singular); A suspension, not collection. Might add: "Aerosols may be primary (emitted as particles) or secondary (formed from gas to particle conversion in the atmosphere) and have different composition and size distribution depending on source, formation process, and chemical and physical evolution in the atmosphere. Aerosols are removed from the atmosphere primarily by uptake in clouds and delivery to the surface in precipitation (wet deposition) and gravitational settling or diffusion to the surface (dry deposition) on a time	Accepted - for "suspension" ; rejected - for the addition.

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						scale of hours (larger particles) to weeks (smaller particles) [Stephen E Schwartz, United States of America]	
AI-23	Atlas	1				I suggest glossary entry for impulse response function: fraction of greenhouse gas or other substance introduced into the atmosphere at a given time that remains in the atmosphere as a function of time subsequent to emission. Dimensionless. [Stephen E Schwartz, United States of America]	Rejected - the terms are used only in chapter 5 where they are defined. Apart very few exceptions, Glossary entries are for terms used in at least two chapters.
AI-24	Atlas	1				Insolation Reads: "Contracted from incoming solar radiation". This derivation is an urban legend. The term derives from the Latin, insolare, to illuminate with sunlight. Inclusion of this derivation will discredit the glossary if not the entire report. [Stephen E Schwartz, United States of America]	Accepted - the definition of "Insolation" has been changed. The error is fixed.
AI-25	Atlas	1				I suggest glossary entry for "stack" as used in chapter 5 [Stephen E Schwartz, United States of America]	Rejected - the term is used only in chapter 5. Apart very few exceptions, Glossary entries are for terms used in at least two chapters.
AI-26	Atlas	1				I have to start by congratulating the authors with managing to get this far given the constraints, not to mention numerous comments from people like me (I'm sure some mutually contradictory). Hats off to the perseverance. It is unfortunate that those constraints were there and it means unfortunately that WGII is doing its own climate plots now. [Dáithí Stone, United States of America]	Noted
AI-27	Atlas	2	14			It says 37 in the table. [Dáithí Stone, United States of America]	Accepted. Updated in the Final Draft
AI-28	Atlas	2	15	2	16	Where available. [Dáithí Stone, United States of America]	Rejected - we thought it was obvious that we only use available data.
AI-29	Atlas	2	17	2	18	Technical Notes: suggest adapt the last sentence in this para "We show maps from one scenario (RCP4.5) but include time series from all RCPs" to emphasise more that all the information for the other three RCPs is available from the Atlas Supplementary Material. This is mentioned in the Introduction as well as on page 4, lines 35-36 but we feel it's important to put this first in the "Technical Notes" to make the readers aware of it. One option could also be to simply move the text from p4, lines 35-36 on "Scenarios" to just before "Data and Processing". This would further clarify that this printed version of the Atlas is limited to maps from one scenario, RCP4.5, but that maps for all the other RCPs are available in the exact same format as Supplementary Material. [Thomas Stocker/ WGI TSU, Switzerland]	Accepted. Change implemented.
AI-30	Atlas	2				Page AIII-2 - Add a definition of anomaly. [Government of United States of America]	Accepted - change implemented
AI-31	Atlas	3	3	3	3	The usefulness of the Atlas would be greatly improved if the baseline period would be pre-industrial. [Government of Germany]	Rejected - we attempt to show the changes from the climate that we are accustomed to, which is the recent past.
AI-32	Atlas	3	3	3	5	Baseline Period: consider adding numbers for the temperature changes since preindustrial (based on the Ch2 assessment and as also included in Annex II, Table AII.1.3) to allow readers to interpret projected changes relative to preindustrial. [Thomas Stocker/ WGI TSU, Switzerland]	Rejected - the difference between the reference period 1986-2005 and "pre-industrial" is taken from observational estimates of the global mean temperature in Chapters 11 & 12. This method cannot be applied to many of the regions of the Atlas due to lack of data in 1850-1900. It would be confusing and inconsistent to use a model-based definition of pre-industrial in the Atlas. (Note that many piControl runs did not take into account the time-averaged cooling effect of volcanic eruptions.)
AI-33	Atlas	3	3			Timeseries: consider marking those regions where ocean grid points are being used to calculate areal means. [Thomas Stocker/ WGI TSU, Switzerland]	Rejected - this is already clearly stated in the caption of the time series graphs.
AI-34	Atlas	3	14	3	15	Ah. You might want to point out to the reader then that some areas contribute more than others to the precipitation time series. [Dáithí Stone, United States of America]	Accepted. Sentence added.
AI-35	Atlas	3	17	3	20	The temperature maps now comprise only DJF and JJA, without any coverage at all of the transition seasons. The justification is that these are "the warmest and coldest seasons in which changes have the largest impact". What impact is being referred to here, because this seems to prejudge outcomes from impact studies	Accepted - due to space constratints the transition seasons are only included in teh suipplementary material, this is clearly stated in the introduction.

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						that WG I is not assessing, so are outside the authors' purview. In fact, the largest impacts often occur in those very transition seasons that are omitted here, because these are when many systems exhibit their greatest sensitivity (e.g. plants break dormancy; ice melt/freeze occurs, etc.). [Timothy Carter, Finland]	Accepted - clause deleted.
AI-36	Atlas	3	17	3	20	There is also a broader point here, in that the averaging of precipitation changes, by being 6-monthly, does not match that of the temperature changes. Why on earth couldn't comparable three-monthly averages be used for all four "seasons" for both variables? Yes, the rainy season/monsoon often overlaps two "seasons", but then it doesn't coincide with the 6-monthly averaging periods either in all regions. I really think some discussion with WG II impact researchers would have been in order here, if this atlas is to serve a useful purpose for applications outside the narrowest meteorological ones. [Timothy Carter, Finland]	Rejected. This was not practically possible in the end as we could not obtain a suitable list of seasons vs regions. Not having the local expertise to choose seasons for each regions we settled on these seasons as most likely most useful to most people.
AI-37	Atlas	3	17	3	20	I can't avoid returning to the point I made in the FOD comments, concerning T/P scatter plots. These could show efficiently, and without the messy overlap found in the current time series, for comparable 3-month time periods and for each of the three time slices, all of the model outcomes on one diagram. Individual models could be plotted anonymously, with different RCPs colour coded (as in the time series), and there is the added opportunity of showing natural variability on the same diagram (e.g. as directional ellipses). Natural variability is currently depicted on the maps as hatched areas. While I think the time series are also interesting, especially as they include historical trends, the projections are so numerous as to detract from the usefulness of the plots. My request would be to keep these but to add scatter diagrams as well. After all, there is no real space constraint on the atlas, though new explanations would, of course, be required and formatting would need to be revised. [Timothy Carter, Finland]	Rejected. We did try again to produce such figures but we felt they would be too confusing.
AI-38	Atlas	3	17	3	22	Because that's what I do, I'm going to go through the formality again of saying that it would be more useful to have different seasons for the different regions, and with a particular focus on transition seasons (temperature or precipitation, depending on which defines the regional seasons). I would have to dig into my e-mails to remind me of what I suggested for the African regions. [Dáithí Stone, United States of America]	Rejected. This was not practically possible in the end as we could not obtain a suitable list of seasons vs regions. Not having the local expertise to choose seasons for each regions we settled on these seasons as most likely most useful to most people.
AI-39	Atlas	3	18	3	19	This statement on impacts has to reference the appropriate chapters of WGII, if it is accurate (and I don't think it is). [Dáithí Stone, United States of America]	Accepted. Text modified.
AI-40	Atlas	3	24	3	27	Are these all land and ocean (where both exist of course)? [Dáithí Stone, United States of America]	Accepted - text adjusted. For some regions land and oceans are combined, for some they are separated, this is clearly marked on those figures.
AI-41	Atlas	4	2	4	6	Why are box and whiskers plots constructed only for the latest 20-year period? Information for the earlier time slices would also be interesting (it is being provided in Chapter 12 and in the SPM). Moeover, can the data behind these box and whiskers plots be accessed somehow from the online electronic atlas? Although these reflect only one method or representing the CMIP5 model uncertainties (I realise that more comprehensive attempts are being made in Chapter 12), these numbers still do have a meaning and potential application in conjunction with the maps and figures in the atlas, so should ideally be made available (in some tables for each region, variable and time period at the end of the atlas, perhaps). [Timothy Carter, Finland]	Accepted - the data for these plots is made available, including the box-and-whisker plots for the two earlier standard horizons. These were left out of the graphical representations for space reasons. They are aslo in Chapter 14, Table 14.2.
AI-42	Atlas	4	13	4	14	Is this the distribution of annual values within that 20-year period or the distribution of the 20-year mean? [Dáithí Stone, United States of America]	Accepted - text adjusted. The distribution of 20-yr mean was meant, this is now clarified.
AI-43	Atlas	4	18	4	25	This calculation is now revised from the FOD, and it is good to see that multi-centennial pre-industrial runs are being used to estimate natural variability. However, why is the statistical significance being judged now against only 1 sd rather than 2 sd (as in the FOD)? The SQRT (2) multiplication was not applied in the FOD (to my recollection), so I expect that imposing this on 2 sd would render most changes as being non-significant (i.e. requiring shading over most regions in most maps). Nevertheless, 2 sd is a more rigorous (and conventional) measure to use. Note that this could also be plotted on a T/P scatter plot if such graphs were to be constructed (as suggested by me elsewhere). [Timothy Carter, Finland]	Rejected. First, the factor sqrt(2) was also included in the FOD, as the s.d. of the difference of two 20-yr periods was considered. The only changes have been the approximation that the s.d. In the reference period is equal to the s.d. In the pre-industrialm period and the change of the hatching criterion from two times the s.d. of natural variability to one. The latter was made after a prolonged discussion to compensate for the rather short time periods chosen (two times 20 years), which add noise that is not relevant to adatptation. The one-s.d. criterion in practice indicates areas that

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							with more senstive and relevant measures of climate change experience close to two s.d. change. Not statistical sig. but S/N
AI-44	Atlas	4	18	4	34	The method of hatching remains unclear. How can there be three different percentiles? And the square root of 2? Please explain for non-experts to understand, as the Atlas will be used by policy makers. [Government of Germany]	Accepted. Text modified.
AI-45	Atlas	4		7		Consider adding Certainty and Confidence Interval definitions in Annex III. Confidence is defined on page 7 but adding the table in the definitions may aid in quickly understanding what the definitions of confidence and certainty are. [John P. Reisman, United States]	Rejected - but the definition of "Confidence" has been changed by including references to one table and one figure of chapter 1 including the more detailed definitions.
AI-46	Atlas	5	5	5	5	About “Figure AI.1: Explanation of the features of a typical time series figures presented in the Annex”. i) Sorry, my English is not perfect, but I think that if there is only one figure, it must be “a typical time series figure” and not “a typical time series figures”; ii) the explanation of the percentiles and mean values in the box at right, are not correctly related to the arrows with the corresponding horizontal segments of the (red) error bar, mainly the following ones:” 5%-tile”, “25%-tile” and “Median”; iii) the same stands for the arrow that goes from “Ensemble mean” to “RCP6.0” horizontal orange line; iv) since the median curve is the orange one, corresponding to RCP6.0, it must be included in this figure and in all similar figures, so that it appears at the front (and all the segments of the curve for the different years can be seen). In this figure (and in other figures of the same kind) the blue (less probable) RCP2.6 result has been drawn as if it was the most important one; v) it would be important to include in each geographical region of the World a mean annual map, not only the seasonal or half a year maps. [Rubén D Piacentini, Argentina]	i) Accepted - textual error. Ii) Accepted. Iii) Rejected - arrow is correct iv) Rejected - first, this is the mean, not the median; second, we do not impose a probability measure on the different scenarios, they happen to be drawn from top to bottom. v) accepted - the mean annual maps will be available in the supplementary information..
AI-47	Atlas	5				Fig AI.1: Percentiles chosen are 5, 25, 50, 75 and 95. However, the uncertainty guidance notes for AR5 refer to 10, 33, 66, 90 as ranges for qualification of the likelihood. For consistency, please give these numbers. [Government of Germany]	Rejected. We choose not to preesent maps and quantiles associated with uncertainty guidance as we can not assume that the CMIP5 ensemble is representetive of the assessed ranges of regional climate change. See e.g. Box 11.2.
AI-48	Atlas	5				Climate feedback parameter: Reads: "F is the heat flux into the ocean"; change to "F is the net heat flux into the planet, mainly into the ocean" Continuing, strike the sentence: "It varies as the inverse of the effective climate sensitivity."; as discussed below the definition of effective climate sensitivity is wholly unsatisfactory. You may wish to state that it is the inverse of the equilibrium climate sensitivity. [Stephen E Schwartz, United States of America]	Rejected - but the definition of "effective climate sensitivity" (in "Climate sensitivity" entry) has been changed.
AI-49	Atlas	6	4	6	4	About “Figure AI.2: Explanation of the features of a typical spatial maps presented in the Annex”. i) The same comment as the one above for Figure AI.1, for I think that if there is only one map represented in this Figure AI.2, it must be “a typical special map” and not “a typical special maps”; ii) the selected time intervals are quite complicated. For example, the largest one is from 1986-2005 (with a mean value of year 1995.5) up to 2080-2099 (with a mean value of year 2089.5). This corresponds to a total time interval of 2089.5 -1995.5 = 94 years. It would be of more significance for understanding different centuries and for comparison purposes to consider the beginning and the end of the present 21th century; iii) it would be clearer if the error boxes placed at the right of the figure were made for the end of the represented period (2100), as was done for example in AR4-WGI, Figure SPM.5 and not for the 2080-2099 period. At first glance, these boxes seem to correspond to the end of the present century and not to the last two decades. [Rubén D Piacentini, Argentina]	i) Accepted - Textual error fixed. Ii) Rejected - The baselines period and future periods are fixed throughout the report. The baseline period has been chosen such that it lies in the recent past with as many high-quality obervatins as possible. The end-of-century peiod was dictated by the fact that many model simulations end in 2100 as prescribed by the CMIP5 protocol. iii) Rejected - it is impossible to define a 20-yr mean of model runs that end in 2100 except by taking the period 2081-2100.
AI-50	Atlas	6	4	6	6	There is no example of hatching on this map. [Dáithí Stone, United States of America]	Accepted - plot has been updated.
AI-51	Atlas	6		7		Climate sensitivity In IPCC reports, equilibrium climate sensitivity refers to the INSERT so called equilibrium change in the annual mean global surface temperature INSERT when the climate has reached steady state following a doubling of the atmospheric equivalent carbon dioxide concentration. ADD Although the term "equilibrium" is commonly used to denote the long-time change in the climate system following a perturbation, this is a misnomer, as the climate system is never at an equilibrium, formally a system where all fluxes are	Accepted - the definition of "Climate sensitivity" has been changed but with a different wording than proposed in the comment and without including the addition concerning the term "equilibrium".

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						matched by equal and opposite fluxes so that there is no net flux on any path, a requirement that clearly is never met in the climate system. Continuing, suggest strike language: "Due to computational constraints, the equilibrium climate sensitivity in a climate model is usually estimated by running an atmospheric general circulation model coupled to a mixed-layer ocean." There are now other methods of estimating climate sensitivity in models, namely the Forster-Gregory approach. [Stephen E Schwartz, United States of America]	
AI-52	Atlas	6				Fig AI.2: Percentiles chosen are 25, 50, and 75. However, the uncertainty guidance notes for AR5 refer to 10, 33, 66, 90 as ranges for qualification of the likelihood. For consistency, please give these numbers. [Government of Germany]	Rejected. We choose not to preesent maps and quantiles associated with uncertainty guidance as we can not assume that the CMIP5 ensemble is representetive of the assessed ranges of regional climate change. See e.g. Box 11.2
AI-53	Atlas	7				Fig. AI.3: We appreciate, that these regions are the same as those used by WG II. [Government of Germany]	Noted.
AI-54	Atlas	7				Effective climate sensitivity. The entire entry needs serious revision if it is to be retained. Current entry: The effective climate sensitivity is a related measure that circumvents the requirement of equilibrium. It is evaluated from model output for evolving non-equilibrium conditions. It is a measure of the strengths of the climate feedbacks at a particular time and may vary with forcing history and climate state. The climate sensitivity parameter (units: °C (W m–2)–1) refers to the equilibrium change in the annual mean global surface temperature following a unit change in radiative forcing. This definition for effective climate sensitivity is no definition "related measure". Break out the definition for climate sensitivity parameter. Revise as follows: The climate sensitivity parameter (units: °C (W m–2)–1) is the "equilibrium" change in the annual mean global surface temperature following a change in radiative forcing, normalized to that forcing; it is the inverse of the equilibrium climate sensitivity. Suggest "equilibrium" in quotation marks here. Note suggested change for climate sensitivity above. [Stephen E Schwartz, United States of America]	Accepted - the definition of "effective climate sensitivity (in "Climate sensitivity" entry) has been changed.
AI-55	Atlas	7				The transient climate response is the change in the global surface temperature, averaged over a 20-year period, centred at the time of atmospheric carbon dioxide doubling, that is, at year 70 in a 1% yr–1 compound carbon dioxide increase INSERT climate model experiment with a global coupled climate model. It is a measure of the strength and rapidity of the surface temperature response to greenhouse gas forcing. [Stephen E Schwartz, United States of America]	Rejected - but the definition of "transient climate response" (in "Climate sensitivity" entry) has been changed and the term "experiment" is no more used.
AI-56	Atlas	7				Cloud condensation nuclei (CCN) The subset of aerosols that... Let it read: The subset of aerosol particles that ... [Stephen E Schwartz, United States of America]	Accepted - the definition of "Cloud Condensation Nuclei (CCN)" has been changed.
AI-57	Atlas	7				Cloud radiative effect The radiative effect of clouds INSERT relative to the identical situation without clouds. Replace "Until recently" by "In previous IPCC reports" this was called cloud radiative forcing, but that terminology is inconsistent with other uses of the forcing term and is not maintained in this report. See also Cloud feedback. [Stephen E Schwartz, United States of America]	Accepted - the definition of "Cloud radiative effect" has been changed.
AI-58	Atlas	8				Looking at these time series I'm wondering if you need to include all the individual simulations for all of the scenarios of the future. They are all overlapping such that you don't see most of them anyway, and thus don't get the sense of spread that the plots are (I think) supposed to be trying to convey. I guess you could keep RCPs 2.6 and 8.5 there, but then just plot the means and box-and-whiskers of the other two. [Dáithí Stone, United States of America]	Noted - the appearance of the thin lines will be improved by making them lighter or transparant, this was taken out of the SOD because a bug in Adobe Reader prevented the figures with transparancy from printing properly.
AI-59	Atlas	11				Equilibrium and transient climate experiment. Reads: An equilibrium climate experiment is an experiment in	Accepted - the definition of "Cloud radiative effect"

Comment No	Chapter	From Page	From Line	To Page	To Line	Comment	Response
						which a climate model is Suggest let it read: An equilibrium climate experiment is a climate model experiment in which the model is [Stephen E Schwartz, United States of America]	has been changed.
AI-60	Atlas	12	1	12	1	Here, in the Arctic, and in a few other high northern latitude plots, there seems to be a wildly anomalous single model outcome projecting severe cooling under at least two RCPs (it's difficult to discriminate on the plots). I am very much in favour of model democracy, and while the model may be behaving perfectly correctly, with all other models exhibiting fatal flaws, nonetheless this result does merit some close attention from the authors, if only because of its apparent quirkiness! I suppose that the authors have had a chance to check the model outputs with the modelling group responsible, because if there is an error or some sort, removing this result could alter some of the summary statistics quite markedly. In any case, it might be worthwhile discussing this result. I noticed that Chapter 12 does mention this briefly (P. 74, L31-34), as follows: "The magnitude of Arctic amplification, for instance, varies among different models, and a subset of models show a weaker warming or slight cooling in the North Atlantic as a result of the reduction in deepwater formation and shifts in ocean currents". So the effect is apparently explicable, even if it still seems somewhat exaggerated. It would be interesting to see if there are other ensemble members that show the same result for this model, and/or if this comes about because of chance anomalies in the 20-year reference and scenario periods. [Timothy Carter, Finland]	Noted - The model is FIO-ESM, which simulates a collapse of the AMOC in all four scenario runs. It cannot be excluded that this is physical, so the results have been retained in the ensemble. This cannot be discussed in Annex I, but is mentioned in Chapter 12.
AI-61	Atlas	13				Global surface temperature Reads: The global surface temperature is an estimate of the global mean surface air temperature. However, for changes over time, only anomalies, as departures from a climatology, are used... Suggest change to read: The global surface temperature is an estimate of the global mean surface air temperature. For changes over time, anomalies, departures from a climatology, are frequently reported.... Suggest glossary entry for Anomaly: Departure from climatological mean over specified time period. (make cross reference above, striking ", as departures from a climatology," [Stephen E Schwartz, United States of America]	Rejected - for "Global surface temperature" (now "Global mean surface temperature"), because the present definition is consistent with the use of the terms in the report. May be - for "Anomaly" expecting the response of SPM LAs to comment SPM-2645.
AI-62	Atlas	13				Global Warming Potential (GWP) Reads: An index, based upon radiative properties of well-mixed greenhouse gases, measuring the radiative forcing following a pulse emission of a unit mass of a given well-mixed greenhouse gas in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide. The GWP represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing terrestrial radiation. The Kyoto Protocol is based on GWPs from pulse emissions over a 100-year time frame. I suggest revised language: An index, based upon radiative INSERT and persistence properties of well-mixed greenhouse gases INSERT other than CO2, of the radiative forcing following a pulse emission of a unit mass of a given well-mixed greenhouse gas in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide. I suggest to add the following sentence: The GWP of a greenhouse gas for a given time horizon is evaluated as the ratio of the Absolute Global Warming Potential of that gas for the time horizon relative to that of CO2 for the same time horizon. I suggest glossary entry for Absolute Global Warming Potential AGWP, with cross reference An index, based upon radiative and persistence properties of a well-mixed greenhouse gase, of the radiative forcing following a pulse emission of a unit mass of a given well-mixed greenhouse gas in the present-day atmosphere integrated over a chosen time horizon (W yr m-2).	May be - expecting a response from chapter 8 LAs.

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						I suggest cross reference to impulse response function. [Stephen E Schwartz, United States of America]	
AI-63	Atlas	16		19		There is a problem with the title of the top left panel. [Dáithí Stone, United States of America]	Accepted - Fixed.
AI-64	Atlas	19				Mole fraction. Reads: Mole fraction, or mixing ratio, is the ratio of the number of moles of a constituent in a given volume to the total number of moles of all constituents in that volume. I am pleased to see this entry and the use of this terminology. However strictly speaking, Mixing ratio is the quantity and mole fraction (dimensionless) the unit. [Stephen E Schwartz, United States of America]	Noted - but "mole fraction" is also used in the report as a substitute to "mixing ratio".
AI-65	Atlas	20				Ocean heat uptake efficiency Reads: This is a measure (W m–2 °C–1) of the rate at which heat storage by the global ocean increases as global surface temperature rises. This is not a definition. A suitable definition might be: This is a ratio of the rate at which heat storage by the global ocean increases as global surface temperature rises to the increase in global surface temperature (W m–2 °C–1) . [Stephen E Schwartz, United States of America]	Rejected - but the definition of "Heat uptake efficiency" has been changed making clearer how it can be estimated.
AI-66	Atlas	22				Radiative forcing Radiative forcing is the change in the net, downward minus upward, irradiance (expressed in W m–2) at the tropopause INSERT or top of atmosphere [Stephen E Schwartz, United States of America]	Rejected - but the definition of "Heat uptake efficiency" has been changed making clearer how it can be estimated.
AI-67	Atlas	27	1	39	17	I am extremely happy to see that the Atlas uses the SEREX regions. While the region chosen for the seasonal analyses for temperature look fne, I beleve that the seasons used for rainfall may not reflect the righ annual cycle of rainfall in regions outside the monsoon regions, particularly in South America. Perhaps this may not be much of a problem. I would suggest to have annual maps and time series, since they help a lot in establishing the mean climate and changes. [Marengo Jose, Brazil]	Rejected. This was not practically possible in the end as we could not obtain a suitable list of seasons vs regions. Not having the local expertise to choose seasons for each regions we settled on these seasons as most likely most useful to most people.
AI-68	Atlas	28	1	31	1	Outline Region: the two regions "Central America" and "Caribbean" are overlapping according to the outlines depicted on pages 28-31 -- please correct [Thomas Stocker/ WGI TSU, Switzerland]	Accepted - the Caribbean region has been redrwan to avoid overlap.
AI-69	Atlas	44		46		Another problem with the top left title. (Yes, I am still paying attention.) [Dáithí Stone, United States of America]	Accpeted - fixed. Thanks, we were obviously exhausted.
AI-70	Atlas	67				Table on page TS 67 - TFE.9, Table 1: Consider adding table and/or definitions to Annex III [John P. Reisman, United States]	Accepted - "Heat wave" and "Drought" are already in the Glossary, but new entries for "Cold days / cold nights", "Warm days / warm nights", "Warm spell" have been introduced, as well as references to box 2.4.