

IPCC AR6 WGIII Second Order Draft Government and Expert Review Comments Responses (Annex II - Definitions, units and conventions)									
If any fields are not readable, please ensure to expand relevant cells. If reading this in PDF format, please refer to the Excel format version of this document available on: https://www.ipcc.ch/report/ar6/wg3/downloads/drafts-and-reviews Please note, "Annex II - Definitions, units and conventions" was previously titled "Annex B - Definitions, units and conventions", and comments and responses below may refer to "Annex B".									
Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response	
11709	0				The shortcoming of the metric GWP-100 for methane is recognized in the report and that other metrics, such as GWP* may better represent the actual warming caused by methane emissions. Still, the report concludes that GWP 100 shall be used but that "this choice does not constitute a recommendation to use GWP100 for any specific policy application as the most appropriate choice depends on the policy goal and implementation of the metric" (p26 1-3). While this might be a valid choice all things considered it becomes problematic when many of the conclusions in the report regarding food and agriculture are based on research using GWP 100, and that these conclusions are used for policy recommendations in the report. In particular, the results of lifecycle analysis for agriculture products and diets are heavily influenced by the metric used. The report concludes "rapidly declining CH4 emissions are given a negative CO2 -equivalent value based on GWP* but a positive CO2 -equivalent value based on GWP" (p 25, 25-27). In the case of diet scenarios this means, for example, that a diet with just a 10% reduction in ruminant meat or dairy will reduce warming using GWP* while using GWP 100 it still cause considerable warming. For further elaboration see John Lynch et al 2020 Environ. Res. Lett. 15 044023. This needs to be reflected in the texts about diets in chapter 7 and 12 (possible also in other places).	Eva Pettersson	Sweden	Taken into account in the revisions of Cross-Chapter Box 2.2 and supplementary material to chapter 2. Our assessment makes clear that GWP-100 does provide scientifically relevant information from a cost-benefit and cost-effectiveness perspective. Every tonne of methane emitted makes Earth warmer than it would be without that emission. Information provided in chapter 7 about abatement options for methane is therefore highly relevant from a mitigation perspective even if such mitigation results in less warming than previous emissions caused at a previous point in time, as indicated by GWP*. Chapters 7 reports emissions of individual gases, not only CO2-eq emissions, to increase transparency about abatement potential of	
15157	0				<p>The Chinese government appreciates and thanks the Bureau members, lead authors, and Technical Support Unit (TSU) of the Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR6 WG III) for their painstaking efforts made for the preparation of the present report. In order to make WG III contribution a more scientific, comprehensive and balanced report, and fully consider the equity of the conclusions of the report, we wish to make the following comments which are hoped to be adopted.</p> <p>1.Regarding the erroneous expressions concerning Chinese sovereignty. There are common-sense errors in the report regarding Taiwan Province and Hong Kong Special Administrative Region of China (including but not limited to page 98 of Chapter 2, page 244 of Chapter 5, pages 120 and 139 of Chapter 6, page 33 of Chapter 9, page 50 of Chapter 13, page 4 of Annex B and page 231 of Annex C),all these errors must be corrected. In some conclusions of the report, maps with national borders are used for the purpose of illustration, and there are also a number of errors such as different background colors for Taiwan Province and Chinese mainland in the maps, erroneous borderlines of East Section and West Section of China-India Border, omitting the Dotted Line of South China Sea as well as omitting the Diaoyu Dao and its affiliated islands. To avoid unnecessary disputes, it is suggested that WG III TSU replace all those maps with national borders in the report with maps without, and relevant figures must be redrawn based on national data to ensure that the same color is used for Taiwan Province and Chinese mainland in the maps, with island dots marked. For those studies with few samples, their analyses are suggested to be made in a textual or tabular form. The questionable maps include but are not limited to Figures 2.37, 6.13, 6.20, 7.12, Box 8.1 Figures 1 and 9.13. All these errors must be corrected in the hope that they will no longer appear in future reports.</p> <p>2. Regarding the improper enumeration or insufficient presentation of Chinese examples. There are a large number of non-objective and unbalanced presentations involving China in the report, and an insufficient presentation of efforts made by China in taking action to mitigate and adapt to climate change. On page 19 of TS, for example, when discussing the reason that GHGs emission rate dropped in recent years, the Summary refers to a structural shift to gas in the United States and the increasing penetration of renewables in Europe, but neglects the fact that China is the world's largest new energy market, with the total wind and photovoltaic powers installations, installation increments and investment in new energy ranking first in the world for several years. The statement in Chapter 14 that the "complex and competing" identities of India and China have led to tensions in the negotiations, which is not factually borne out, should not be mentioned in a scientific report. Our specific comments are detailed in the table attached, which includes but is not limited to specific comments for the Chapters. It is suggested to further check and revise relevant statements.</p> <p>3. Regarding the use of country classification criteria in the report. WG III report uses an inappropriate country classification</p>	Government of China	China	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, as well as the text. The new text makes a clearer case for the adopted classification and the rationale behind it.	
76143	0				For improved transparency and clarity, I hope the authors can report emissions and mitigation options for individual gases wherever possible, instead of the often more ambiguous CO2-equivalents. See more on this in Annex B section A.B.10.6: Use of GHG metrics in WGIII contribution to AR6: guidance to authors	Jan Fuglestad	Norway	Thank you, efforts have been made to increase the reporting of individual gases where possible based on the available literature.	

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Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response
77063	0				#8. On Agricultural methane emissions, WGIII has inappropriately chosen the GWP100 metric just for procedural reasons. GWP100 fails to make the required distinction between situations in which the trend in methane emissions is increasing, stable or declining. In all three situations, GWP assigns a CO2-equivalent for methane based solely on the current year's emissions, thereby implying a continued methane contribution to global warming. This is unrealistic because a declining trend in methane emissions can contribute to global cooling. Using the GWP100 metric unfairly penalizes countries like Ireland and New Zealand, whose agricultural emissions are large relative to their CO2 emissions. Hence WGIII should adopt the GWP* methodology (as explained in Annex B, section A.B.10), to reflect the latest scientific data. It is even more important to incorporate the pioneering work of Happer and Wijnngaarden, which proves that CH4 and N2O have insignificant GWP, see https://arxiv.org/abs/2006.03098 . This topic is also under discussion in the Technical Group on Methane within the UN Food & Agriculture Organization. Unwarranted constraining of agriculture output when ~1bn people on the planet are under-nourished is simply not acceptable.	Jim O'Brien	Ireland	Rejected: as the Cross-chapter box on GHG metrics makes clear, along with supplementary material and Annex B.8, the reason for adoption of GWP100 is not only for procedural and consistency reasons, but also because GWP100 provides close to cost-effective mitigation for the temperature goal of the Paris Agreement and is consistent with a cost-benefit approach to CH4 mitigation using social discount rates. GWP* provides a useful additional perspective about the effect of cumulative methane emissions, but this does not capture the contribution to warming that each methane emission makes. Even if CH4 emissions are declining, on-going CH4 emissions do contribute to warming, not cooling; deep reductions of CH4 are needed to limit warming to likely below 2 degrees and lower (see also WGI SPM). WGIII relies on the physical science assessment of GHG metrics by WGI. The results obtained by Happer and Wijnngaarden are not in the peer reviewed literature and
14279	0	0	0	0	While a regional perspective seems to be useful to illustrate some of the findings of the report, the approach to country groupings presented in Appendix B does not seem to be appropriate. Annex B seems to refer to the 1990 OECD countries, which is not up to date anymore. In addition, OECD countries do not cover all of the high-income countries. The assessment refers to classifications as in the UNFCCC Annexes. As the Paris Agreement does not use this classification anymore, the IPCC should not refer to it anymore. Finally, the classification of Annex B seems to include some overlaps of regions, in particular for Eastern Europe. For the final version of the report, we would prefer to see a classification based on criteria relevant to the analysis. These should include economic, technological, social and governance indicators that drive GHG emissions.	Government of Luxembourg	Luxembourg	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, as well as the text. The new text makes a clearer case for the adopted classification and the rationale behind it.

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Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response
45641	0	0	0	0	<p>__Country groupings: We have serious concerns about the approach to country groupings presented in Appendix B. The three nested levels of country groupings used as the basis for the assessment and the additional groupings used in the report are not suitable to provide relevant information. We therefore urge the authors to revise their approaches to country grouping.</p> <p>- The high-level classification of developed countries seems to refer to the 1990 OECD countries, i.e., most members belong to the high per capita income countries, but in 1991 the OECD had eight fewer countries than today. Moreover, several high-income countries are not members of the OECD, but should belong to the group of developed countries (High Level).</p> <p>- The three classification levels are not consistent with each other, e.g., Eastern Europe (Low Level) is part of the developed countries (High Level), but at the same time Eastern Europe is also a classification (High Level) within the group of developed countries (High Level).</p> <p>- Comparing the information on High Level and Low Level, it turns out that some countries with a high HDI and a high GDP are not in the group of developed countries. On the other hand, some countries with lower income levels are allocated to the group of developed countries.</p> <p>- Part of the assessment of WG III refers to classifications from the UNFCCC Annexes, which represent the levels of development in 1992, and are therefore no longer valid. The Paris Agreement no longer refers to Annex 1 and non-Annex 1 countries, but to the principle of "common but differentiated responsibilities and respective capabilities". This reflects that the old classification from 1992 is no longer seen as helpful.</p> <p>We are concerned that these classifications lump together countries with very different levels of economic, technical and human development. We do not see a systematic and scientific approach for the choice of country classifications. We kindly urge the authors to provide alternative approaches to country groupings based on criteria relevant to the analysis of the WG III report, including economic, technological, social and governance indicators that drive GHG emissions as well as the availability and implementation of mitigation options.</p> <p>In addition, each time when using these classifications for country groupings in the report, please refer to the explanations in Annex B since understanding the approach underlining the country groupings is essential for understanding the</p>	Government of Germany	Germany	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, as well as the text. The new text makes a clearer case for the adopted classification and the rationale behind it.
83537	1	1	1	1	<p>I strongly support the choice to cover the greenhouse gas metric discussion in appropriate technical depth in Box 2.2 and the TS, but not elevate it to the SPM. At the same time, some sections of Annex B on greenhouse gas metrics do currently not provide a balanced assessment and discussion of this topic. Some paragraphs cite literature only partially, repeat point, and at times read like fan letters for novel metrics. The discussion in Annex B should still be significantly improved for balanced and accuracy, ensuring that a robust assessment is presented.</p>	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Thank you, Annex B has been reduced to provide factual information about the choice of GWP-100 as default metric in the WGIII report only. Additional detail supporting our assessment is now provided as supplementary material to chapter 2, and we have taken comments on board to ensure balance of this material and supplement the core assessment contained in Cross-Chapter Box 2.2.
31327	1				Surprised there is nothing on Energy return on investment EROI - covered in Ch 6 and a growing literature - but not in Glossary.	Ralph Sims	New Zealand	Thank you for your comment. Rejected - EROI is outside the scope of the Annex. EROI is discussed in Ch6.
43517	3	14	3	36	As it is mentioned in Part I: Definitions and units and A.B.1 Regional classifications and A.B.1.1. Low level of regional classification, it is suggested that an indicator would be clearly defined for both developed and developing countries as these two cases has taken into consideration in whole context of the Annex B	sadegh zeyaayan	Iran	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, and consequently the text.

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50423	3	14	3	36	As it is mentioned in Part I: Definitions and units and A.B.1 Regional classifications and A.B.1.1. Low level of regional classification, it is suggested that an indicator would be clearly defined for both developed and developing countries as these two cases has taken into consideration in whole context of the Annex B	Government of Iran	Iran	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, and consequently the text.	
17761	3	16	5	5	(A.B.1) are the definitions and classifications of countries robust, given the discussion at the AR5 WGIII approval session?	Jonathan Lynn	Switzerland	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, and consequently the text.	
15329	4	7	4	9	In the definition of East Asian countries in Annex B, China is already included. Hong Kong, China and Macao, China should not be listed separately because they are special administrative regions of China. So, it is suggested to delete "China Hong Kong Special Administrative Region, China Macao Special Administrative Region".	Government of China	China	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, and consequently the text.	
19527	5	1	5	5	This classification is problematic. It mixes a kind of a country group ("Developed Countries") and geographical regions with countries across development level varies. In some cases, in the full report, the annex is pointed to when "Developing Countries" is referred to. Assumedly, this then translates to all other countries than those included in "Developed Countries", which is a bit unclear. Overall, it is not clear what the reasons behind and the basis of the classification is and how it serves the assessment. (Previously, country groupings in WGIII have been subject to considerable debate and it would be useful to be very transparent on the reasons behind whichever classification will be presented.)	Markku Rummukainen	Sweden	Thank you for your comment . Text revised. We have revised the entire guidelines for regional classification for WGIII, as well as the text. The new text makes a clearer case for the adopted classification and the rationale behind it.	
86297	5	6	6	2	Suggest including a reference to IEEE and IET published documents for defining units of measurement.	RABIZ FODA	Canada	Thank you for your comment . Sources are indicated in the header of each table, and cited accordingly.	
31323	6				Not seen Ppm or Ppb before. Is usually ppm and ppb	Ralph Sims	New Zealand	Thank you for your comment. Accepted. Text Revised.	

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31321	7]	Ralph Sims	New Zealand	Thank you for your comment. Accepted. Text Revised.
79379	7	0	7	0	In the first item of the table on top of page 7, an example such as: "15 USct2015 /kWh is equivalent to 41,67 USD2015 /GJ" (based on the relation: 1 GJ= 277,78 kWh), could be charitably provided...	Raymond Zaharia	France	Thank you for your comment. The aim of the tables is to simply present units. We added a note at the end of the section for kWh/GJ conversion.
31325	8				Table A B 8. Mtoe, Mtce, GWh etc should be on one line.	Ralph Sims	New Zealand	Thank you for your comment. Accepted. Tables will be better presented in the final production.
79381	13	5	13	6	This rather unusual definition of discount rate ("The rate at which this discount factor changes overtime is called discount rate, which can be static or dynamic."), seems to be inconsistent with the use of "discount rate" made in previous pages of Annex B. (See for instance line 8 page 10, & line 10 page 11.)	Raymond Zaharia	France	Thank you for your comment . The entire discounting discussion has now been moved to Annex III with more extension material on discounting.
79383	14	18	14	18	Not sure if this short description ("[...] these values are multiplied through by the EDGAR electricity and heat sector.") may be enough to perform further calculations and verifications.	Raymond Zaharia	France	Thanks. We have expanded the description and edited for clarity: "The base data for total global, regional and sectoral emissions in this report is the EDGAR database (see section A.B.12.). Since there are some discrepancies between the electricity and heat emissions totals in EDGAR and IEA, we make some adjustments in order to estimate indirect emissions in EDGAR using the IEA data. First, we match the sectors in EDGAR and IEA. Second, for each country and emissions source available in the IEA database, we take the IEA indirect emissions value and divide it by the total IEA value for electricity and heat. Third, we multiply these values through by the EDGAR value for electricity and heat. This procedure ensures that indirect emissions, in principle, sum to the correct total (EDGAR) value of electricity and heat that we use elsewhere in the reporting. (However, total indirect emissions still do not sum to the total electricity and heat sector. This is due to an incomplete allocation of electricity and heat emissions in the IEA dataset, equal to 0.008 Gt CO2 in 2018, or about 0.06% of the total electricity and heat generation.)"
20125	15	1	15	28	Risk is defined, inter alia in respect to (or orbiting around) uncertainty, but uncertainty is not, like in AR5.	Nikas Alexandros	Greece	Noted. The risk definition refers to the POTENTIAL for adverse consequences, which reflects the fact that uncertainty about actual consequences is indeed a core part of the concept of risk.

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4165	15	1	17	13	There is no definition about the concept "climate crisis" or "crisis" (or even correlated concepts like collapse or emergency) related to the definition or concept of "risk". I recommend to include a clear definition about "crisis", as used in the Chapter 5 of this seconde draft. The term "climate crisis" is already used in the Chapter 5, in the pages 68 and 185; besides others 3 citations from references in the same Chapter (already exist): citation on p.113 in Chapter 5: Demand, services and social aspects of mitigation: "Flyvbjerg, B., 2020: The law of regression to the tail: How to survive Covid-19, the climate crisis, and 28 other disasters. Environ. Sci. Policy, 114, 614–618, https://doi.org/10.1016/j.envsci.2020.08.013 "; and citation on p.139: "Mitchell, J. K., 2019: Growing the Constituency: A Twenty-First Century Challenge. Disaster Research and the 14 Second Environmental Crisis, J. Kendra, S.G. Knowles, and T. Wachtendorf, Eds., Springer , 161–15 188."; and p.161 Temple, J., Why we need broader coalitions to combat environmental racism and climate change 36 MIT Technology Review. MIT Technol. Rev.,37 https://www.technologyreview.com/2020/06/11/1003162/a-green-new-deal-architect-explains-38-how-the-protests-and-climate-crisis-are-connected/ (Accessed June 19, 2020)	Frederico Salmi	Brazil	Thank you for your comment and suggestion. The definition of risk and related concepts is an important element to the assessment across all Working Group. This also relates to the terms hazard, and impacts. Please also note definitions of risk management, risk perception, and risk trade-off.
28603	17	15			This section provides a useful overview of the discussion around metrics. It does so very well in relation the physical science side. Much less so in terms of its policy dimension. The metrics question under the UNFCCC is settled it's GWP-100. The point of the policy dimensions of other metrics is dealing with rather model-specific questions and multi-century optimization questions. Arguably not very near-term focused. What is, however, more policy relevant is the questions of policy specific requirements for metrics that might go beyond a climate physical consideration, namely questions of accounting, policy setting, environmental integrity and equity and fairness. Some of these issues are being touched upon throughout the section, but not really spelled out concretely (e.g. issues of equity are missing altogether). Some revision in the structure of the whole section with less focus on some of the physical properties and more on the policy and mitigation implications of it should be considered.	Carl Schleusner	Germany	Taken into account. The material has been condensed and shifted into supplementary material, supporting the cross-chapter box on GHG metrics, in chapter 2. The job of IPCC is to provide a scientific assessment, not whether the issue of metrics is settled under the UNFCCC (which, we note, is always subject to revision by the Parties to the UNFCCC and/or Paris Agreement on the basis of the best available science). There is insufficient literature to provide a detailed assessment of equity dimensions beyond the papers cited; we cannot go beyond that as that would no longer constitute an assessment of the available literature.
81897	17	15	32	35	The discussion of GHG metrics from a mitigation perspective in this section provides a very useful and needed link between the AR WG1 and WG3 and is strongly appreciated.	Anke Herold	Germany	Noted, thanks. We had to reduce the material substantially due to page and time constraints for revisions, but hope to have retained key aspects.
81899	17	15	32	35	The section includes many references to AR5-WG1 discussion and it may be useful to check and strengthen the references and consistency to AR6 WG1 chapter 7 on metrics. It is mentioned as an outstanding task, but may also imply less references to AR5.	Anke Herold	Germany	Accepted, and cross-references have been updated where relevant.
77149	17	15	33	1	As in comment #8 above on Agriculture methane emissions, WGIII has chosen the GWP100 metric for procedural reasons. GWP100 fails to make the required distinction between situations in which the trend in methane emissions is increasing, stable or declining. In all three situations, GWP assigns a CO2-equivalent for methane based solely on the current year's emissions, thereby implying a continued methane contribution to global warming. This is unrealistic because a declining trend in methane emissions can contribute to global cooling. The GWP100 metric unfairly penalizes countries like Ireland and New Zealand, whose agricultural emissions are large relative to their CO2 emissions. Hence WGIII should adopt the GWP* methodology (as explained in Annex B, section A.B.10), to reflect the latest scientific data. It is even more important to incorporate the pioneering work of Happer and Wijngaarden, which proves that CH4 and N2O have insignificant GWP, see https://arxiv.org/abs/2006.03098 . This topic is under discussion in the Technical Group on Methane within the UN Food & Agriculture Organization. Unwarranted constraining of agriculture output when ~1bn people on the planet are under-nourished is not acceptable.	Jim O'Brien	Ireland	Rejected: as the text makes clear, the reason for adoption of GWP100 is not only for procedural and consistency reasons, but also because GWP100 provides close to cost-effective mitigation for the temperature goal of the Paris Agreement. Also, as explained in the Annex, even if emissions are declining, methane emissions do make a marginal contribution to warming, not cooling, and this warming is highly relevant to avoid in order to achieve the temperature goal of the Paris Agreement. GWP* provides a useful additional perspective about the effect of cumulative methane emissions, but this does not capture the contribution to warming (rather than cooling) that each methane emission makes. WGIII relies on the physical science assessment of GHG metrics by WGI. The results obtained by Happer and Wijngaarden are not in the peer reviewed literature and their conclusions are not supported by the peer-reviewed literature and the WGI assessment.
83365	17	30	17	31	It would be useful to also provide the minimum requirement for non-CO2 forcing for temperature stabilisation. SR1.5 indicates that non-CO2 forcing should decline gradually at a specific annual % per year for warming to stabilize.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this sentence has been deleted due to space constraints and is covered in WGI.
83367	18	27	18	27	Including some examples of often-used time horizons might be helpful.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; illustrative references have been added
83371	19	27	19	27	Include "would" before "introduce". Even today, when GWP-100 is used, UNFCCC decisions and national policies allow for the update of GWP-100 values to more recent (IPCC) estimates.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.

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83369	19	3	19	4	Suggest to change to: "For example, when aiming to achieve a climate policy goal of limiting warming as closely to 1.5°C as possible, global average surface temperature typically peaks by around 2055"	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account in revised wording
83373	19	32	19	33	Double-check this aspect is covered in FGD WG1 Section 7.6.2	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Yes this is discussed in WGI chapter 7
83375	19	39	19	40	This sentence makes it sound like it will always lead to a more nuanced comparison (which depends on how it is applied and in which context) and that the IPCC expects/hopes that these will be applied in the future. I suggest to revert to a more factual statement about the current state of play: "This could allow for more nuanced comparisons of the effect of various emissions on different aspects of climate change, but such new metrics are currently not applied in actual policy contexts."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83379	20	11	20	12	This statement is unclear. Suggested rewording: "Moreover, CO2 equivalent emissions based on GWP or GTP do not imply that climate outcomes are exactly the same over time, neither when emissions are considered as instantaneous pulse emissions nor when they are cumulated over time."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; the figure and existing literature demonstrates that this is more than just as 'not exactly' the same, as warming based on cumulative CO2-eq emissions using GWP100 would be about a factor of 2 different from actual warming after 50 years
83381	20	17	20	17	SLCF hasn't been introduced	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Accepted; text revised
83383	20	17	20	17	"Stringent" is subjective. Simply referring to "mitigation scenarios" does the job.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Accepted
83385	20	18	20	19	Suggested, more neutral statement: "The different cumulative behaviour of CO2 and SLCF emissions is particularly relevant in mitigation scenarios: each ton of additional CO2 emissions causes further warming until emissions reach net-zero." This can cross-reference WG1, Section 5.5.1 (on the TCRE)	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Accepted
83387	20	19	20	20	SLCF emissions don't have to decline rapidly for this to be true. Suggested, more neutral rewording: "By contrast, declining SLCF emissions result in their contribution to global surface air temperature to decline since the warming from past emissions does not persist (Allen et al. 2018)."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account in revised wording; the decline (for CH4) has to be at least 0.3% per year.
83389	20	21	20	24	This statement is unnecessarily sweeping. Suggested, more neutral wording: "This behaviour is well known and can be readily replicated with simple climate models (see Figure 1), but cumulative SLCF emissions estimated with GWP100 do not capture this decline (J. M. Lynch et al. 2020)."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Accepted
83391	20	24	20	26	Here and in the rest of the paragraph, specific statements are being made about GWP-100. However, are these statements not equally true for GWP and GTP?	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83393	20	24	20	26	The same is true when using new metrics for single year targets. I hope that limitation of GWP* and CGTP is highlighted in a balanced way further below.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; a revised section has been added that shows the implications of using different metrics to achieve a predetermined CO2-eq emission target
81901	20	5	20	6	CGTP50 and CGTP 100 presented in Table A.B.9 are not dimensionless as the other metrics presented in this table, the dimension is in years which should be added to the table. It would be useful to add some further explanation to the table related to CGTP because the values are much higher and it is not very clear from the table that CGTP is less comparable than GWP and GTP. As the following section elaborates further on GWP*, it would be useful for the reader if illustrative values of GWP* would be included in table A B 9 as well	Anke Herold	Germany	Partially accepted: dimensions have been added. It is not possible to give a simple value for GWP* since for that metric, the value of an emission depends on the emission 20 year prior. More detailed discussion of CGTP is found in WGI which is cross-referenced
83377	20	9	20	11	It is unclear what this statement tries to say. What is referred to with policy goals and what is meant with actual climate outcomes? The statement seems to implicitly refer to temperature goals and GWP or GTP, what about the other climate metrics? The use of a single metric and time horizon is clearly not the only reason why policy goals and climate outcomes would not be perfectly aligned.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; the text does not say that this is the only reason why policy goals and outcomes might be misaligned, but the fact that a choice can be made about the time horizon, and that this choice can have a large impact on emitters of SLCFs, clearly is relevant as part of a discussion of metrics
83395	21	16	21	18	What constitutes a "relatively simple estimation" is subjective. Recommended more neutral wording "These new metrics estimate the one-off CO2 emission or removal that would result in an approximately equivalent change in temperature as from a sustained change in SLCF emission rates."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83397	21	18	21	20	This statement can be made more accurate/less misleading, because it are not the metrics that provide this equivalence, but their specific use and application. It also has some repetition. Suggested rewording: "As a result, cumulative CO2-equivalent SLCF emissions based on CGTP or GWP* relate nearly linearly to global surface air temperature increase, similar to the relationship found for cumulative CO2 emissions."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints (this material is covered in WGI).
83399	21	22	21	25	The specific context and assumptions under which this statement is true should be communicated up-front, and presented in a more neutral way. This statement can also be removed because it is repetitive. It repeats findings for GWP-100 reported on Page 20, as well as findings for GWP* reported on page 21. The IPCC should not be seen as being pushing one perspective by unduly repeating it with different words	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints (this material is covered in WGI).

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Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response
28601	21	29			I think this is a useful differentiation, although I'd suggest different names. Instead of 'marginal' and 'additional' effect, I'd use 'emission centered' and 'warming centered approach'. Because in addition to the factors highlighted, also the following should be added. A marginal metric treats each unit of emissions the same, regardless of the time or place of emissions. This is a prerequisite for most policy contexts (as rightly highlighted below), but should be stated very clearly here and contrasted. It is thus also in line with the treatment of any unit of emissions as environmental pollution under international law. 'Additional' metrics do not have that feature. The evaluation of a unit of non-CO2s here critically depends on the history and, in any but the global context, also on the emitter. This raises fundamental concerns of equity and fairness intrinsic to these metrics as it has been pointed out in Rogelj & Schlessner 2019. Issues of fairness and equity thus need to be addressed when discussing additional metrics.	Carl Schlessner	Germany	Taken into account but not accepted in full. We do not think that 'emission centred' or 'warming centred' captures the differences since arguably any emission metric is emission-centred. We keep the expression 'marginal' warming since this links with marginal emissions and marginal costs as used in economics. We have modified the text to make clearer that additional metrics do not treat the same quantity of emissions the same. Equity and fairness depend on how metrics are applied, they are not properties inherent in metrics themselves. Metrics simply describe what is, whereas equity and fairness arise if policy choices are made based on a particular use of those metrics.
81767	21	33	21	38	This paragraph appears to be at odds with another section (page 29, line 20-17) in how it describes GWP* ability to estimate either (only) 'additional' or 2) 'additional' and 'marginal' warming. Given the high-level of the description given on page 21, it would be useful to caveat the (only) additional statement to be clear that under some treatments marginal warming can also be estimated.	Government of New Zealand	New Zealand	Comment no longer relevant, as this material has been deleted due to space constraints.
83401	22	13	22	13	Would be helpful to provide clarification in the caption as to where the solid arrow for CO2 is to be found.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Figure has been improved to show the solid arrow (it was obscured by the shaded area).
81773	23	1	23	19	Unclear why marginal metrics are more suited to price-based approaches to mitigation in the first sentence - suggest elaborating on this further. Useful narrative from line 9 to 19 about policy relevance of alternative metrics - suggest this comes up into chapter 2.	Government of New Zealand	New Zealand	This material has been condensed due to space constraints, we simply provide a cross-reference to core economics literature that uses marginal effects of pollutants.
83403	23	14	23	14	Suggest to include the following sentence: "WG1 (Section 5.5.2) uses AR6-calibrated simple climate models to estimate the impact and potential variation of projected future non-CO2 emissions on the remaining carbon budget."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83405	23	14	23	18	This seems to be a bit overly enthusiastic about what metrics by themselves can achieve. I suggest this to be corrected and described in a more balanced way: "Metrics like CGTP and GWP* can provide a simple method to understand how SLCF abatement would impact the remaining carbon budget compared to a reference trajectory (Allen et al. 2018; Collins et al. 2018, 2019; see also WGI Chapter 5, and WGIII Chapter 3)." To be sure, there is not explicit "reference trajectory" that is assumed.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints. It has been taken into account in relevant wording in the cross-chapter box on GHG metrics.
83407	24	32	24	42	These lines would be stronger with the supporting literature cited net to each statement.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account in revised text
5615	25	1	25	8	Replace "Renewable" by low carbon sources	Michel SIMON	France	Comment seems to be misplaced
83409	25	31	25	31	Include "defined in that metric" between "net-zero GHG emissions" and "have been reached"	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
81903	25	5	25	16	The text says that the metric values for CH4 are very similar if the goal is to limit warming to well below 2°C and refers to Table A.B.9. However table A.B.9 shows significantly different metric values and not similar values. It may be better to delete the reference to table A.B.9 in the first reference. It would be appropriate to add a new table with the all metrics used in this paragraph (e.g. GWP 10 and GTP 40 are not presented in table A.B.9. This would allow a better understanding of the message of this paragraph which seems quite important for the current discussion on limiting warming to well below 2°C.	Anke Herold	Germany	Taken into account; the table has been extended to show different GTP time horizons, and wording has been revised to say "broadly" comparable. This is more about orders of magnitude than numerical identity.

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Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response
83411	26	32	26	35	Clark et al (2020) does not provide evidence for this discussion on metrics. Instead it uses a comparison of current trends of food-related emissions with mitigation potentials. The metric choice is irrelevant. I suggest the sentence to be removed as it misleads the reader in thinking Clark et al (2020) actually carried out a comparison of policy implications of GWP-100 vs GWP*.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; the wording has been revised to make clearer that the main focus of the study was to use GWP* itself to characterise warming-equivalent emissions.
83417	27	11	30	34	This section focussed on cumulative emissions and thus comes to the logical conclusion that GWP* or other combined metrics perform better than GWP-100 or GTP. For balance and in order not to mislead the readership in thinking that GWP* is always better, a section should be added that also discusses the strengths and weaknesses of metrics for single-year targets, as they are specified in NDCs. Such a section would show that marginal metrics provide a much better fit to single-year targets than metrics that allow CO2-equivalent emissions to vary a lot from year to year.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer directly relevant, but taken into account in overall revisions. We have strongly reduce the discussion around cumulative emissions due to space constraints, and focus in the supplementary material mainly on conceptual differences rather than the performance of specific metrics.
83413	27	23	27	24	This statement is inaccurate. WG1 Ch5 uses a simple climate model to take into account the effect of non-CO2 forcers. There is thus no "need" for these metrics to estimate the remaining carbon budget. Note as well, that the expression of non-CO2 GHGs in CO2-equivalence with step-metrics does not eliminate the need for a simple climate model, as these new metric approaches have not yet been shown to be applicable for aerosols and their precursors.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
81769	27	41	28	35	This section (including Figure 3) describes potential trade-offs for theoretical substitutions of CO2 and CH4 under the RCP2.6 scenario. Presumably this analysis has been included solely to consider how accurately GWP100 and GWP* provide correspondence between CO2 and CH4 emission mitigations (and temperature), rather than providing information on the temperature consequences of mitigating either CO2 or CH4 preferentially. If this is true, it would be useful to consider and mitigate the risk that it was used for this alternative purpose (or others). It would also be useful to discuss whether similar trends shown in Figure 3 would be expected for other RCP scenarios (in addition to the comment on GWP* correspondence to MAGICC results).	Government of New Zealand	New Zealand	Comment no longer relevant, as this material has been deleted due to space constraints.
83419	27	43	28	35	This hypothetical example is highly misleading, both in its description and its failure to highlight its limitations. To start with, it does not illustrate "the effect of allowing full substitution of CO2 and CH4 emissions along the CO2-equivalent emissions trajectory of an illustrative RCP2.6 scenario." If it would simply "allow" it, CH4 emissions would never be reduced below the lowest emissions floor for methane. RCP2.6 has already extremely low CH4 emissions. Bringing CH4 emissions down to zero in order to infer the impact of specifying pathways in GWP-100 is simply misleading. This example should draw on the information available in the AR6 scenario database, to inform the potential variation instead. This will result in a much smaller variation, and would also result in a better contextualization of the Denison et al (2019) results that are misleading for the same reason. Second, there are further conceptual problems with suggesting that emissions are "substituted" but implied greenhouse gas prices of the mitigation measures seem to have no relationship to the pathways. In which policy context would CH4 be substituted by CO2 while pricing/penalizing CH4 emissions to decline to zero while CO2 emissions reductions would be released? There's no easy solution to account for the latter in a stylized scenario, but that doesn't make it right to present a misleading example, while WG3 contains much of the evidence required to inform a better assessment.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
81771	28		28		In Figure 3 it would be useful to display a graph of the GWP* equivalence values to calculate the CO2 emission value used for a given year (ideally between the methane and fossil CO2 panels).	Government of New Zealand	New Zealand	Comment no longer relevant, as this material has been deleted due to space constraints.
83421	28	13	28	20	This is assessment of the impact of substitution between GHGs is misleading. It fails to highlight that these are hypothetical scenarios (e.g. on line 13) or that the pathways assumed are not supported by the other evidence on pathways provided in the WG3 report.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83423	28	16	28	20	Suggesting that the variation derived from purely hypothetical pathways that were designed without any constraints on technical or policy feasibility is deeply misleading. This sentence should be removed.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83425	28	20	28	20	These deviations do not represent theoretical maximum deviations. They represent a hypothetical stylized exercise without any reference to mitigation pathway reality. The statement in the previous sentence explicitly suggesting that these variations are "non-trivial" is thus misleading given the limitations. This needs to be presented in a more balanced and neutral way.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83433	29	10	29	13	This use was also suggested in context of the fairness aspects surrounding the use of GWP* as discussed in: Rogelj, J., Schlessner, C.-F., 2019. Unintentional unfairness when applying new greenhouse gas emissions metrics at country level. <i>Environmental Research Letters</i> 14. 114039. https://doi.org/10.1088/1748-9326/ab4928	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83435	29	11	29	13	Many of the statements in this paragraph can be easily taken out of context. I strongly recommend that each statement accurately states in which context and under which circumstances GWP* provides more accurate representations.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.

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Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response
83439	29	18	29	18	For balance, this figure could also be used to highlight the how the annual emissions in both GWP-100 and GWP* relate to the implied global warming.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83437	29	19	29	25	This caption and figure is inaccurate in that it suggests that metrics alone provide an estimation of warming. Here, the use of TCRE should be described.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83427	29	2	29	17	This paragraph does not provide a balanced assessment as it focusses on one particular application (cumulative CO2-equivalent emissions and warming). This can be dealt with by also highlighting the strengths and weaknesses of using GWP* for single-year targets	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83429	29	2	29	4	This statement is misleading. It generalizes an insight applicable to a specific context and use of metrics. It also repeats findings already highlighted earlier. These findings can either be consolidated, or at least this statement can be dealt with through the following edits: "Cumulative CO2-equivalent CH4 emissions over time based on GWP* are more closely proportional to temperature change compared to cumulative emissions expressed in GWP100 for a wide range of hypothetical emission scenarios (Lynch et al, 2020), while GWP-100 emissions in an individual year are more accurate in reflecting the actual warming resulting from CH4 emissions."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83441	29	28	29	31	This statement should make the specifics clear first, before making a generalizing statement that can be taken out of context. Moreover, the literature speaks mainly to methane, and the entire evidence provided in this section speaks to methane. No evidence is provided for other SLCF (which include also aerosols). The generalisation made in this statement and the confidence level thus seems to lack evidence. Suggested edit: "Available studies and this assessment have focussed on methane and the applicability of GWP* and CGTP on other SLCFs is very underexplored. Collectively, these studies therefore provide only low confidence that cumulative CO2-equivalent SLCF emissions expressed using CGTP or GWP* are more closely proportional to their implied global warming than when expressed using GWP or GTP, particularly for GHG emissions aggregated in a cumulative GHG budget in WG3. Without this context, the statement reads like a strawman."	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83443	29	31	29	32	This statement should make clear that GWP-100 is not used to estimate the remaining carbon budget in WG1, and neither are GHG emissions aggregated in a cumulative GHG budget in WG3. Without this context, the statement reads like a strawman.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
28593	29	33			It is quite strange that findings from individual papers are discussed at length above, (Lynch et al 2020, etc), but when it comes to policy implications, the authors write that the "scientific literature is very limited". First and foremost, because Schleussner et al. 2019 and Rogelj & Schleussner 2019 assess the policy implications of physical metrics this section very much talks about.	Carl Schleussner	Germany	Comment no longer relevant, as this material has been deleted due to space constraints.
83447	29	36	30	12	This paragraph is biased, and should provide a more balanced reflection of the scientific debate. The text is clearly and overtly biased towards one part of the literature. A comment on a paper is cited and given un-disputed space while neither the insights of the original research paper (Rogelj & Schleussner, 2019) and the reply of the same authors to this comment in 2020 is presented or even cited. This needs to be remediated.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83431	29	4	29	7	This statement sounds like a recommendation on the "use" of GWP* and can be made more neutral and accurate. The statement should say under which conditions GWP*-based emissions can provide an estimate of the marginal warming. <u>Currently, the statement puts out a teaser without providing insight.</u>	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
28599	30	10			The authors fail to acknowledge the fundamental point of Rogelj & Schleussner (2019): That the application of GWP* and similar metrics requires consideration of issues of equities and fairness.	Carl Schleussner	Germany	Comment no longer relevant, as this material has been deleted due to space constraints. The fundamental issue of distributional consequences arising from metrics choices (and their application) are noted in the cross-chapter box on GHG metrics.
28597	30	13			The problem is not that net-zero GHGs might be reached earlier with GWP*. The problems are that reaching net zero in GWP* in line with Article 4 (2050s or later) fails to achieve the goal of Article 2.1. And that net-zero GHG GWP* might be reached without zero CO2, thereby not curtailing long-term warming. And that reaching net-zero in GWP* is inconsistent with the long-term 1.5°C limit to be achieved after a potential overshoot. In short, the whole mitigation architecture of the Paris Agreement is being jeopardized. I suggest the use of a different illustration from Schleussner et al. (2019) on those issues. <u>It is recommended to include parts of Table 1 of Schleussner et al. (2019) in here.</u>	Carl Schleussner	Germany	Taken into account; the discussion has been reduced substantially due to page constraints. We provide a simple explanation why temperature outcomes differ under different metrics but do not enter into an interpretation of the Paris Agreement.

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Comment ID	From Page	From Line	To Page	To Line	Comment	Reviewer	Country	Response
83451	30	13	30	26	This paragraph should integrate WG3 expertise on the interpretation of international treaties and highlight the factual observation that because GWP* has been published before the writing and adoption of the Paris Agreement, the interpretation of Article 4 cannot possibly have been informed by it.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Comment no longer relevant, as this material has been deleted due to space constraints.
83453	30	13	30	33	This section should also highlight the implications of switching between various metrics. In particular: "Re-interpreting the Paris Agreement's Article 4.1 with GWP* instead of GWP-100 would result in a weakening of the mitigation ambition of the Paris Agreement, because less stringent emissions in methane would be required to reach the balance goal that is set in Article 4.1.".	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; this is reflected in the supplementary material in chapter 2 (shifted there from this Annex). Cross-chapter Box 2.2 on GHG metrics makes the more general point that any target stated originally in one metric would result in a change in outcome and ambition if it is then met based on a fundamentally different metric (which could be global, national or sectoral targets).
83455	30	13	30	33	This section should also highlight the limitations and context in the illustration that is provided here. Pathways shown in Figure 5 all used GWP-100 in weighting to model methane reduction as part of a multi-gas approach. If GWP* would be used instead, the pathways would only reduce methane much later to reach net zero GHG and result in higher warming overall. This is also illustrated in Schlessner et al (2019) .	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; we clarify the fact that the pathways shown are for the same actual emissions. We are not aware of any studies that have used GWP* in global economic studies, and note that GWP* could be used in various ways as a basis for determining relative abatement priorities (i.e. GWP* could be used in a marginal sense just like GWP or GTP, in which case the pathways might not look very different - but this is conjecture since no studies exist that we could assess).
83449	30	16	30	18	There is a marked shift in tone and style when discussing limitations of GWP* compared to when strengths are being presented. Strengths are being presented as integral parts of the metric (e.g., GWP* results in ...), while weaknesses are formulated in an indirect way. This variation in style should be resolved for the section not to be perceived as being biased towards promoting GWP*.	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; the text has been revised substantially and reduced with a view to present supplementary material that further supports the Cross-Chapter Box on GHG emission metrics in a neutral but relevant way.
83415	30	28	30	28	I'm a bit puzzled by the absence of uncertainty ranges around all but GWP*-equivalent emissions. Are these the emissions for one specific pathway or for a range of pathways? What do the single lines show?	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Taken into account as part of the revisions of the figure; we now show results for four individual illustrative mitigation pathways used in chapter 3.
28595	30	29			This figure does not fully illustrate all issues at hand and the inconsistencies created in the PA mitigation architecture when interpreted with GWP*. The problem is not that net-zero GHGs might be reached earlier. The problems are that reaching net zero in GWP* in line with Article 4 (2050s or later) fails to achieve the goal of Article 2.1. And that net-zero GHG GWP* might be reached without zero CO2, thereby not curtailing long-term warming. I suggest to use illustrations using stylised pathways from Schlessner et al. (2019) to illustrate that case.	Carl Schlessner	Germany	Rejected: the figure has been revised to show results for four illustrative mitigation pathways used in chapter 3. We consider it important to show actual pathways from the literature that reflect economic and social assumptions rather than stylised pathways only. The Figure of course does not fully illustrate all issues at hand; it simply shows what the CO2-eq emissions would be if the world follows those actual pathways but CO2-eq emissions are reported at global scale using different GHG emission metrics. We also note that GWP* could be used in various ways as a basis for determining relative abatement priorities (i.e. GWP* could be used in a marginal sense just like GWP or GTP, in which case the pathways might not look very different - but this is conjecture since no studies exist that we could assess).
51673	33	70	34	4	Comment is on Annex A - Glossary, which is surprisingly not in the options. The definition of "Nature-based solutions" is insufficient in the IPCC context, as it doesn't clarify the role of nature-based solutions for climate change mitigation and adaptation	Florin Vladu	Germany	Thank you for your comment. The definition for 'nature based solution' is consistent with the definition used in the IUCN. It is a sufficiently broad definition that encompasses how it is used in the underlying literature. Specific examples of nature based solutions related to climate change adaptation and mitigation are provided in various chapters in the WG II and WG III reports
79385	48	1	48	1	Indicating how this list of reference papers has been ordered could be helpful. (By the name of the first author, in alphabetical order, I guess, rather than the usual order... according to when the paper is quoted in the chapter.)	Raymond Zaharia	France	Thank you for your comment . Text revised. We have revised the references presentation.

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86299	48	1	55	32	Suggest including a reference to IEEE and IET published documents for defining units of measurement.	RABIZ FODA	Canada	Thank you for your comment . Sources are indicated in the header of each table, and cited accordingly.
83445	54	14	54	15	This reply is also accepted and available as preprint already: https://www.essoar.org/doi/10.1002/essoar.10505891.1	Joeri Rogelj	United Kingdom (of Great Britain and Northern Ireland)	Thank you, all references have been updated to their accepted and published versions as appropriate.
66177	276	18	276	27	More clarity needed relating growth rates in text (7, 15 and 20%) to the interpretation of Fig 2.30	Donal OCallaghan	Ireland	Comment no longer relevant, as this material has been deleted due to space constraints.