

Topical Editor, comments to the author (11 Nov 2022):

Great job responding to most of the reviewers' comments. However, your responses to several reviewer comments (R1.C2, R1.C3, R2.C4) indicate that changes would be made to the Supplementary Material, but I don't see them. Please make those changes and upload the updated Supplement, including a tracked-changes version.

There are some results that have changed. Why? E.g. (line numbers in tracked-changes version), L43, L900-10 .

Non-public comments to the Author:

Minor things (line numbers in tracked-changes version):

L333: Add "a" before "growing"

L807-21, also R1.C5: Please include references to sub-plots (e.g., 1a), which would help reader understanding of these figures.

L1634: Should "were" be "were not"?

Author responses alongside new upload (15 Nov 2022):

However, your responses to several reviewer comments (R1.C2, R1.C3, R2.C4) indicate that changes would be made to the Supplementary Material, but I don't see them. Please make those changes and upload the updated Supplement, including a tracked-changes version.

Thank you for noticing that these additions were still missing! Now we have added more information in the Supplementary Material, which we believe should be enough to satisfy these three reviewer comments.

We have uploaded:

- This response (v2_0_2-response_to_editor)
- An updated supplement (v2_0_2)
- Tracked changes supplement, from v1 to v2_0_2
- An updated manuscript (v2_0_2)
- Tracked changes supplement, from v2 to v2_0_2

More specifically, for R1.C2 we now added Supplementary Tables 3-5, which are detailed lists of the emissions and climate variables related to the climate assessment workflow, with references to it in the text. To follow up on R1.C3, we have now added a paragraph in the Supplementary Material on vetting and refer to that in the main manuscript. For R2.C4, we had originally hoped that the addition of Supplementary Figure 2 and the changes to Supplementary Table 2 (the inclusion of totals by category and model framework) would be enough – but we realise that in line with the answer to R1.C2 we should have added some text. Now, indeed in line with the missing information that was promised in response to R1.C3, we added text to further explain Supplementary Figure 2 and related to the vetting explanation.

There are some results that have changed. Why? E.g. (line numbers in tracked-changes version), L43, L900-10.

That is correct. The changes fall in two categories.

- *Update to v1.1 scenario database = consistency with the IPCC report.*

The AR6 public database update v1.1 now includes a file with more detail on the climate variables, including the FaIR and CICERO data. It was noticed that in our initial submission, a few bugs were still left in the scenario data, which resulted in not having data for all scenarios in all calculations. These have now been resolved to (a) be fully in line with the correct number of scenarios in the IPCC report and (b) have the same handling of how to calculate the Kyoto Gases basket.

In short, the main bug was that in the previous version of the data used for the preprint, a string matching error occurred. Due to the scenario string of a handful of scenarios from the FaIR data had one non-capitalized letter, which was capitalized in the MAGICC and CICERO data. This caused the matching to fail, leaving those scenarios out of the comparison. We found this mistake and fixed it, with the number of scenarios (1202) with temperature assessment now everywhere being in line with the IPCC report.

More specifically:

- L43; this was an accidental bug in the first version, where some scenarios were accidentally dropped in the handling of the v1.0 of the detailed database. This did not affect the main database, but was caused by some differences in capitalized/non-capitalized scenario name strings in the climate data of FaIR and CICERO which was different from that of MAGICC, causing that these were not successfully combined. Now, our results are back in line with the IPCC report again, after this inconsistency in the extra climate data was resolved. This can be seen perhaps most clearly in the updated numbers of scenarios in Figure 3B.
- L900-10: The scenario numbers here were caused by a similar issue, where the extra climate data used in v1 was not exactly in line with what was used in the IPCC report which has now been resolved.

- *Updated (clearer) language.*

Any other changes only result from an attempt to provide slightly more clear communication about the insights. The one change here to highlight would be line 884 (in tracked changes), on the high end of F-gases emissions. We switch the language from 7Gt/yr to 5Gt/yr. While the previous version with 7Gt/yr was true, it relied on only one scenario in the database. To avoid giving the possible impression that 7Gt/yr is a common factor in the AR6DB, we opted to go with more robust language, changing it to 5Gt/yr in combination with “a set of high emissions scenarios”.

It should be noted that these changes were marginal, and no insights have changed fundamentally.

L333: Add "a" before "growing"

Thanks, done.

L807-21, also R1.C5: Please include references to sub-plots (e.g., 1a), which would help reader understanding of these figures.

We have now added references to sub-plots of Supplementary Figure 1, in the main text.

L1634: Should "were" be "were not"?

Using "were" is correct here. We have added "... such that infilling was not necessary." to clarify.