Earth Syst. Dynam. Discuss.,
https://doi.org/10.5194/esd-2020-68-RC1, 2020

Earth System Dynamics
Discussions

Interactive comment on "Climate model projections from the Scenario Model Intercomparison Project (ScenarioMIP) of CMIP6" *by* Claudia Tebaldi et al.

Anonymous Referee #1

Received and published: 28 October 2020

This paper provides a first overview over temperature and precipitation projections from the ScenarioMIP simulations conducted for CMIP6. As such, it is more of a documentation than a cutting edge research paper, in part also because many of the CMIP6 results are very similar to CMIP5. However, I think this is ok given the clearly defined scope of the paper and the assumed goal to support the AR6 process.

The paper is well written with clear figures and sound methods. I have a few minor comments that could be considered before publication.

Minor comments:

L130-: is there a reason these papers aren't cited in the classic style with "XYZ et al."?

L147-: nothing wrong with this paragraph given the high level nature of the study, but I think it would still benefit the reader to end the introduction with a set of specific research questions that are being addressed in this paper.

L205: "likely conservative". I think I know what the authors are trying to say, but I still think it would be clearer to be explicit and say "underestimated" and maybe also briefly explain why.

Paragraph on L223: Possibly relevant paper, although conceptually similar to Tebaldi and Friedlingstein: Marotzke (2019).

Generally, figure labels are too small. White space between panels could be decreased to make maps bigger and better readable.

Fig A5 is insightful and given its relatively detailed discussion in the text, I suggest to add it to Fig 2.

L325: ok, but how about a simple difference maps of CMIP6-CMIP5?

Fig 4b: could the Tokarska constraint be applied to CMIP5 as well to show that it makes less of a difference in CMIP5 (as expected)?

L465: Semantics, but technically if the reference period is 1995-2014 and thus its mid year is 2004, then the models have 16 years, not 5, to reach 1.5°C.

L510: this is indeed new, to me at least. Doesn't look like there was such a coherent signal in CMIP5 models (Pendergrass et al. 2017). It is also a bit counterintuitive perhaps, but definitely plausible. A little more context on the history of this (why is the result new?) and maybe maps to indicate where this is most likely to originate from would be appreciated.

L520-: This recent paper could provide some more context here: Milinski et al. (2019)

The discussion section is a bit light on references to other papers. I don't want to provide a list, but I trust the authors are able to do a better job at this given their collective

expertise. One specific paper that is interesting but still relatively new: Parsons et al. (2020)

References

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