

Almost ready for publication

Review of: "Transient Earth system responses to cumulative carbon dioxide emissions: linearities, uncertainties, and probabilities in an observation-constrained model ensemble."

Overall evaluation:

The manuscript has been greatly improved from the original version. The methods and goals of the numerical experiments are now clearly outlined, satisfying my primary criticism of the original manuscript. I have a few more minor comments on the manuscript but believe it will be ready for publication after these changes have been made.

Specific Comments:

Line 3: Change "transient response in" to "transient response of"

There are a few place in the manuscript where the phrase "A ~1000 member" is used. This should be "An ~1000 member".

Line 30: write out "e.g." as "for example" or "such as".

Line 35: Cite Zickfeld et al. 2012 and Harrington and Zickfeld 2014 here.

Line 44: You can change the citation to Paris Agreement 2015.

Line 55: I think "ocean warming" would sound better that "sea water warming".

Line 57: Delete commas around "but".

Line 65: May be better phrased as the difference between the system the model represents and the actual system the model is intended to describe. In the present wording it is unclear whether "coupled Earth system" refers to a model or the natural world.

Line 70 to 73: The sentence "They allow ... public." is confusing. Please re-write for clarity.

Line 126: TCPRE is getting to be a very long acronym. Maybe shorten to "Transient parameter response to cumulative CO₂ emissions (TPRE)" or something similar.

Line 129: "steric" is missing from "sea level"

"Please note" is use a few times in the manuscript I think this would read better as just "Note".

Line 381: Delete “on the other hand”.

Line 485: “as well as a very rough proxy for soil fertility”. Either find a citation for this or delete.

Line 501 to 505: This sentence is too long. Please break it up for clarity.

Line 574: Change “much depend” to “depend much”

Line 744: Write out “Twenty-six”.

References:

Herrington T, Zickfeld K (2014) *Path independence of climate and carbon cycle response over a broad range of cumulative carbon emissions*. *Earth System Dynamics* 5(2):409–422

Zickfeld K, Arora V, Gillett N (2012) *Is the climate response to CO2 emissions path dependent?* *Geophysical Research Letters* 39(5)