Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2022-49

Anonymous Referee #1

Referee comment on "Transient climate simulations of the Holocene (version 1) – experimental design and boundary conditions" by Zhiping Tian et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2022-49-RC1, 2022

Review of
"Transient climate simulations of the Holocene (version 1) – experimental design and boundary conditions"
by Zhiping Tian, Dabang Jiang, Ran Zhang, Baohuang Su
for Geoscientific Model Development

The paper describes the experimental design of a small set of transient Holocene simulations, and a few results.

Part 1.1 is a honest summary of the present knowledge of the climate evolution over the Holocene. Part 1.2 is a honest summary of the main results from previous simulations of the Holocene by different groups. Both parts are based on a good review of the present literature, and I appreciated this synthesis. They provide a good base for part 1.3 which explains clearly why new Holocene simulations, with ESMs (not EMICs), unaccelerated models, etc ... might bring new insights about the Holocene climate.

Part 2 is a very short model description. There is no need to get more in depth, as the model is fully described in the cited literature.

Part 3 describes the experimental design. The description is comprehensive, and would allow any modeller to run a similar set of experiments with its own model (or with the same model).

Part 4 gives a few preliminary results.

The paper is clear, easy to read, with a relevant structure and progression. Abstract and conclusion are fully supported by the main text. The langage seems good, but my own english does not allow me to have a relevant evaluation. I didn't find any typo. Figures are clear and readable. I thank the authors for the care taken with the manuscript.

I have no major concern about the paper, which perfectly fits the GMD category "Model experiment description paper".

I have just one minor concern.

Line 233 reads that the spin-up run has a 'stable' Atlantic Meridional Overturning Circulation (AMOC). Most (all ?) models show some variability of the AMOC on inter annual to decadal time scales. I would appreciate to get an idea of the amplitude of the inter annual to decadal variability of this experiment, particularly for the AMOC. If the amplitude is strong, the choice to start the transient experiment form a state with high or low AMOC might have some impact on the result.