

Interactive comment on “Implementation of the Community Earth System Model (CESM1, version 1.2.1) as a new basemodel into version 2.50 of the MESSy framework” by A. J. G. Baumgaertner et al.

Anonymous Referee #1

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This paper briefly describes the implementation of the CESM1 dynamical model within the MESSy framework. This is a technically and scientifically interesting piece of work, and should be of great interest to the wider Earth system modelling community. This paper is not a scientific validation or evaluation, merely a description of the implementation.

Four different configurations used have been run for 1 model year each, using different initialisations. A limited number of diagnostics are provided for model assessment, principally the Global Electric Circuit (which integrates a number of other quantities). This is an interesting quantity to use for diagnostic purposes, and fits well for this model evaluation. Basic ozone and OH plots are also provided for some configurations
C1958

assessed. The plots are sufficient to show that the model set-ups, as described, have been technically implemented.

Additional model output is referenced as Baumgaertner (2015), which is around 1800 pages of plots for a selection of variables. While it is excellent to see this detail provided as a reference, it is difficult to make sense of this output. I would strongly advise the authors to publish a proper scientific evaluation of the set-ups presented here, either as a continuation of the year-2000 timeslice, or as a pre-industrial control simulation. Additionally, one model year is not long enough to draw any meaningful conclusions as to scientific validity - I would suggest much longer simulations. This evaluation paper would also be of great interest to the community.

The paper itself is generally well written, with only minor typographical errors (detailed below). The paper is concise as a lot of the technical details of the implementation have been placed in the supplementary information, covering the VERTDIFF submodel and details of the general implementation. The chemical mechanism and namelists used are also provided. I wonder whether some of the detail provided in the supplementary information needs to be in the paper itself, as much more of the technical details are covered there. However, this would affect readability and so I am happy for this to be left as it is.

Specific points

p 6539, l 4-5: The authors state "Similarly, an exemplary comparison of surface OH and Antarctic ozone as examples for atmospheric chemistry functionality shows good agreement." Given the short length of the simulations presented here, I would not make such a statement in the conclusions, especially as the authors state on p 6538, l 11-13 "Note that the chosen variables and types of comparisons have no scientific justification for a full model evaluation, but are only example applications."

Typographical Errors

p 6524, l 16: "allowing to use MESSy". I think that this should possibly be "allowing the use of MESSy".

p 6525, l 5: "earth" should be capitalized.

p 6531, l 7: should be "metadata"

p 6531, l 15: should be "(Jöckel 2006)"

p 6531, l 28/p 6531 l 1: I'm a little confused here - do the authors mean that "the number of columns can be different for all rows"?

References

Baumgaertner, A. J. G.: Comparison of CESM1/MESSy and ECHAM5/MESSy (EMAC), doi:10.5281/zenodo.18846, 2015. 6535

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