

Interactive comment on “Pliocene Model Intercomparison Project (PlioMIP): experimental design and boundary conditions (Experiment 1)” by A. M. Haywood et al.

Anonymous Referee #2

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This article gives a short introduction to the Pliocene Model Intercomparison Project PlioMIP and experiment design and boundary conditions of experiment 1 of PlioMIP.

Model intercomparison projects are useful instruments to overcome the limitations of the use of a particular selected model in many (paleo)climate modelling exercises. It is both helpful for participants in the intercomparison project and for the whole (paleo)climate community. Participants on the one hand may compare the strengths and weaknesses of the own model with those of other groups. The whole (paleo)climate community on the other hand benefits from the opportunity to analyse and understand which climate signals in the models are due to e.g. parameterization of a specific

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model.

In the first part of the article the authors give an introduction to the time slice of interest in the project, followed by a brief discussion on the meaning of model intercomparison projects. The second part describes how the participants climate models have to be set up to ensure comparability of each groups model output. In the third part the data sources and procedures deployed to create the project's boundary conditions are explained, followed by an overview over the criteria the model output has to meet.

I have some specific comments on some uncertainties (subgrid parameterizations in paleo-modelling), sea ice and biome set up. This work is suitable for publication in GMDD. I recommend "accepted with minor revisions".

Here is a list of suggestions and comments I would like to give to the authors:

(1) P1218, L 6-7. I suppose the hyphenation of "ge-ographic" is not correct. (2) P1219, L 11. Change "refereed" to "referred" (3) P1219, L 26-27. Change "community more easily understand" to "community to understand more easily". (4) P1220, L 5. Change "was set at 50 years" to "was set to 50 years". (5) P1220, L 9. Change "was set at 405 ppmv" to "was set to 405 ppmv". (6) P1220, L 16. Change "In the absence of any proxy data to the contrary," to "In the absence of any adequate proxy data,". (7) P1221, L 12. Topo_Plio is calculated by Orog_Plio_PRISM3D-Topo_Modern_PRISM3D. Is Orog_Plio_PRISM3D correct or shall it be Topo_Plio_PRISM3D? (8) P1221, L 19. Change "Also Modern SST" to "Also modern SSTs". (9) P 1221, L 19-22. The meaning of the sentence "Also Modern SST are projected ..." is not clear to me, to rephrase it might be helpful for the readers. (10) P 1222, L 27. Change "configuration, are produced" to "configuration, is provided" (11) P 1225, L 20. Change "are differenced" to "are subtracted" (I suppose here the authors refer to subtracting two data sets). (12) P 1226, L 1-2. Sinus interpolation is problematic in some areas where non-linear feedbacks are acting, see e.g. Laepple and Lohmann (2009, Paleoceanogr.). You may comment on the implicit assumption you did. (13) P 1228, L 3. Change "warmer as" to

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"warmer than". (14) Please provide the reader with the sea ice boundary condition, e.g. through a map of sea ice distribution. (15) Please comment on other (fixed) boundary conditions, such as roughness, gravity wave drag parameterizations etc. and discuss the potential uncertainty through unknown parameters like the variance of the orography (at least in some of the models this is required). (16) Please improve the quality of some figures: e.g. some black boxes around the figures (Fig. 3), the size and quality of the figures (e.g. the biomes). (17) I would like to see a reference on how the biome parameters are translated into climate model input.

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