

## ***Interactive comment on “Pre-industrial and mid-Pliocene simulations with NorESM-L” by Z. S. Zhang et al.***

### **Anonymous Referee #2**

Received and published: 22 March 2012

In the paper "Pre-industrial and mid-Pliocene simulations with NorESM-L" Zhang et al. introduce the model setup employed for the generation of their Pliocene Model Intercomparison Project (PlioMIP) experiment 2. The comprehensive earth system model NorESM-L is introduced, the generation of the model setup is described, and some first results are presented and briefly discussed.

Zhang et al. prepared a manuscript that has a clear structure. It presents sufficient information on the experimental procedure, and therefore allows the reader to interpret the results of the experiments within the framework of PlioMIP. The publication of this paper will therefore be an important addition to the GMD Special Issue "Pliocene Model Intercomparison Project (PlioMIP): experimental design, mid-Pliocene boundary conditions and implementation".

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In addition to the suggestions by the Anonymous Referee #1, I would like to give some minor suggestions of mainly technical nature that the authors might want to consider prior to the publication of the final revised paper.

1 Introduction, page 120, line 25: change "synthesis" to "syntheses".

1 Introduction, page 121, line 15: change "is" to "are".

2 Model description, page 121, line 25: change "to" to "of".

2 Model description, page 122, line 8: change "in" to "of".

2.1 Atmospheric model, page 122, line 23: By some journals it is suggested to "cite authors rather than papers". A citation therefore should start with a "by" rather than with an "in". I propose to change "in" to "by" (this advice is also listed some more times further down). This is my very personal opinion, and the authors might have good reasons not to follow this suggestion.

2.1 Atmospheric model, page 123, line 1: change "Detailed" to "A detailed".

2.2 Land model, page 123, line 12: change "in" to "by".

2.2 Land model, page 123, line 14: change "in" to "by".

2.3 Sea ice model, page 124, line 2: If I see it correctly, there is an extra space between the citation "Lipscomb et al., 2007" and the following bracket.

2.3 Sea ice model, page 124, line 3: change "calculated" to "calculate".

2.3 Sea ice model, page 124, line 4: change "Detailed" to "A detailed".

2.4 Ocean model, page 124, line 8: change "founded" to "based".

2.4 Ocean model, page 124, line 11: Would it make sense to write "against a reference pressure ..." or "with respect to a reference pressure ..." instead of "with a reference pressure ..."?

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2.4 Ocean model, page 124, line 16: change "Further" to "Furthermore".

2.4 Ocean model, page 124, line 20: change "in" to "by".

3.1 Pre-industrial control experiment, page 125, line 5: change "Solar constant are" to "The solar constant is".

3.1 Pre-industrial control experiment, page 125, line 7: change "aerosols" to "aerosol".

3.2 Mid-Pliocene experiment, page 125, line 19-20: I personally would rephrase the sentence "This is the same as that used in the pre-industrial control run." to "These conditions are identical to the pre-industrial control run.".

3.2 Mid-Pliocene experiment, page 125, line 26: If I am not mistaken, there is a typo in the file name. Change "biom\_veg\_1.2" to "biome\_veg\_1.2".

3.2 Mid-Pliocene experiment, page 126, line 1: If I did not miss it, the abbreviation "LSM" is not defined in the manuscript. I would suggest to add the definition here.

3.2 Mid-Pliocene experiment, page 126, line 8: I would rephrase "at the same as those used in the" to "at the same levels as the".

4.1.1 Surface air temperature, page 126, line 19: add a "the" before "global annual mean".

4.1.1 Surface air temperature, page 127, lines 3-5: The unit of latitudes is formatted inconsistently across these lines (60 °S in line 3, vs. 70° N and 60° N in lines 4 and 5). I propose to change "60 °S" in line 3 to "60° S".

4.1.2 Precipitation, page 127, line 20: add a comma after "However".

4.1.3 Sea surface temperature, page 128, line 1: add a "the" in front of "Arctic".

4.1.4 Sea surface salinity, page 128, line 12: delete the "n" of "American".

4.2.1 Surface temperature, page 128, line 19: Section 4.1.1 has the title "Surface air temperature". Maybe the authors would like to also use this title here for consistency?

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4.2.1 Surface temperature, page 128, line 22: There might be a typo in one of the temperature values. Should the temperature close to the North Pole be "-7 °C" instead of "7 °C"? In Fig. 2a, the average temperature of the Mid-Pliocene is still below 0 °C close to the North Pole.

4.2.1 Surface temperature, page 129, line 9: change "at" to "during".

References, page 133, lines 15-18: There are some missing space characters for authors that have two initials for the first name. Change "Geer, A.J." to "Geer, A. J.", change "Healy, S.B." to "Healy, S. B.", and change "Monge-Sanz, B.M." to "Monge-Sanz, B. M.". Furthermore, add an "and" in front of "Vitart, F.:".

References, page 136, line 16: If I am not mistaken there is a typo, and "Dickinson" should be changed to "Dickinson".

References, page 137, line 26: change "Mankoff, Ken" to "Mankoff, K.".

Tables, pages 139-140: If I am not mistaken, the tables are not referenced in the manuscript's main body. I suggest to include references to the tables at appropriate positions.

Tables, page 139: Would it maybe improve the readability of the table if the subtitles (e.g. "Land model" and "Coupler") were formatted bold or in italics (if the rules of GMD allow this)?

Figures, page 141: Change in the caption of Fig. 1 "(Red)" to "(red)", and change "(Blue)" to "(blue)".

Figures, page 143: Change in the caption of Fig. 3 "with comparison" to "in comparison".

Figures, page 144: Change in the caption of Fig. 4 "with comparison" to "in comparison".

Figures, page 145: In the caption of Fig. 5, the text "The bold lines on the left sides"

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should be changed to "The bold lines on the right sides".

Figures, page 145: Would it make sense to extend the color scale of Fig. 5 towards higher values? It might be that the cutoff at +6 °C hides some interesting details of the regional structures of high latitude warming.

Figures, page 146: In the caption of Fig. 6, the text "The bold lines on the left sides" should be changed to "The bold lines on the right sides".

Figures, page 148: I would add a title to the vertical axis of Fig. 8 (e.g. "depth / m"). Additionally, there are two typos in the remarks within Fig. 8 b,d: Change "Mid-Piocene" to "Mid-Pliocene".

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