

Interactive comment on “Mid-Pliocene climate modelled using the UK Hadley Centre Model: PlioMIP Experiments 1 and 2” by F. J. Bragg et al.

Anonymous Referee #1

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‘Mid-Pliocene climate modelled using the UK Hadley Centre Model: PlioMIP Experiments 1 and 2’ by Bragg et al. is one of the latest in a series of papers submitted to the special issue of GMD, ‘PlioMIP: experimental design, mid-Pliocene boundary conditions and implementation’. The paper gives a brief description of the climate model concerned, followed by a more detailed description of the experimental design. Results of these and of some other related experiments are then provided.

The paper follows closely what is expected from PlioMIP and has been written clearly. The authors have managed to include many interesting figures. Supplemented by results from closely related experiments, the paper includes several points which will invite further discussion in future work.

I would therefore recommend that the paper be published. There are several points

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which I have listed below. Some of them are suggestions which I leave to the authors.

Some of the figures (and the labels on the colour bars) seem too small considering the amount of detail in them, although the final appearance may change significantly after typesetting. In the case where there are 3 sub-figures in one row, it may help to either place colour bars below the figures or just replace multiple colour bars with just one if they are exactly the same. Also, figure 10 could be split into two separate figures, one with a-f, and the other with g-j.

Page 849, line 24 and page 850, line 12: How does the circulation change? A small description would suffice.

Page 849, line 11: It may be better to simply say that there is ‘a lack of warming’ or ‘less warming’ and avoid the use of the word ‘cooling’ as this may give the impression that Pliocene temperatures in the far north Atlantic are lower than those of the control experiment.

Page 849, line 1: I assume that the word ‘increased’ is used in comparison with experiment 1 since the actual latitudinal temperature gradient in experiment 2 appears to be smaller than that of the control. Perhaps the authors should write something along the lines of ‘a latitudinal temperature gradient which, although has decreased, is larger than that of experiment 1’.

Page 852, line 7: Following on from the above point, any sign of polar amplification in experiment 2 (with the coupled model) should be stated in the paper, even if it is weaker than that in experiment 1. In figures 7d-f, the increase in zonal average temperature is clearly much greater at high latitudes.

Minor points:

Page 838, line 16 (abstract): ‘models shows and increase’ → ‘models show an increase’

Page 840, line 12: ‘specifies’ → ‘specified’

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Page 842, line 14: 'Mcwilliams' → 'McWilliams' (ditto, page 853, line 26)

Page 842, line 21: The two phrases need to be joined with a conjunction or split into two separate sentences, e.g. '...freezing in leads. Also ice can form...'

Page 842, line 23: As above, e.g. '...is assumed for ice. Excess salt...'

Page 842, line 24: As above, e.g. '...in the top layer and converging ice has...'

Page 847, line 21: Change to 'falls close to' or 'falls to nearly', etc.

Page 848, line 17: Change to 'rainfall in the Pliocene, especially in the extent...'

Page 850, line 12: 'the model, however there is' → 'the model. However, there is'

Page 851, line 5: 'Hemisphere is has' → 'Hemisphere has'

Page 852, line 20: 'significantly, no evidence' → 'significantly, although there is no evidence'

Page 852, line 22: Change to 'in the model. In the data'

Page 852, lines 22-23: It may be helpful to describe the feature in one to a few words e.g. 'a significant warming feature'

Interactive comment on Geosci. Model Dev. Discuss., 5, 837, 2012.

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