

Interactive comment on “Interannual climate variability seen in the Pliocene Model Intercomparison Project” by C. M. Brierley

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Overall this is an interesting paper and the reviewers have provided a clear set of recommendations that will enhance the paper, and I would like to see those carried out wherever possible.

Specific comments:

Authorship of PlioMIP Papers was discussed at the 2011 PlioMIP workshop in Reston USA. The reviewer is correct that the anticipated norm is for appropriate representatives of each modelling group to be approached and offered co-authorship on papers that use their model outputs. Time series SSTs necessary for the evaluation of ENSO have not been included in other papers, nor have ENSO analyses been presented con-

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sistently, therefore this paper would seem to fit into the category where co-authorship should be offered. However, following the 2011 workshop no one came forward to complete the ENSO analysis and the author has therefore filled an important gap in the PlioMIP Phase 1 science portfolio. At the editor and lead on PlioMIP modelling I would not personally hold the author to the Reston 2011 agreement. However, I think it would be best practice to talk to representatives of each modelling group anyway to ensure that the summary of ENSO behaviour for each model presented in the paper in in accord with the understanding of ENSO behaviour for the Pliocene within each modelling group. This is valuable especially given the stated potential for different analyses facilitating different interpretations of the result. That may provide sufficient intellectual input for the author to feel able to offer co-authorship anyway.

The PhD work of Bonham utilised the PRISM2 data set of boundary conditions. The major difference compared to PlioMIP was the specification of a lower cordillera of North and South America in PRISM2 compared to PRISM3/PlioMIP (by 50%). That provides a possible explanation to the differences noted with the work of Bonham and it would be useful to explore this further within the paper. I will send the author a copy of the relevant thesis.

The consistency presented in the modelled behaviour of ENSO from the ensemble is, on the face of it, a little surprising given previous work that has shown the lack of consistency in AR3/4 type models when imposing a CO₂ perturbation. In PlioMIP the main boundary condition changes were vegetation distribution, ice volume and CO₂. There were only minor orography changes outside of the ice sheet regions. Modelling groups approached the implementation of Pliocene vegetation very differently so it is hard to see how this could have driven the consistency in ENSO behaviour. High CO₂ has been shown by the work of Matt Collins (and others) to create a spread of ENSO responses in models of this vintage (from increased to decreased variability or no change). That leaves just the change in ice volume to account for the consistency in ENSO response, although the mechanism to explain this is not clear. Ultimately

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it would lead to a far more satisfying and reassuring conclusion if the cause of the consistency in modelled ENSO behaviour for the Pliocene could be identified rather than simply speculated.

Alan Haywood.

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