

Interactive comment on “On the importance of initial conditions for simulations of the Mid-Holocene climate” by H. Renssen et al.

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The revised paper seems much improved, but I have a few queries remaining in response to referee #1. I think your response to referee #2 is fine.

1. Referee’s major comment (1) - discussion of initial conditions.

The paper states that the orbital and greenhouse forcings for 9ka are changed from 6ka. I may have missed it, but I don’t think you have actually mentioned what the forcings are for 9ka. Since 9ka is not a time that is included in the PMIP protocol, it would be helpful if the values were stated. Adding them in the table would probably be the easiest way to provide the information.

2. Referee’s major comment (2) - latitude-depth figure

I think you are defining the "final state" to be the average over 100 years, but this information seems to only be included in the caption to Table 1? Since you refer to the "final state" in several places in the paper, as well as in the caption to Figure 2, please make the definition clear near the start of the Results section in the main body of the paper.

CP does not have the page length limitation of some other journals, so inclusion of a figure showing the actual climate state, as well as the difference plots is also possible. For example, if you like, you could also show the 9ka and 6ka states.

3. Referee's major comment (4)

As mentioned above, CP does not have a page length constraint so adding another figure is not a problem. While I agree that showing difference plots that do not show a significant difference is not helpful, I think that, especially since this paper contains no other figure showing a map of the model output, showing at least one climate or vegetation map for the initial and final climate states and/or differences between the pre-industrial, 9ka and 6ka climate states would be interesting.

4. Referee's minor comment (4) - limitations of 9ka simulation

You do not seem to have added anything to the paper in respect of this, nor is it clear what you mean by a "reasonable representation of the 'real world'". I would have thought that adding a couple of details on this matter to the text of the manuscript should strengthen your argument.

5. Referee's minor comment (6) - adjustment time

As I understand it, you are defining the "adjustment time" as the instant at which the transient model state first reaches the "final model state" (which is presumably a 100 year average?). This is clearly not the same as the equilibrium time which could be defined as the time at which the climate state is statistically indistinguishable (at some arbitrary level of significance) to the final model state. Your definition of "adjustment

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time" seems likely to provide a time which is shorter than this. On the other hand it seems clear from your figure (1) that, although the time to equilibrium may be considerably longer than the stated "adjustment time", at the "adjustment time" the differences between the climate state and the final climate state are indeed very small.

You probably think I am splitting hairs, but since the "adjustment time" is one of the major results of this paper, and is likely to be often used as justification for model experimental set up by other modellers in the future, I think it is important that, as the referee suggests, this issue is fully discussed and clarified in the paper.

Bonus comment: Section 3, p6 It is stated that an average global ocean temperature of 3.11 C is "considerably" warmer than a temperature of 3.07 C. Surely this is actually a very small difference?

Interactive comment on Clim. Past Discuss., 2, 315, 2006.

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