

## ***Interactive comment on “A multi-model assessment of last interglacial temperatures” by D. J. Lunt et al.***

**Anonymous Referee #2**

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The manuscript provides a well structured and well written assessment of PMIP3 model simulations of the last interglacial (LIG). Manuscript strengths include: scoring of model simulations according to LIG temperature proxy records; and highlighting where models agree (or not) with this data and with each other. I believe the manuscript is suitable for publication. Some minor clarifications/corrections and possible improvements are provided below.

Minor points:

General point 1. A main finding of the study is that, while the model simulations do adequately reflect the changes in LIG insolation pattern, they do not simulate the overall climate of the LIG very well. A possible implication from this is that although the model atmospheric dynamics are adequate to capture the 1st order insolation impacts, the

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models themselves are not yet adequate to the job of simulating past warm climates e.g. the coupled ocean-atmosphere dynamics are not up to the job / too highly tuned to present-day climate. If this is an accurate reflection of the authors own view, perhaps this could perhaps be stated more clearly in the conclusions/abstract.

General point 2. Whilst it is difficult to know how to plot figures which adequately show the results from many simulations together, some of the figures are really difficult to read, with too many tiny panels. Fig 5 is particularly bad for this. Is there perhaps some means of making Fig 4 and esp Fig 5 a bit more readable?

Abstract L13 Occasionally ‘model’ is used where ‘simulation’ would be better (there are a few other instance of this).

Abstract L16 Change phrase ‘far from perfect’.

P3660 L9 This is not correctly expressed as ‘a gradient’, perhaps a ‘difference’?

P3663 L29 I personally don’t much like the use of ‘flavours’. Can you use ‘versions’? Flavours is very vague and seems a bit unhelpful re: climate modelling. (There are other instance of the ‘flavours’ terminology that should also ideally be changed.)

P3665 L11-19 Can you add a line to say why you chose to use NCEP reanalysis as opposed to any other product?

P3665 L20- It would also be interesting to know what the errors are specifically at the sites where you have LIG proxy data. An error (model skill) score for the preindustrial simulation could usefully be added to Table 1 or Table 2.

P3666 L4-7 Work on the use of multi-ensembles of simulations has previously tended to use a larger suit of purely GCM-based simulations. I think there is perhaps no precedent for a mixed EMIC/GCM ensemble and one which features a rather small number of independent GCM simulations. Some further consideration of this and comments and/or references would be useful. See also comment on Fig 7 below.

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P3666 L23 Can the statement on the reasons for differences between NCAR and BRE-MEN 'flavours/versions' be firmed up?

P3666-P3669 Some subheadings for this section would aid readability e.g. 'seasonal differences', 'mean annual differences', etc..

P3670 L5- A table containing the simulation skill scores, or another column in the pre-existing Table 2, would be helpful.

P3671 L24-25 Reference required here re: evidence.

P3675 L5 Please summarise here the main improvement recommendations: they sounds like a main conclusion.

Tables/Figures:

Table 1. Would be useful to have a it more detail for more models in column Other/Model resolution.

Fig. 4 and Table 1/2. There appears (on use of a microscope) to be possible discrepancies between model/simulation titles between panel headers and the table (e.g. ECHAM5?).

Fig. 7. Given some reservations about the compilation/use of a simulation ensemble, it would be nice if comparisons for individual (best case?) simulation could also be shown.

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Interactive comment on Clim. Past Discuss., 8, 3657, 2012.

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