

## ***Interactive comment on “The modern and glacial overturning circulation in the Atlantic ocean in PMIP coupled model simulations” by S. L. Weber et al.***

**S. L. Weber et al.**

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Dear Jules,

thanks for your comments. We have now revised our manuscript and I will outline the changes below.

You ask the question of whether the processes that govern the model behavior, when subject to a global warming experiment, are orthogonal to those at work during the LGM. Given the diversity of MOC responses in our present set of models, and the diversity of governing processes, I must admit that I cannot answer this question. The best conclusion is that it is inconclusive. We did add some discussion (and relevant references) with respect to this issue to the revised paper.

We have solved the question of more information on model details as follows. For each model there is now a reference to either the published LGM simulation or, if this is not yet available, the control state. We give model version numbers, where appropriate. A number of models have their output data in the PMIP database, together with a description of the simulation and additional references to technical reports etc., which is another source of information on model details mentioned in the revised paper.

We have extended the description of model aspects that are directly relevant for the present analysis.

A better description of the MOC control state is also included in the revised version (section 3). We have chosen to do this in terms of a few characteristic numbers rather than plots. This was a useful comment, as we do see some dependence of the MOC response during the LGM on the accuracy of the control state.

Also, the model control states are compared to estimates based on Levitus data in Figures 3, 4 and 5 of the revised paper.

A caveat on the representation of the MOC in current coupled models is added to the conclusion section.

We have added the analysis of the scaling behavior of the deep reversed cell as suggested by A. Paul. This nicely complements the analysis of the main cell (overturning strength versus the density difference between the northern and southern ends of the Atlantic basin). The deep cell is found to scale much better with the meridional density difference than the main cell, confirming the leading role of the deep cell.

Hopefully, Table 3 is improved following your suggestions. This is now discussed earlier in the paper (in section 5), so that it is easier to see where the Yes/No's come from (and the ambiguous ?yes/?no's are removed).

Most of the referees comments have been followed in the revised paper, as detailed in my response to the reviews.

Nanne (on behalf of all co-authors)

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Interactive comment on Clim. Past Discuss., 2, 923, 2006.

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