

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

**Anonymous Referee #2**

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This paper analyzes and compares the Atlantic Meridional Overturning Circulation (AMOC) in PMIP LGM and present day experiments. With five simulations from the PMIP2 effort and four additional experiments the authors have collected a good data base and cover the spectrum from more or less simplified EMICs and comprehensive GCMs. Such studies are highly welcomed because they allow to put into perspective the range of possible AMOC responses and to judge if processes invoked to explain the AMOC changes in a certain model also work in other models. The authors identify the Atlantic fresh water budget as a very important contributor and also underline the role of the relative role of AABW and NADW strength. In particular, they elucidate the role of fresh water fluxes in the simulation. The paper is well and concisely written and

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does not need many changes to be published in CP. What I was missing, however, is more detailed discussion of how well the models reproduce present day climate and how this might influence the AMOC response, leading to an evaluation rather than just an account of AMOC changes. For example, the inclusion of the observed (e.g. Levitus) salinity profile might help to see how water masses (e.g. AAIW) are represented in the model. Since there are only five figures, there might be even space to display all the models stream functions and to discuss if they show a realistic form (e.g. deep water formation in Nordic Seas).

Minor points: Page 926, para. 2: how long is long enough ? Maybe the experiment lengths could be included in table 1.

Page 930, para 4.2: Is there any explanation for this discrepancy of observed and modeled fresh water transports?

Fig. 3: Include observed profile (see above)

Fig. 4: Better display the relative role of T and S in their contribution to the density anomaly. ty anomaly.

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