

Interactive comment on “Minor effect of meltwater on the ocean circulation during deglaciation” by G. Lohmann et al.

Anonymous Referee #3

Received and published: 19 September 2012

I have reviewed the manuscript entitled “Minor effect of meltwater on the ocean circulation during deglaciation” by Lohmann et al. In this manuscript, the authors studied the deglaciation from 20 to 11 kyr BP. They tested the influence of the melt ice sheet water runoff to the Atlantic ocean circulation. They suggest that the AMOC is stronger during MWP-1a although during that period of time, the global mean sea level rises by 14 to 20 meters. A possible mechanism the authors suggested is that the melt water might have flowed into the ocean bottom instead of the surface, thus would not affect the AMOC much. I found this manuscript is very interesting, but the structure of the manuscript is very confusing. It is not clear whether the authors have demonstrated what they have claimed in this manuscript. I would suggest the authors to do a major revision on the manuscript. In my opinion, this manuscript at present format is not acceptable for publication. Major comments: 1. Although the authors proposed an
C406

alternative mechanism to explain why the MWP-1a would not disrupt the AMOC, it is not clear from the manuscript how they demonstrated this. 2. It is not clear how they have changed the climate background states? Changes of the solar radiation? CO₂ concentration? It would be good to show a few figures of the forcing the authors have used in their experiments. Also it is not clear what the energy balanced atmospheric model provide to the ocean model. Is there a sea ice model? Or the sea ice is prescribed? 3. If indeed that the meltwater flows into the ocean bottom, there much be marine core evidence. It would be good for the authors to give some proxy evidence on this. 4. In this manuscript, the authors heavily cited Fairbanks (1989). Is there any new reference? 5. Figure 3 is confusing. The line colors do not match the inserted map. 6. In section 3.4, it is not clear what experiment the authors are talking about – meltwater injected to ocean bottom or at the surface? 7. It is not clear from Figure 5, why the AMOC nearly collapsed around 14 kyr BP, but quickly recovers later.

Interactive comment on Earth Syst. Dynam. Discuss., 3, 801, 2012.