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Interactive comment on “The impact of early Holocene Arctic Shelf flooding on climate in an atmosphere–ocean–sea–ice model” by M. Blaschek and H. Renssen

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Thank you very much for your review and the useful criticism and suggestions for improving our manuscript. We agree with the reviewer that the atmospheric component of LOVECLIM is not the preferable choice for investigating atmospheric responses and dynamics, and this is also the reason why we have focused on the oceanic response rather than on the atmospheric dynamics. As noted by the referee, this is the first modelling study that specifically addresses the impact of deglacial shelf flooding on climate. It is clear that this study should be considered as a first step that should be followed by additional analyses with more complex models. Ultimately this topic should

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be studied using transient experiments performed with models including the coupled atmosphere-ocean-ice system.

The reviewer mentions that we have neglected the impact on climate of sea level changes outside the Arctic and that we have not compared our results with geological records. Our goal has been to specifically analyse the impact of Arctic Shelf flooding in a climate model. In our opinion the chosen experimental set up, with only changes in the Arctic, provides the best analyses to reach our research goal. If we would have had also included sea level changes in the rest of the world, it would have been very difficult to determine what the specific impact of the shelf flooding in the Arctic on climate is. Furthermore, we consider comparison with global geological records outside the scope of this study.

Please find the individual Comments in the attached PDF. Please notice that in the reply to the editor we included an overview of all changes made to the manuscript.

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/9/C2361/2013/cpd-9-C2361-2013-supplement.pdf>

Interactive comment on Clim. Past Discuss., 9, 4191, 2013.

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