

Interactive comment on “Warm Nordic Seas delayed glacial inception in Scandinavia” by A. Born et al.

Anonymous Referee #1

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The paper 'Warm Nordic Seas delayed glacial Inception in Scandinavia' by Born and coauthors describes results from experiments, where results from global atmosphere-ocean models and stand-alone atmosphere model simulations for 115ka have been investigated with the help of an ice sheet model. The authors focus on Scandinavia.

In general, the findings are sufficiently new, although not completely surprising, and the topic fits into Climate of the Past. The description of the experiments could be more clear. I did not find in the text, how long the ice sheet model has been run and how it was initialized. However, in the way the authors use the ice sheet model, this may not even matter, as they basically restrict their analysis to results from the very simple mass balance scheme of the model.

The analysis of the results is not particularly advanced and could be further substanti-

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ated. However, if the prescribed temperature changes in the Norwegian Sea translate 1:1 into temperature changes in Norway (the glacier nuclei are probably on the atmosphere grid point next to the ocean, where SST has been modified or may be even on the same grid point), the analysis is probably sufficient and more would be an overkill.

The paper should be published after some corrections. A second round of review is not necessary.

Detailed comments:

1507-20 Give some information, how you downscaled the atmosphere data onto the finer SICOPOLIS grid. Where all grid points used for the interpolation onto the fine grid, or just land points? This becomes essential, as surface temperature is used to calculate the mass balance (or did you use surface air temperature? In this case please be more accurate in the text).

1507-21 There must have been used some height correction for the downscaling as well. Describe it.

1508-2 As resolution is an issue, especially with the steep Scandinavian orography, the resolution of the atmosphere model should be given here explicitly and the reader should not have to do a literature research to find these facts.

1508-10 Where ends the 'North Atlantic' in the south? Where is the margin between the adjusted and unadjusted SSTs in the sensitivity experiments?

1508-10 It may be an improvement, if the description of the atmosphere-only experiments is moved to section 4, where it is partially described again.

1509-10 This is probably not restricted to 115ka, but also valid today. Is the relation between Scandinavian summer temperatures and Greenland-Scotland-Ridge heat transport at 115ka different than in the control simulation? Is the ocean lead by 1 year statistically significant?

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1509-21 Mention explicitly that these runs are atmosphere-only., see comment 1508-10.

1511-17 Does this ice rafted debris in the Nordic Seas really origin from Scandinavia? Or could the longer lifetime of the icebergs from Greenland and Svalbard due to the colder temperatures (and the associated longer advection length scale) explain this fact as well? How long does it take to build up a Scandinavian ice sheet that can transport enough ice rafted debris into the Nordic Seas?

Fig. 2 Units are missing.

Fig. 5 The small ice caps are hard to see, you have to know that they are there to see them on the plot.

Interactive comment on Clim. Past Discuss., 6, 1503, 2010.