

***Interactive comment on* “The impact of different glacial boundary conditions on atmospheric dynamics and precipitation in the North Atlantic region” by D. Hofer et al.**

Anonymous Referee #1

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This paper studies a classical topic: the atmospheric response, especially precipitation, to different glacial boundary conditions, but now in a state of art model CCSM4. The results are all reasonable and consistent with all previous studies. It is, however, very boring to read, because, except for the use of another model, there is nothing really new (in spite of a lot of work, indeed). Perhaps, the only thing interesting is a relatively clear identification of the dominant role of Laurentide Ice Sheet on the response of rainfall, storm track in the North Atlantic region, relative to other forcings. In particular, the Lagrangian storm tracking is interesting, not commonly used in paleoclimate modeling analysis. Therefore, I would not recommend the paper to be accepted in its present form. Instead, I suggest the authors to refocus the paper on the role of ice sheet on

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the atmospheric dynamics in the North Atlantic region.

P70, ~L15: “the coastal line is taken as zero. . . , For the LGM. . . .” The description of the land-sea mask change is not clear. Please rewrite these and makes it clear.

P74, ~L10-20: LGM model-data comparison, It will be useful to include the comparison with CCSM3 at least for LGM1 and 2, if this paper really wants to address the LGM model-data comparison. I guess the score of data-model consistence may be similar in CCSM3 and CCSM4. This again, is my point of this kind of study, so what? The big picture is simulated in all models.

P78, . . . there are so many “not shown”. I understand, because there is nothing really new and interesting. There is why the whole paper it boring.

P78, L20-25: it is very difficult to see the difference in response between different ice sheets in Fig.8. (Fig.9 and 10 may be ok, but not Fig.8). To focus on this effect, it is best to difference each other, perhaps, difference LGM ice sheet.

Also, ice sheet effect is a classical problem. There have been many papers on this. Manabe discussed it in 70's, and Kutzbach in CLIMAP papers discussed it in 80's. A recent paper on ice sheet effect is Eisenman et al. (2009, Rain driven by receding ice sheets as a cause of past climate change, *Paleoceanography* **24**, PA4209, doi:10.1029/2009PA001778.). The discussion here should be put in the historical context. There are new things here, the storm track analysis is new. But, still, other major features should be in historical context. I think a short paper focusing on ice sheet effect on storm track and precipitation will indeed be interesting.

P79 L5: “A lower altitude of. . . . In the North Atlantic at 20oN”. Which figure this refers to? I can't see these.

Interactive comment on Clim. Past Discuss., 8, 63, 2012.

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