

Interactive comment on “

Climate response to freshwater perturbations in Northern or Southern Hemispheres at the last glacial inception, the last glacial maximum and the present-day” by G. Philippon-Berthier et al.

Anonymous Referee #2

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The paper describes simulations with a climate model analyzing the response to freshwater perturbations in model versions with and without interactive ice sheets in order to assess climate-ice sheet feedbacks. In general the paper has a low standard both in new scientific results as well as in presentation. In the present form it is not close to a publishable paper. I recommend rejection or major revisions. I think more and in depth analysis is required in order to understand the model response. This may take

C597

longer than possible for a revision. If the editor/authors decide on a revision I suggest to consider the detailed comments outlined below.

1. The paper is hard to read. This may be understandable for a first-time non native English speaking writer. But I strongly urge the senior co-authors of the paper to have a serious re-write and/or involve a native English speaker.
2. The paper is highly descriptive and in depth analysis of the results is missing. It is insufficient to publish model results without providing analysis and understanding of why the model behaves the way it does. E.g. the authors show differences in the hysteresis curves (Fig. 3) due to including interactive ice sheets, but it remains unclear why. In Fig. 4 they show that E-P increases at year 12000, but this increase is a (perhaps expected) consequence of the earlier resumption of the AMOC and does explain why the AMOC resumes earlier in the case with interactive ice sheets.
3. Important references are missing. Ocean – ice sheet feedbacks (Schmittner et al. 2002 Science 295 1489) showed ice sheet response and feedbacks to ocean circulation changes. In the discussion of the bipolar seesaw the first paper that explained this response is missing (Crowley 1992 Paleoclimatology, 7, 489). Southern ocean freshwater forcing (Saenko et al., 2003 GRL 30, 1734). Reference to Knutti et al. (2004) should be removed. The first author of that paper admits that the main conclusion is wrong and an artifact of freshwater compensation used in their experiments.

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