Interactive comment on "Transient climate simulations of the deglaciation 21–9 thousand years before present; PMIP4 Core experiment design and boundary conditions" *by* R. F. Ivanovic et al.

Anonymous Referee #1

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Ivanovic, 2015, Transient climate simulations of the deglaciation 21-9 thousand years before present; PMIP4 Core experiment design and boundary conditions

The paper describes the design of the coordinated Core simulation over 21-9 ka with time varying orbital forcing, greenhouse gases, ice sheets and other geographical changes. The choice of two ice sheet reconstructions is given but no meltwater is prescribed. The paper reviews in detail the past experimental designs by EMICs and AOGCMs (ex CCSM) and their results but unfortunately mismatches the experimental design presented this time because of no meltwater. I am afraid the readers are lost in

understanding what we can learn from the experiment at the present form of the paper. I recommend the paper published after revision by (1) presenting a core experimental series with melt-water given at least in a very simple way and (2) explaining what kind of analysis are useful after collecting the non-meltwater experiments from PMIP community. Also (3) clarify the design related to coastline, bathymetry and salinity change due to ice sheet change.

(1) For the first point, the meltwater that is consistent with the ice sheet provided from two schools should be provided so that additional experiment with meltwater can be performed. Where to release could be an option. As in many studies, the regional difference (South vs. North) during the deglaciation is presented and discussed but without the meltwater there is no way expecting the reproduction in proxy as in Clark et al, 2012 or Shakun et al, 2012. Even if there is uncertainty of the location of the meltwater or an uncertainty of timing of abrupt change of melt water, at least the total amount of meltwater can be provided and given by each modelling group. The change of total amount ($\sim$ sea level change) should be consistent with the ice sheets reconstructed and also constrained fairly well (Clark et al, 2009).

(2) For the second point, if the PMIP4 Core experiment group asks for the non melt-water experiment, then the reason and what is expected should be described clearly. If there is no melt-water, there is no sense in doing a transient experiment, which is very expensive. It is unclear at the moment why the non-melt water experiment should be done as a Core experiment. PMIP experiments with AOGCMs are expected to do model-data comparision as well as model-model experiment, but what are the data-model comparison expected? Many studies suggest that the melt water might be important for understanding the "bipolar" ice core signals and various regional signals in proxy. Since the experiment demands substantial computational resource as well as man-power for many groups, the explanation should be convincing. The introduction in the paper is not sufficiently written for the non-melt water transient experiment. Perhaps what is expected scientifically after collecting the results could be written in an

independent section in more detail.

(3) On the design related to coastline and bathymetry change due to ice sheet change: In table 2, the design of salinity change is unknown. Define what (and how) the modelers do with the total ocean salinity change, which should be consistent with the ice sheet change and melt water.

There are two options for the "Bathymetry" but what happens when the ice sheet covers the ocean in the model that keeps the "Preindustrial bathymetry"? What is prescribed for ice sheet and what should be done for ocean boundary condition should be carefully designed and described for the participants.

Page 9073 line 9 "many questions and untested hypotheses remain" but the current study should show the perspective, how it answers the questions and the hypotheses are tested.