Interactive comment on “


Anonymous Referee #2

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This paper describes an Earth system model of intermediate complexity coupled to ice sheet/shelf models for Greenland and Antarctica. To my knowledge, this is the first coupled model that includes two-way coupling between a climate model and both ice sheets, with testing for the Last Glacial Maximum and the warm Last Interglacial. I recommend publication with only minor revisions.

Page 1235. Describe the melt rates and calving prescriptions in more detail. A figure or table would be useful here.

Section 3.1. Please give the length of the equilibrium simulations for the late Holocene, LGM, and Eemian. Longer than about 5000 years would be a problem for the Eemian because of the changing orbital conditions.

Page 1241. The mean model-based estimate of Otto-Bliesner et al. (2006) of 2.8m of global SLR (range 2.2 to 3.4m) includes contributions of both GIS and other Arctic ice fields. Their study gives a GIS SLR range of 1.9 to 3.0m. Also a counterargument to the Eemian GIS having extensive ice in southern Greenland (Fig. 8f) is the marine core results of deVernal and Hillaire-Marcel [Natural Variability of Greenland Climate, Vegetation, and Ice Volume during the Past Million Years, Science, 320, 1622 (2008)]. Their pollen records from marine sediments off southwest Greenland suggest dense vegetation over southern Greenland during Stage 5e. This should be included.

A paper that the authors might find relevant is one by Greve et al. [Greve, Saito, and Abe-Ouchi, Initial results of the SeaRISE numerical experiments with the models SICOPOLIS and ICLES for the Greenland Ice Sheet] just published online in Annals in Glaciology. They found that the standard version of SICOPOLIS produces an ice-free northern Greenland for present day, albeit with a positive degree-day method for surface melting.

Interactive comment on Geosci. Model Dev. Discuss., 3, 1223, 2010.