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Modeling today's sea-level contribution of glacial Antarctica

Torsten Albrecht (1) and Anders Levermann (1,2)

(1) PIK - Potsdam Institute for Climate Impact Research, Potsdam, Germany (torsten.albrecht@pik-potsdam.de), (2) University of Potsdam, Potsdam, Germany

The present dynamic state of the Antarctic Ice Sheet is mainly a product of past climate evolution, namely the history of advance and retreat during the last four glacial cycles. To this end, we need to account for this internal memory in order to better understand present changes and to project future contributions to sea-level rise, particularly with regard to anthropogenic climate change.

This requires a fully dynamic model including ice-shelf dynamics as well as a continental scale treatment of the transition zone and a proper coupling to oceanic and atmospheric forcing data, all of this is included in the Parallel Ice Sheet Model (PISM). Instead of aiming at a best-guess simulation, we provide an ensemble of model simulations for 15km resolution that incorporates uncertainties from climate boundary conditions, internal process-modeling and ice parameter choices. With this approach we produce a broad ensemble of model-representations of the present day Antarctic ice sheet, that is at the same time well constrained by paleoclimatic data (e.g. LGM configuation) and present-day observations.