



Ensemble of simulations of the Antarctic Ice Sheet over the last glacial cycles with PISM

Torsten Albrecht (1), Ricarda Winkelmann (1,2), Anders Levermann (1,2,3)

(1) Potsdam Institute for Climate Impact Research (PIK), Earth System Analysis, Potsdam, Germany (torsten.albrecht@pik-potsdam.de), (2) Institute of Physics and Astronomy, University of Potsdam, Potsdam, Germany, (3) Lamont-Doherty Earth Observatory, Columbia University, New York, USA

Reconstructions of the past evolution of the Antarctic Ice Sheet provide important constraints for projections of the ice dynamics that include the long memory of the ice sheet.

We present an ensemble of simulations with the three-dimensional numerical ice sheet model PISM for the last two glacial cycles with systematically varied model parameters that shows the statistical envelope of possible sea-level histories. Boundary processes relevant on paleo time scales, e.g. concerning the bottom friction or response of the lithosphere in marine ice sheet regions as well as the climatic forcing have been improved in the model.

The non-linear response of the ice sheet to individual and interacting climatic forcings points to the large ice shelf regions of Ross and Ronne-Filchner as key regions for past ice-sheet change. Modeled grounding line migration during the last deglaciation reveals self-amplification with consequences for our current understanding of the Marine Ice Sheet Instability and for the current and future sea-level contribution of Antarctica.