

Greenland ice sheet sea-level projections based on downscaled regional climate model simulations

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Projections of the future sea-level contribution from the Greenland ice sheet with physically based numerical models depend crucially on a good representation of the surface mass balance (SMB), which is expected to govern the ice sheet's response on a centennial time scale. In this study, we force the Community Ice Sheet Model with SMB from the regional climate model RACMO 2.3 that is downscaled to a 1 km resolution, explicitly taking the SMB-elevation feedback into account. The thermo-dynamic state of the ice sheet is defined using a glacial-interglacial spin-up technique and combined with a transient inversion procedure to find a present-day initial state close to the observed geometry. We analyse the ice sheet response to a range of climate change scenarios with focus on the effect of changes in the downscaling and initialisation procedures.