



Greenland ice sheet surface mass balance projections from IPCC AR4 global models

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Results from atmosphere-ocean general circulation models (AOGCM's) for the IPCC 4th Assessment Report are used to investigate surface mass balance (SMB) future projections of the Greenland ice sheet (GrIS). The most efficient models for the GrIS climate modeling are chosen by comparison between the 1970-1999 outputs (averages and trends) from the Climate of the twentieth Century Experiment (20C3M) and reanalyses (ECMWF, NCEP) as well as observations (ice core measurements). The outputs from these most efficient models are after used to assess changes planned by the IPCC greenhouse gas emissions scenarios (SRES) for the 2070-2099 period. The GrIS SMB projections are estimated from changes in precipitation and in the 500hPa geopotential height from these AOGCM's outputs. However, large uncertainties remain in these SMB projections based on simplified physics and huge model outputs. High resolution simulations made with regional models (which simulate explicitly the SMB by taking into account the surface feedbacks) forced at their boundaries by a GrIS well-adapted AOGCM could bring more precise brief replies.