

Response of Greenland Ice Sheet to the Global Warming Simulated by a High Resolution AOGCM coupled by an Ice Sheet Model

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We compute contribution to sea level from the Greenland ice sheet under future global warming scenarios using models of three different types.

The first one is an Atmosphere/Ocean coupled GCM. Changes in surface mass balance of the Greenland ice sheet is computed by the result obtained by global warming experiment with several scenarios, which are submitted to the next IPCC report. The AOGCM used in this study is the Model for Interdisciplinary Research on Climate, version 3.2 (MIROC3.2), developed at the Center for Climate System Research, University of Tokyo (CCSR), National Institute for Environmental Studies (NIES) and Frontier Research Center for Global Change (FRCGC) [K-1 model developers, 2004]. High (T106 and 0.28x0.19 degrees) as well as medium (T42 and 1.4x0.56 degrees) resolution are performed. The second one is an ice sheet model forced by the GCM results (off-line model). Effect of change in ice-sheet dynamics upon ice discharge (run-off) terms are included by this type. The ice sheet model used in this study is Ice sheet Model for Integrated Earth system Studies (IcIES) developed at CCSR and FRCGC [Saito and Abe-Ouchi, 2004; in press]. The third one is an on-line coupled MIROC-IcIES. The change in ice-sheet topography and/or run-off affects the atmosphere and ocean by this type. We estimate a short-time scale response by A.D. 2100 as well as a long-time scale response after more than thousands years. Comparison is made between scenarios, coupling types, GCM resolution, and so on.