Overview of the Ice Sheet Model Intercomparison Project for CMIP6 (ISMIP6)

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The sea level contribution from the Greenland and Antarctic Ice Sheets made by the glaciological community as part as the Intergovernmental Panel on Climate Change (IPCC) process have often been out of phase with the climate scenarios considered by the wider Coupled Model Intercomparison Project (CMIP) community. However, in the current phase of CMIP, an effort for ice sheet models to be better integrated in the CMIP6 initiative has been endorsed by the CMIP panel. We present the framework for the new effort, ISMIP6, the Ice Sheet Model Intercomparison Project for CMIP6. The primary goal of ISMIP6 is to improve projections of sea level rise by focusing on the evolution of the Greenland and Antarctic ice sheets under a changing climate, along with a quantification of associated uncertainties (including uncertainty in both climate forcing and ice-sheet response). This goal requires an evaluation of AOGCM climate over and surrounding the ice sheets; analysis of simulated ice-sheet response from standalone models forced "offline" with CMIP AOGCM outputs and, where possible, with coupled ice sheet-AOGCM models; and experiments with standalone ice sheet models targeted at exploring the uncertainty associated with ice sheets physics, dynamics and numerical implementation. A secondary goal is to investigate the role of feedbacks between ice sheets and climate in order to gain insight into the impact of increased mass loss from the ice sheets on regional and global sea level, and of the implied ocean freshening on the coupled ocean-atmosphere circulation. These goals map into both "Melting Ice and Global Consequence" and "Regional Sea-Level Change and Coastal Impacts" Grand Challenges relevant to Climate and Cryosphere (CliC) and the World Climate Research Program (WCRP).

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