



Modeling the influence of the Greenland ice sheet melting on the Atlantic meridional overturning circulation during the next millennia

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A three-dimensional Earth system model of intermediate complexity including a dynamic ice sheet component has been used to investigate the long-term evolution of the Greenland ice sheet and its effects on the Atlantic meridional overturning circulation (AMOC) in response to a range of stabilized anthropogenic forcings. Our results suggest that the Greenland ice sheet volume should experience a significant decrease in the future. For a radiative forcing exceeding 7.5 W m^{-2} , the modeled ice sheet melts away within 3000 years. A number of feedbacks operate during this deglaciation, implying a strong non-linear relationship between the radiative forcing and the melting rate. In the most extreme scenario considered, the freshwater flux from Greenland into the surrounding oceans is higher than 0.1 Sv during a few centuries. This is however insufficient to induce a shutdown of the AMOC in the model.