



## **Improved representation of ice discharge from the Greenland ice sheet into the surrounding ocean**

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Ice discharge and surface melt are the most important elements of the Greenland ice sheet (GIS) stability; both currently contribute about equally to the present ice loss of the GIS. Nowadays it is becoming more and more clear that for an explicit representation of ice-ocean marginal processes (outlet glaciers, fjord dynamics, calving) current modeling approaches are probably not adequate and that the present topographical data sets are of insufficient resolution to describe these small-scale ice marginal processes. But the ability to adequately capture the relevant processes leading to ice loss of the GIS is tremendously important for understanding the role of the GIS in a changing world under global warming. As a preliminary attempt to resolve these challenges we introduce a new parameterization of ice discharge, which has been recently included in the coupled regional climate-ice sheet model REMBO-SICOPOLIS. Here, the ice discharge from the major hydrological basins of the GIS are explicitly considered and the model parameters are adjusted to fit observational data, in particular to data on ice discharge. We compare standard large-scale modeling approaches with our new approach. Steady-state as well as transient simulations under future warming scenarios are performed and discussed. In particular, we demonstrate the impact of our new approach on the stability behavior of the GIS.