



## **Modelling the present and future behaviour of the glaciers terminating into Godthåbsfjord, West Greenland**

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The mass loss of the Greenland ice sheet is caused by changing surface mass balance, direct melting on the surface, ice flow through the numerous outlet glaciers, and basal melt. The largest outlet glaciers, like Jakobshavn Isbræ, are studied in great detail. However, processes leading to their behaviour such as calving and basal melting are not well understood.

In this study, we focus on the fjord system, Godthåbsfjord, near Nuuk in West Greenland. Godthåbsfjord is a unique fjord with its length of about 300 km and a shallow sill at the fjord entrance that protects the fjord system. There are several tidewater glaciers terminating into the fjord contributing to the fresh water content in the fjord. The largest contributor is Kangiata Nunâta Sermia (KNS). Also, comprehensive oceanographic measurements in Godthåbsfjord are compared to link the ice sheet model to the fjord system.

Here we aim to describe the present and future behaviour of KNS. The Parallel Ice Sheet Model (PISM), developed at the University of Alaska Fairbanks, is used for the regional modelling applied to the KNS drainage basin. Climatic forcing is provided by the Danish Meteorological Institute in form of HIRHAM5 ERA-Interim reanalysis model output covering the 1989 – 2011 period. PISM is able to show seasonal variability in the modelled fluxes when monthly means of the climatic forcing are applied.

Observed surface velocities from InSAR and GPSs, ice thickness, and solid ice flux estimates at the terminus are used to determine the best parameter setting describing the present state of KNS. Those settings are then used for future projections (until 2050) to estimate solid ice flux and basal melt, that enters the fjord system as fresh water.

This study is conducted in affiliation with the Greenland Climate Research Centre in Nuuk.