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Reconstruction of past oceanographic variability in Southeast Greenland from marine sedimentary records: The influence from the Atlantic Multi-decadal Oscillation

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The Greenland ice sheet is one of the most significant water contributors to the rising global sea level, and therefore there are concerns about its long term stability. However, prediction of its contribution to global sea-level rise is complicated by lack of knowledge about mechanisms behind ice sheet change. In particular ice streams and their interaction with components of the atmospheric and oceanic climate system needs further investigation in order to make realistic models of future sea level rise.
The SEDIMICE project ('Linking sediments with ice-sheet response and glacier retreat in Southeast Greenland') investigates past outlet glacier fluctuations in Southeast Greenland. The aim is to extend the knowledge from observational time series further back in time by analysing sediment cores retrieved from fjords by outlet glaciers and from the shelf.
This presentation is based on results from a core retrieved near Sermilik Fjord by Helheim Glacier. The past 6000 years of Irminger water variability on the shelf has been reconstructed by analysing sediments from a side-bassin to the through connecting Sermilik fjord with the Irminger Sea. This reconstruction shows the Late-Holocene climate deterioration and is superimposed by a centennial-scale climate variability, which at times concurs with the climate records obtained for Northwest Europe. A wavelet analysis of the high-resolution K/Ti data (indicating grainsize variability) shows that the AMO (50-70 yr quasi-periodicity) recurrently controls Irminger water variability on the shelf. These results highlight the importance of adequate representation of regional climate modes in prognostic ice-sheet models.