



Reconstruction of the past 2000 years of ocean and glacier variability in Sermilik Fjord, SE Greenland, based on sediment archives

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Glaciomarine sediments represent valuable archives of climate and glacier variability in the arctic environment. Especially the fjords along Greenland's east coast represent a dynamic and complicated system, influenced by regional ocean circulation, local currents and by glacier terminations. Therefore, they represent appropriate locations for sedimentary core studies in order to detect the relative glacier and ocean variability.

The aim of this project is to reconstruct the past 2000 years of glacier and ocean variability in Sermilik fjord, SE Greenland, into which Helheim glacier terminates. This is done by analysing two sedimentary cores (ER11 and ER07) and hereby reconstruct fluctuations in marine-terminating outlet glacier dynamics (including iceberg and to a lesser extent melt water production) and the interaction with oceanographic changes. The oceanographic variability is reconstructed on the basis of benthic and planktonic foraminiferal analysis and the content of the biomarker IP25 and these proxies are interpreted to reflect changes in the inflow of the warm Irminger Current and polar waters in association with the East Greenland Current. Interestingly, studies show that the onset of the Little Ice Age was characterised by intensified inflow of Irminger Current water masses to the Southeastern and Southwestern shelves of Greenland and that these may be associated with a contracted subpolar gyre. At the same time, the EGC Polar Water transport also intensified leading to a stratified water column on the shelf and this may have favoured entrainment of warm subsurface IC waters. Alternatively, the relatively warm rim of the eastern subpolar gyre may have promoted intense submarine melting of extended outlet glaciers at this time, producing enhanced melt water outflow which favoured estuarine circulation processes maintaining the inflow of IC water masses. Thus the aim of this study is to investigate in detail the circulation of these LIA warm waters from shelf into the fjords and in particular the glacier response/role. The results will provide valuable information for improving model studies of ocean-cryosphere interaction and prediction of future sea level changes.