



Investigating ice-ocean interactions in Kangerdlugssuaq Fjord over the past ~600 years through proxy reconstructions.

Flor Vermassen (1,2), Marie-Alexandrine Sicre (3), John M. Jaeger (4), David J. Wangner (1,2), Laurence M. Dyke (1), Vincent Klein (3), Kurt H. Kjær (2), and Camilla S. Andresen (1)

(1) Geological Survey of Greenland and Denmark, Copenhagen, Denmark, (2) National History Museum of Denmark, Copenhagen, Denmark, (3) Laboratoire d'Océanographie et du Climat, Paris, France, (4) University of Florida, Gainesville, United States of America

There is a growing body of evidence demonstrating that changes in warm water inflow to Greenlandic fjords are linked to the rapid retreat of marine-terminating outlet glaciers. This process is thought to be responsible for a substantial component of the increased mass loss from the Greenland Ice Sheet over the last two decades. Sediment cores from glaciated fjords provide high-resolution sedimentological and biological proxy records which can be used to evaluate the interplay of warm water inflow and glacier calving over timescales longer than the instrumental record.

In this study, a short core (1.5m) positioned at the head of Kangerdlugssuaq fjord is investigated to establish a multi-proxy record of glacier behaviour and oceanographic conditions. The core covers the past ~600 years, spanning back to the start of the Little Ice Age. Grain-size analysis is performed to quantify ice-rafted debris (IRD), a parameter related to the calving intensity of Kangerdlugssuaq glacier. Bottom current strength is reconstructed by measurements of the mean sortable silt; periods of vigorous current flow are assumed to be due to enhanced warm water inflow. A record of sea surface temperatures is derived from alkenone paleothermometry (Uk' 37), and the origin of the alkenones is discussed (in situ vs. advection). Reconstructions of ice-ocean interactions on a longer timescale provide a baseline to better understand the recent -and potentially future- retreat of marine-terminating glaciers in Greenland.