Linking glaciers, ocean and atmospheric variability – lessons from marine sediment archives

Camilla S. Andresen[1], K. H. Kjær[2], A. Kuijpers[1], Andreea Elena Stoican[1] and Anne Jennings[3]

[1]Geological Survey of Denmark and Greenland, Department of Marine Geology and Glaciology, Denmark; csa@geus.dk
[2]Centre for GeoGenetics, Natural History Museum, Denmark
[3]Institute of Arctic and Alpine Research (INSTAAR4), University of Colorado at Boulder, USA

Since major outlet glaciers on Greenland started to accelerate, thin and retreat in the early 2000s, the causes and significance of this change has been debated, however, it is widely believed now that changes in the ocean currents around Greenland play an important role. The understanding of the climatic influence on outlet glacier behaviour is hampered by the short time span for which satellite observations of glacier changes exist. Insight from paleo records can provide additional information here; we attempt to extend the glacier changes back in time by analysing sediment cores obtained from the fjords into which the outlet glaciers terminate and thus leave clastic sedimentary traces from icebergs and melt water. Likewise, regionally originating warm and cold currents leave traces of their past variability by affecting microfossils in these same sediment cores. Thus, we can investigate the interaction between oceanographic variability (and associated climatic modes of atmospheric variability) and glacier changes. Here we present studies covering the time since the Little Ice Age until recent.