



## **Holocene Provenance Changes and Ice Sheet Dynamics traced by Radiogenic Isotopes in Melville Bay Sediments, Northwest Greenland**

Lina Madaj (1), Friedrich Lucassen (1), Claude Hillaire-Marcel (2), Jens Weiser (1), and Simone Kasemann (1)

(1) Marum - Center for Marine Environmental Sciences and Faculty of Geoscience, University of Bremen, Germany, (2) GEOTOP, Université du Québec à Montréal, Canada

The Greenland Ice Sheet (GIS) is the largest freshwater storage on the northern hemisphere and the last remaining major ice sheet after the last deglaciation. Significant changes in its volume and size and therefore in freshwater input into the ocean potentially affect ocean circulation patterns and global climate. During the Holocene the GIS has retreated and advanced on changing rates leading to variabilities in freshwater runoff and hence sediment supply through meltwater discharge. Today about 27 % of the GIS drain into Melville Bay [1], an area of major ice streams and ice berg calving in northwest Baffin Bay.

We investigate changing provenances of detrital material recorded in two marine sediment cores from southern and northern Melville Bay. Variations in isotopic ratios of strontium (Sr), lead (Pb) and neodymium (Nd) label the different source regions of meltwater discharge as well as more distal sea-ice and current-transported sediments during the Holocene and support the reconstruction of past ice sheet dynamics and sediment pathways. Our current results indicate significant differences of the northwest GIS margin activity between the early and mid Holocene. The early Holocene is marked by more radiogenic Sr signatures in southern Melville Bay records compared to northern records. Around 6 ka BP values of both records converge and point to the same sediment source region for the Melville Bay area for the late Holocene. The combination with Pb and Nd suggests that the variations in sediment provenances were mainly influenced by local contributions rather than distal transport pathways. A possible cause for the convergence in source regions towards the end of the Holocene could be the establishment of the northern Baffin Bay circulation system after the complete opening of Nares Strait and/or a possible migration of an ice divide [2] leading to a shift in drainage regions.

[1] Rignot & Kanagaratnam (2006), *Science* 311, 986-990

[2] Slabon et al., (2018), *Geomorphology* 318, 88-100