

EGU21-6426, updated on 04 Jul 2022

<https://doi.org/10.5194/egusphere-egu21-6426>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Holocene variability of the northeastern Laurentide Ice Sheet in the Clyde Inlet area, western Baffin Bay, from radiogenic isotope records in marine sediments

Johanna Hingst¹, Claude Hillaire-Marcel², Friedrich Lucassen¹, Christoph Vogt¹, Emmanuel Okuma¹, and Simone Kasemann¹

¹MARUM – Center for Marine Environmental Sciences and Faculty of Geoscience, University of Bremen, Germany

²Geotop – Centre de recherche en géochimie et géodynamique, Université du Québec à Montréal, Canada

The reconstruction of late glacial ice sheet fluctuations helps understanding and modelling the local glacio-isostatic adjustment as well as global eustatic changes. From this viewpoint, the large-scale spatial and temporal variations of the Fox Basin-Baffin Island ice dome (NE Laurentide Ice Sheet, Canada) have been well documented. However, high frequency Holocene fluctuations and final decay of it are still poorly documented. We have thus investigated the behaviour of one of its eastern outlet glaciers in the Clyde Inlet fjord, northeastern Baffin Island. The reconstruction of ice sheet margin fluctuation is based on the radiogenic isotope composition (Sr-Pb-Nd) and mineral assemblage of detrital sediments in two marine cores raised within and off the Clyde Inlet (GeoB22346-3, Clyde Inlet head; GeoB22357-3, adjacent continental shelf). Radiogenic isotope ratios and bulk mineral assemblages from such sites are imprints of bedrock erosion along the active ice margin, as well as along ice-streams and subglacial drainage patterns. They may thus be used for the reconstruction of spatial and temporal variations in meltwater discharge into Baffin Bay and of the position of the active margin fluctuations inland. The location of the two sediment cores also informs on the traceability of radiogenic isotope signals from proximal to more distal areas of sediment deposition. Changes in mineralogical and radiogenic isotope compositions at the proximal core site suggest ice margin and drainage fluctuations rather than a constant retreat throughout the Holocene. Shelf sediment provenances are dominated by relatively homogenized Baffin Island inputs during the mid to late Holocene, but record a slightly offshore ice margin position from the late Pleistocene to the early Holocene.