

EGU2020-6774

<https://doi.org/10.5194/egusphere-egu2020-6774>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Asynchronous instability of NE ice streams of the Laurentide Ice Sheet recorded in the marine sediments of Labrador Sea during the last glacial cycle

Harunur Rashid^{1,2}, Mary Smith³, Min Zeng¹, Yang Wang¹, Julie Drapeau⁴, and David Piper²

¹College of Marine Sciences, Shanghai Ocean University, Shanghai, China (tetulia27@hotmail.com)

²Bedford Institute of Oceanography, Dartmouth, Canada (tetulia27@hotmail.com)

³School of Earth Sciences, The Ohio State University, Columbus, USA (mesmith5286@gmail.com)

⁴Earth and Planetary Sciences, McGill University, Montreal, Canada (jdrapeau@mcgill.ca)

Hughes et al. (1977) hypothesized of a pan-Arctic Ice Sheet that behaved as a single dynamic system during the Last Glacial Maximum. Moreover, the authors suggested a nearly grounded ice shelf in Davis Strait implying that little or no exchange between Baffin Island and the Labrador Sea. Here we present data at 1-cm (<100 years) resolution between ~12 ka and 45 ka that shed light on the discharge from Hudson Strait and Lancaster Sound ice streams of the Late Pleistocene Laurentide Ice Sheet. A reference sediment core at 938 m water depth on the SE Baffin Slope was investigated with new oxygen isotope stratigraphy, X-ray fluorescence geochemistry, and 18 ¹⁴C-AMS dates and correlated to 14 regional deep-water cores. Detrital carbonate-rich sediment layers H0-H4 were derived principally from Hudson Strait. Shortly after H2 and H3, the shelf-crossing Cumberland Sound ice stream supplied dark brown ice-proximal stratified sediments but no glacial debris-flow deposits. The counterparts of H3, H4, and (?)H5 events in the deep Labrador basin are 4–10 m thick units of thin-bedded carbonate-rich mud turbidites from glacial debris flows on the Hudson Strait slope. The behavior of the Hudson Strait ice stream changed through the last glacial cycle. The Hudson Strait ice stream remained at the shelf break in H3-H5 but retreated rapidly across the shelf in H0-H2 and did not deglaciate Hudson Bay. During this time, Cumberland Sound ice twice reached the shelf edge. In H3–H5, it remained at the shelf break long enough to supply thick turbidites. Minor supply of carbonate-rich sediment from Baffin Bay allows chronologic integration of the Baffin Bay and Labrador Sea detrital carbonate records, which is diachronous with respect to Heinrich events. The asynchrony of the carbonate events implies an open seaway through Davis Strait. Our data suggest that the maximum extent of ice streams in Hudson Strait, Cumberland Sound, and Lancaster Sound was neither synchronous.