Geophysical Research Abstracts
Vol. 18, EGU2016-10340, 2016
EGU General Assembly 2016

Tracking millennial-scale Holocene glacial advance and retreat using Osmium isotopes: Insights from the Greenland Ice Sheet

Alan Rooney (1), David Selby (2), Jeremy Lloyd (3), David Roberts (3), Andreas Lu¨ckge (4), Bradley Sageman (5), and Nancy Prouty ()

(1) Department of Earth and Planetary Sciences, Harvard University, Cambridge, United States (alanrooney@fas.harvard.edu), (2) Department of Earth Sciences, Durham University, Durham, United Kingdom (david.selby@durham.ac.uk), (3) Department of Geography, Durham University, Durham, United Kingdom (d.h.roberts@durham.ac.uk), (4) Bundesanstalt fu¨r Geowissenschaften und Rohstoffe, Hannover, Germany (andreas.lueckge@bgr.de), (5) Department of Earth and Planetary Sciences, Northwestern University, Evanston, United States (brad@northwestern.edu), (6) US Geological Survey, Pacific Coastal & Marine Science Center, Santa Cruz, United States (nprouty@usgs.gov)

Using new high-resolution osmium (Os) isotope stratigraphy from cores adjacent to the Greenland ice sheet we highlight the potential for chemostratigraphy to contribute to our understanding of ice sheet dynamics. This study utilizes sediment cores that have excellent chronological controls and demonstrates the role of local and regional weathering fluxes on the marine Os residence time. Distal to the Greenland ice streams core MSM-520 displays a steady lowering of the Os isotope composition during the Holocene. In contrast, proximal to the calving front of Jakobshavn Isbræ (core DA00-06), the Os isotope stratigraphy highlights four stages of ice stream retreat and advance. Our chemostratigraphic records provide vital benchmarks as we attempt to better constrain the future response of major ice sheets to climate change. Variations in Os isotope composition from sediment and macro-algae (seaweed) sourced from both near-field and far-field settings emphasize the overwhelming effect local weathering sources have on seawater Os isotope composition.