



PP13A-2038: Late Holocene glacial history of Petermann Fjord, Northwest Greenland: Non-destructive CT, XRF, and magnetic results from OD1507 sediment cores

Monday, 12 December 2016

13:40 - 18:00

📍 Moscone South - Poster Hall

An international and interdisciplinary expedition to Nares Strait and Petermann Fjord, Northwest Greenland, onboard the Swedish Icebreaker Oden July-September 2015 (OD1507) sought to understand the Holocene history of the Petermann glacial system among other research objectives. Petermann Glacier, which terminates as a floating ice-tongue in Petermann Fjord, is thought to be especially sensitive to ice-ocean interactions. While limited historical observations dating back to 1876 suggest the Petermann Ice Tongue extends about 70-90 km from the grounding-line, large calving events in 2010 and 2012 reduced the ice-tongue extent to about 45 km from the grounding-line. A suite of 14 marine sediment cores recovered a range of glacio-marine facies that form an along fjord (15-80 km from the grounding-line) and an across fjord depth (473-1041 meters water depth) transect. CT scans clearly identify four primary fjord facies, including bioturbated, IRD-rich, laminated and mud with stratified graded sand layers. The latter of these occurs near the modern grounding-line. Additionally, a new MATLAB routine is used to quantify clasts >2 mm in size from the CT scans. XRF sediment geochemical changes mirror magnetic mineral concentrations and are driven by varying contribution of Ca-rich and Ca-poor sources, which we interpret as a reflection of the mixing of the local carbonate rocks and crystalline basement excavated by the ice sheet. Initial paleomagnetic results isolate a strong and stable characteristic remanent magnetization which show remarkable similarity to paleosecular variation (PSV) recorded in nearby mid-late Holocene varved lakes on Ellesmere Island. This non-destructive dataset provides robust correlations, indicating a coherent and dynamic record of changes in the Petermann glacial system during the late Holocene, including evidence for a significant grounding-line retreat followed by the growth and relative paleo-extent of the modern Petermann Ice Tongue.

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