

Provenance of a distinct gray layer from the Lomonosov Ridge off Greenland

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The high-latitude position, landlocked character, special hydrology and bathymetry make the Arctic Ocean unique in comparison to the other oceans. Due to its characteristics, the sediment record from the deep sea basin becomes an important archive for reconstructing paleoclimate and paleo-environmental conditions. The sediment deposited in the Arctic Ocean is transported by sea ice and icebergs, which are controlled by the Arctic surface circulations. Several cores from the central Arctic, the Lomonosov Ridge north of Greenland and the Morris Jesup Rise contain a distinct grayish, ice rafted debris (IRD)-rich, layer with some specific features: a sharp lower boundary, relatively low content of manganese, and a lack of bioturbation. Heavy minerals from these layers were analyzed primarily by Electron Probe X-Ray Microanalyzer (EPMA) and Scanning Electron Microscope-Energy Dispersive Spectrometer (SEM-EDS) to establish the prominent provenance areas. The provenance variations can show the paleo-distribution and transport pathways of sea ice and icebergs and even indicate the origin of some abrupt glacial events. Initial results suggest that the majority of the grains in the gray layer originates from a limited area near the Putorana Basalt Plateau. We therefore hypothesize that this gray layer is related to an abrupt ice dammed lake drainage from northern Siberia, tentatively dated to around the boundary between MIS 4 and 3.