NEW EVIDENCE FOR GLACIAL SCOURS ON THE SEAFOOR OF THE ARCTIC BASIN: CHUKCHI BORDERLAND, ALASKA MARGIN, AND LOMONOSOV RIDGE

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Recent processing of sidescan sonar and bathymetric data collected during the Science Ice Exercises (SCICEX) field programs of 1998-1999 aboard the USS Hawkbill shows new evidence for intense glacial scouring of the seafloor in several key regions of the Arctic basin. The Chukchi Borderland, Alaska Margin and Lomonosov Ridge all show signs of several distinct types of glaciogenic seabed deformation. The first style of glacial scouring includes seafloor sediments furrowed to varying depths, with piles of sediments thrust into levees along the margins of the furrows. The furrows cross each other at random angles, indicating a probable origin from the keels of large icebergs dragged across the seafloor in response to wind or current forcing. A second suite of seabed features includes fields of linear, parallel grooves that cover many kilometers of seafloor. These groove fields are similar to subaerial glacial flutes, and we infer that they are formed by large cohesive masses of ice traveling across the seafloor in a single direction. In many locations, we are able to distinguish the relative ages of ice scour features due to cross-cutting relationships, though absolute chronologies for the ice grounding events are still uncertain. Many of the iceberg furrows common throughout the study area could not have been generated by modern icebergs or ice islands in the Arctic, whose keel drafts only rarely exceed depths of ~50m. Submarine glacial flute fields are even more difficult to explain via the modern ice regime of the Arctic, since some of these features are found at depths up to 1km below modern sea level. We thus
hypothesize that the observed ice-grounding features were produced during or prior to the Last Glacial Maximum in the Arctic basin.