Late Quaternary depositional and glacial history of the Arliss Plateau off the East Siberian margin in the western Arctic Ocean

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초록

Sedimentary stratigraphy and facies analysis along with seismostratigraphic and multibeam bathymetry data are used to reconstruct the last glacial impact on the Arliss Plateau (AP) and attendant sedimentation in the adjacent Chukchi Basin (CB) in the western Arctic Ocean off the East Siberian margin. Sediment core ARA02B/16B-GC from the AP lower slope captures glacier-related depositional history during the last estimated ca. 100 ka (MIS 1-5c) based on regional lithostratigraphic correlation. The sedimentary record shows distinguishable interglacial and glacial patterns. The identified sedimentary facies reflect several modes of glaciogenic deposition by drifting icebergs, suspension settling from turbid meltwater plumes and/or detached underflows, and turbidity currents. Based on strong reflectors related to lithological boundaries, a downslope subbottom profile from AP to CB is divided into seismostratigraphic units (SSU) 1 and 2 corresponding in the core record to MIS 1-3 and MIS 3-5c, respectively. An acoustically transparent lens within SSU 2 correlates on the upper slope to debris lobes downslope from the AP top covered by megascale glacial lineations. This geomorphic/sedimentary and facies analysis, the last debris lobe horizon was deposited in glacial/deglacial environments during late MIS 4 to early MIS 3. The absence of similar glaciogenic debris lobes within SSU 1 indicates no direct glacial impact on the AP during the Last Glacial Maximum (LGM). These results suggest that the last glacial erosion of the AP occurred during or immediately after MIS 4, possibly related to major glaciation in northern Siberia at ~50-70 ka.