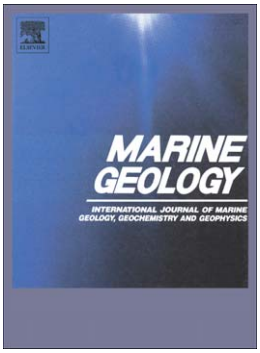

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Submarine landform assemblages and sedimentary processes in front of Spitsbergen tidewater glaciers

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Abstract

New swath-bathymetric data from the inner parts of the three Svalbard fjords Ymerbukta, Trygghamna, and Magdalenefjorden reveal the landform assemblages deposited in front of tidewater glaciers in west and northwest Spitsbergen. Overridden moraines in Ymerbukta, a tributary of Isfjorden in central west Spitsbergen, record several re-advances of the Esmarkbreen glacier at the head of the fjord after deglaciation, and glacial lineations formed in seafloor sediments are indicative of fast ice advance during one of these events. A terminal moraine and associated debris lobe mark the maximum ice extent during the Holocene, which, implied by the presence of crevasse-squeeze ridges, is likely related to a surge of Esmarkbreen. Several De Geer moraines provide evidence for subsequent slow and step-wise retreat. In the adjacent Trygghamna and in Magdalenefjorden in northwest Spitsbergen the landforms are similar but the absence of overridden moraines and glacial lineations shows that the glaciers probably only re-advanced once during the Holocene and that ice flow was relatively slow. Terminal moraines and associated debris lobes mark the maximum extent of these advances and formed during the Little Ice Age (LIA). In Mag-

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