



## **Signatures of ice flow, retreat and meltwater delivery in the Gulf of Bothnia**

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The Gulf of Bothnia has variably played host to the main ice divide of the Fennoscandian ice sheet, ice stream onset, trunk and retreat zones, marine ice sheet decay into the large proglacial Baltic Ice Lake, and the subsequent development of an 'inland' marine basin. It is likely to have acted as both source and depocentre for the delivery of ice, water and sediment in both subglacial and ice-marginal domains. These domains and dynamics have been largely inferred from terrestrial, peripheral evidence. The submerged terrain has been little investigated and its glacial geological archives are virtually unknown.

In recent years large swathes of high resolution multibeam echo-sounding data (5-10 metre grid cells) from the Baltic Sea and Gulf of Bothnia have been collected for the Swedish Maritime Administration. These data reveal, with unprecedented clarity, glacial landforms associated with the flow and retreat of ice in these basins. Multiple generations of glacial lineations associated with Baltic and Finnish ice streams are resolved, and indicate their shifting geometry and evolving dynamics. Grounding line deposits at a variety of scales allow us to characterise the style and possible rates of retreat. Our data further offer a detailed view of a dynamic subglacial hydrological system on a sediment substrate: its locally varying patterns of incision and sediment deposition, the extent and connectivity of channelised networks, and the intimate relationship between meltwater landforms, ice-marginal deposits and subglacial bedforms. Here we present these data and explore some of their implications for processes of landform creation, large-scale sediment redistribution in the Bothnian and Baltic basins, the coupling between the glacial hydrological system and ice flow/retreat dynamics, and the regional palaeo-ice sheet history.