

The power and changing pattern of palaeo-ice streams of the western Scandinavian Ice Sheet

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Morphological interpretation of the sea floor of the Norwegian continental shelf has identified a series of cross-shelf troughs separated by shallower banks. Glacial lineations are found in these troughs, but are not present on the intervening banks. Along the margins of some of the troughs, lateral ridges are inferred to mark the shear margins of palaeo-ice streams. The streamlined bedforms are similar in morphology and scale to streamlined Antarctic bedforms, which are linked to former fast-flowing ice streams on the continental shelves of Antarctica. Generally, cross-shelf troughs are reused by ice streams from one glaciations to the next, but sometimes major switch in ice-stream flow direction between two glaciations can occur. This can be shown by the use of 3D seismic cubes, where deeply buried surfaces can be found with elongated streamlined landforms interpreted as MSGLs. We have identified one such area on the mid-Norwegian shelf where a palaeo-ice stream has changed ice-flow direction from one glaciations to the next.

Sediment delivery from the ice streams on the mid-Norwegian shelf has led to the build-up of major depocenters along the outer shelf and to large-scale shelf progradation. More than 1000 m of Quaternary sediments have been deposited in large areas around the outer/upper continental slope and the shelf edge has prograded up to 150 km westwards during the Quaternary.