



Glacier fluctuations and sediment architecture in the fjords of western Scotland: evidence from the subsurface.

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Glaciation has been a major factor shaping the marine and terrestrial landscapes of northern Britain over the last 0.5 Ma, carving fjord landscapes in western Scotland and depositing a wealth of geomorphic features on the continental shelf and slope. Fjord systems contain a unique sedimentary record of past ice-sheet activity that allow detailed ice-retreat histories to be reconstructed – which in turn can improve our understanding of ice-sheet dynamics, sea-level change and geological processes. We have acquired and analysed over 130 km of high-resolution 2D seismic (boomer) survey data in addition to over 60 km² of new high-resolution multibeam echosounder data, supported by 20 seabed sediment cores from Loch Broom, a deglaciated fjord in NW Scotland. Using these geophysical datasets we map the detailed seabed geomorphology and subsurface architecture and, in combination with onshore geological investigations, we reconstruct the Late Weichselian glacier fluctuations and sea level history at the end of the last glacial cycle in the fjords of NW Scotland. This multidisciplinary work presents new seismostratigraphic, geomorphological and geological data suggesting that glacier oscillations (advance/retreat behaviour) occurred in Loch Broom during the Lateglacial period (~15-11 ka BP). Ice dynamic behaviour is suggested to be analogous to some modern high-latitude systems, where glaciers enter the fjord systems transverse to the valley axis. Detailed analysis of the subsurface architecture allows factors (i.e. direction of ice advance/retreat) influencing the complex fjord stratigraphy to be constrained. We attempt to resolve the debate surrounding the possible presence of glaciers in this part of Scotland during Greenland Interstadial 1.