



Glacial sediments beneath ice streams: evidence from NW Scotland

T. Bradwell (1), M. Stoker (1), H. Mathers (1,2), A. Finlayson (1), D. Fabel (2)

(1) British Geological Survey, Edinburgh, UK, (2) Department of Geographical and Earth Sciences, University of Glasgow, UK (tbrad@bgs.ac.uk)

The Minch palaeo-ice stream significantly influenced the flow geometry of the NW sector of the last British Ice Sheet and drained over 15,000 km² of its total area. Geomorphological mapping from digital surface models and aerial photographs has identified a strongly convergent flow set of erosional and depositional bedforms in NW Scotland associated with this former ice stream. Numerous large-scale streamlined features – which we term ‘till tails’ – occur in the lee of isolated mountains, such as An Teallach, Stac Pollaidh and Quinag. These highly elongate ice-flow directional features range from 2 to 25 km in length and are generally less than 1 km wide. Field investigations have shown that the sediments within these ‘till tails’ comprise stacked and sheared, highly consolidated, matrix-supported glacial diamicton with strong clast fabrics orientated in the direction of former ice flow. Other sedimentological features within this unit such as striated clasts, stoss-lee clasts, and low-angle shear planes are all consistent with a subglacial origin. This glacial diamict has also been identified offshore in seismic profiles and in seabed sediment cores. We suggest that this characteristic matrix-rich till, where present, was deposited beneath a thick, highly mobile, ice stream and is attributed to differential velocity and subglacial pressure variations in the lee of extremely large bedrock obstacles. Furthermore, we suggest that these subglacial ‘till tails’ may be diagnostic of ice streams or their tributaries flowing through dissected mountainous terrain.