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Geomorphological activity during the Lateglacial in the corrie complex of Ben Hope, NW Highlands, Scotland

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The Lateglacial Period in Europe is characterised by pronounced climatic fluctuations and encompasses the time from Devensian (Weichselian) ice sheet retreat to the beginning of the Holocene. The most notable period in terms of geomorphological activity is the Younger Dryas (12.7-11.5 ka BP), during which an ice cap centred on the main watershed covered c. 350 km2 of the NW Highlands (Lukas and Bradwell, 2009); only one individual corrie glacier existed on an isolated mountain massif (Arkle) to the north of the main watershed in this area during the Younger Dryas (Carr et al., 2009). The study site at Ben Hope, c. 10 km east of the main ice cap, is the most prominent and highest mountain in this area (927 m asl). At this site, Sissons (1977) suggested the presence of small glaciers in the three corries on the eastern side of the mountain, based on the identification of lateral moraines and a series of hummocky moraines.

However, recent mapping of the field evidence by the present authors suggests that the landform assemblages in the corrie might have been misinterpreted from aerial photographs: The undulating ground at the toe of the corrie (A) resembles openwork blocks with a-axes of up to 5 m that are angular to subangular. The corrie headwall contains (B) an elongated accumulation of large blocks (a-axes up to 10 m) between 644 m and 740 m a.s.l. This feature displays a steep front (35-40°) and a central depression that is elongated downslope. Above this feature, a truncated spur displaying antiscarps can be observed (C). The centre of the corrie is occupied by a lochan and two coherent, 15 m-high, blocky ridges that are covered by up to 2 m of peat (D).

The evidence is at present interpreted as (A) undulating rockfall debris, possibly on to former glacier ice which melted during retreat, due to the presence of depressions and lack of spatial order. (B) is interpreted as a tongue-shaped rock glacier, (C) as a localised rockslope failure originating from the NE spur of the corrie rim and (D) is taken to resemble either a larger protalus rampart or the remnants of a protalus lobe (cf. Humlum, 1982). The presence of a rockslope failure and rock glacier, most likely of Younger Dryas age, negates glaciation in this area during the Younger Dryas and contradicts earlier work by Sissons (1977). Relict rock glaciers are an important source of information for regional palaeoenvironmental reconstructions, and in this poster we will present first results of palaeoclimatic reconstructions and implications from the landform assemblages on Ben Hope, using modern analogues.

References

Carr, S.J., Lukas, S., Mills, S.C. 2009. Glacier reconstruction and mass-balance modelling as a geomorphic and palaeoclimatic tool. Manuscript submitted to Earth Surface Processes and Landforms.

Humlum, O. 1982. Rock glacier types on Disko, central west Greenland. Norsk Geografisk Tidsskrift 82, 59-66.

Lukas, S., Bradwell, T. 2009. Reconstruction of a lateglacial (Younger Dryas) mountain ice field in Sutherland, NW Scotland, and its palaeoclimatic implications. Manucscript submitted to Journal of Quaternary Science.

Sissons, J.B., 1977. The Loch Lomond Readvance in the northern mainland of Scotland. In: J. M. Gray and J. J. Lowe (Eds.), Studies in the Scottish Lateglacial environment. Pergamon Press, Oxford, 45-59.