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Patterns of ice retreat and plateau icefield dynamics in the Monadhliath Mountains, Scotland

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In Scotland, events relating to the Last Glacial-Interglacial Transition (LGIT) remain poorly constrained at present, often hindered by variations in the quality and density of research and a lack of suitable dating material. The palaeoglaciological record from this period can provide key evidence for glacier dynamics and their links to climate change, yet at present, the record is still underutilised and much work remains to be undertaken.

The Monadhliath Mountains comprise of a large dissected plateau, which has received very little research attention in the last 100 years. Furthermore, it is traditionally believed that ice masses did not build up in the Monadhliath Mountains during the Younger Dryas due to low precipitation rates, yet recent modelling suggests that the plateau was sufficiently high and wide enough to support glaciation during this time (Golledge et al., 2008), advocating a (re) investigation of this area.

Following extensive and systematic geomorphological mapping in the region, both remotely and during two summer field campaigns, this work suggests the presence of two coalescent plateau icefields, which together covered an area of c. 250 km2 in the Monadhliath Mountains during the Younger Dryas. Landform assemblages within all 31 outlet valleys and on the plateau are used to reconstruct the maximum extent of the Younger Dryas plateau icefield and subsequent patterns of retreat. Basic numerical modelling of ice-surface profiles helps to elucidate the location of nunataks and ice thickness across the plateau at both the maximum extent and throughout the initial phases of deglaciation. Systematic analyses of ice-marginal landforms within outlet valleys of the Younger Dryas Monadhliath Ice Cap reveals that there is a marked contrast between many of them, manifest in the style of final retreat onto the plateau.

Golledge, N.R., Hubbard, A., and Sugden, D.E., 2008. High-resolution numerical simulation of Younger Dyras glaciation in Scotland. Quaternary Science Reviews, 27: 888-904.