Cumberland Geological Society

Cumberland Geological Society visit to Swindale Head, Saturday 2 July 2022
Glacial landforms in Upper Swindale
Leader: Sylvia Woodhead
Meet: 10.30 NY 522143 park in a roadside layby, along the road to Swindale Foot, about 400m past the filter house at the end of Open Access land, where a bridleway goes off.

The route is a medium walk of about 5½m/8k, up to the valley head and Forces Falls, returning on the south eastern side of the valley. From the parking area we will follow the minor road past Swindale Foot, then take a permissive RSPB path in the valley bottom (may be wet), then up to Swindale Head Farm, joining the bridleway south, past The Knott, to the Local Geological Site (7_146) moraines, to Dodd Bottom, Hobgrundle Gill, then up to Forces Falls. We may continue on the steep bridleway up to the col into the upper Mosedale valley, source of an ice cap, returning on a rougher path on the SE side of the valley back to the cars.

Brief description of the Local Geological Site

Swindale Head exhibits a range of glacial features. Upper Swindale is a straight glacial trough, with a former ribbon lake floor, glacially over-steepened sides, and a truncated spur at Gouther Crag, formed in a previous glacial period. The trough end of Swindale Head preserves features from the Younger Dryas, or Loch Lomond Stadial, now dated as 12, 900 to 11,700 years ago, when it was believed that there was an extensive plateau ice cap over the Lake District peaks. A short-lived glacier abraded and shaped a rock outcrop, and left a complex suite of glacial morainic mounds.

Swindale Head preserves features from a time when the Lake District was plunged back into a mini-glacial period which lasted over 1000 years. An ice cap developed on the peaks, and an ice tongue, possibly the most easterly in the Lake District, moved north-eastwards down Swindale. The glacier did not flow very far down the valley, but it did abrade and shape the rock outcrop of The Knott. The melting ice deposited a number of ridges of moraine, whose crest lines indicate an ice flow direction. The ridges mark the extent of this mini Ice Age glacier.

Full description

Swindale Head has a long history of investigations. It is a classic area of glaciological study. The moraines have been known for over 100 years. It was first mapped by G Manley 1959, later by W. Pennington in 1978. The former presence of a Loch Lomond Stadial (LLS) glacier was identified by the hummocky end moraines at the valley head by Sissons 1980, who considered that 64 such glaciers had existed in the Lake District. In 1998 R. Clark & P. Wilson made a detailed description of the moraines, and concluded that LLS glaciers were more widespread than envisaged by Sissons. The moraines were mapped by McDougall in 2013 and a plateau icefield above Swindale was identified by Bickerdike et al in 2016 & 2018. The valley continues be the subject of research.

A 5½ mile walk round the head of Swindale shows a varied suite of glacial landforms, which together provide evidence for a short lived glacier around 11,000 years ago. The corrie backwall is complex, with arcuate high cliffs, and 3 streams flowing in from a higher corrie above. The waterfall in Hobgrumble Gill forms a hanging valley, with Dodd Bottom corrie basin at its foot.

A suite of morainic ridges, mounds and valley side debris shows a similar complexity to the Black Sail moraines in Ennerdale, which are considered to be the most complex in England. 5-6 groups of moraine can be identified. From above they appear plastered with glacial drift. When seen from below many are rock-cored. A small section eroded by the Swindale Beck into the base of a morainic mound shows a wide diversity of size of fragments, some half-metre boulders, most angular, a couple rounded, set in a relatively fine matrix of small angular pebbles. No sorting is evident. It is probably moraine, though the rounded boulders may reflect meltwater steams and the finer matrix may be a solifluction deposit. The valley head also includes The Knott, a glacially scoured rock outcrop, a large complex roche moutonnée, clearly ice smoothed on its up-ice side, and showing a plucked NE face. The variety of morainic ridges suggests a complex environment at the end of the Loch Lomond Stadial: now considered to have existed 12, 900 to 11,700 (Bickerdike 2018). The variety and complexity of the morainic mounds merits further study.

The Mosedale Beck enters the Swindale valley, at right angles, from the east, via the spectacular Forces Falls, which appear to be structurally determined; fault possibly or just joint guided. The marked right angle bend in the Swindale Beck among the moraines is an interesting feature. Above the falls, the Mosedale valley is now believed to be the site of a former extensive plateau ice cap, mapped by Bickerdike et al, 2016, as covering over 91 sq km.

Returning on the east side of the valley, the path at first crosses ice-scoured rocks. Deposits of lateral moraine plastered on the hillside create steep, smooth, bracken covered slopes, with some erratic blocks dropped by the ice. Further down the valley there are a series of large blocks which have fallen from the glacially oversteepened sides, especially at Gouther Crag, a climbing crag. There are good views of The Knott in the middle of the valley.

References

Bickerdike H.L., Evans D.J.A. et al 2018 Glacial landsystems , retreat dynamic & controls on Loch Lomond Stadial (Younger Dryas) glaciation in Britain *Boreas*

Bickerdike, H.L. and Evans, D.J.A. and Stokes, C.R. and O Cofaigh, C. (2018) 'The glacial geomorphology of the Loch Lomond (Younger Dryas) Stadial in Britain : a review.', *Journal of quaternary science*., 33 (1). pp. 1-54.

Mc Dougall DA 2013 Glacial style & the geomorphological record: evidence for Younger Dryas Stadial plateau icefields in the eastern Lake District *Quaternary Science Review* 73, 48-58

Wilson, P. and Clark R. 1998 Characteristics and implications of some Loch Lomond Stadial moraine ridges and later landforms, eastern Lake District, northern England *Geological Journal* 33, 73-87

Swindale moraines as mapped by P. Wilson & R. Clark in 1998, Geol. Journal

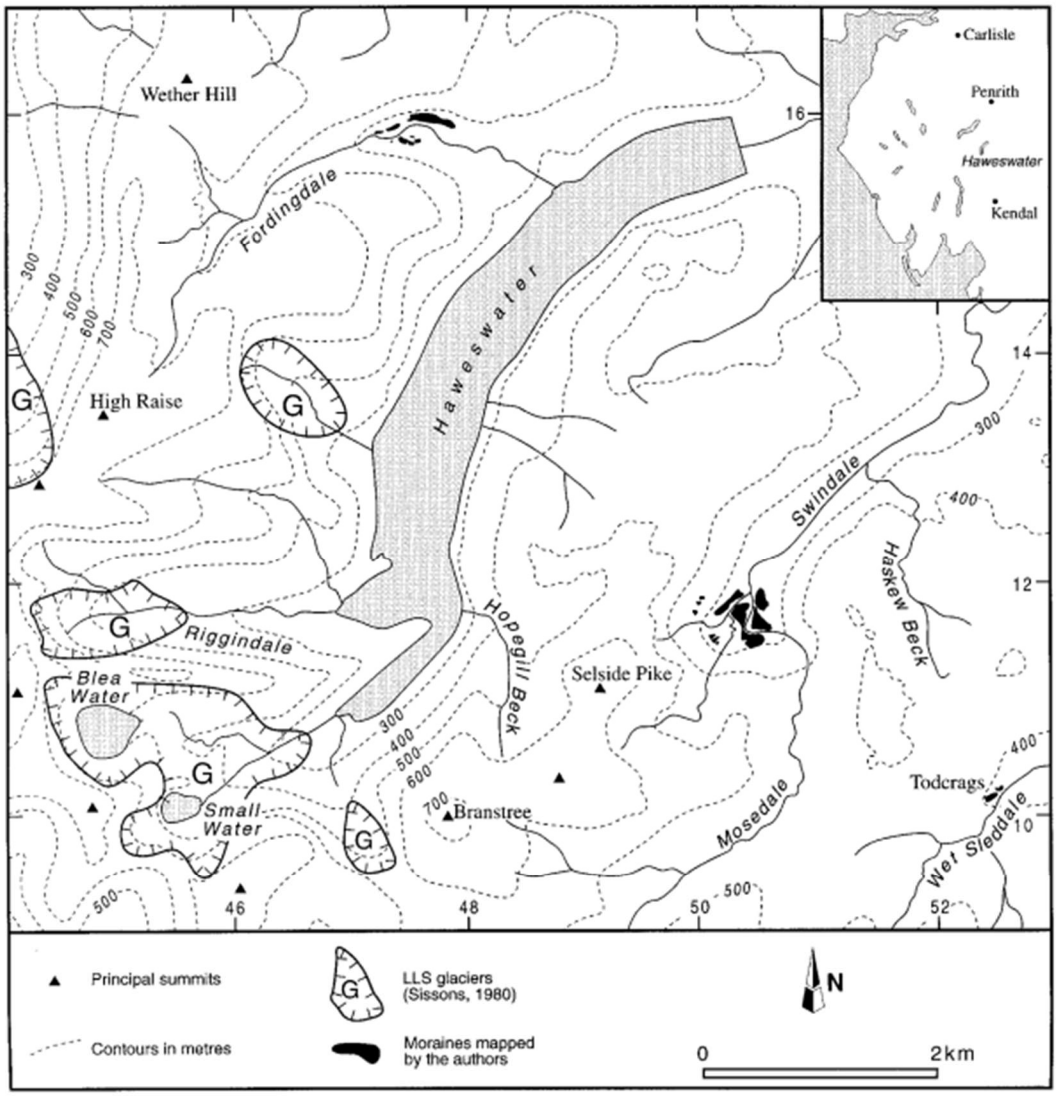


Figure 1. The Haweswater catchment and neighbouring valleys. National Grid co-ordinates (Grid Letters NY) are given at 2 km intervals along the southern and eastern margins. Inset shows Lake District location of Haweswater

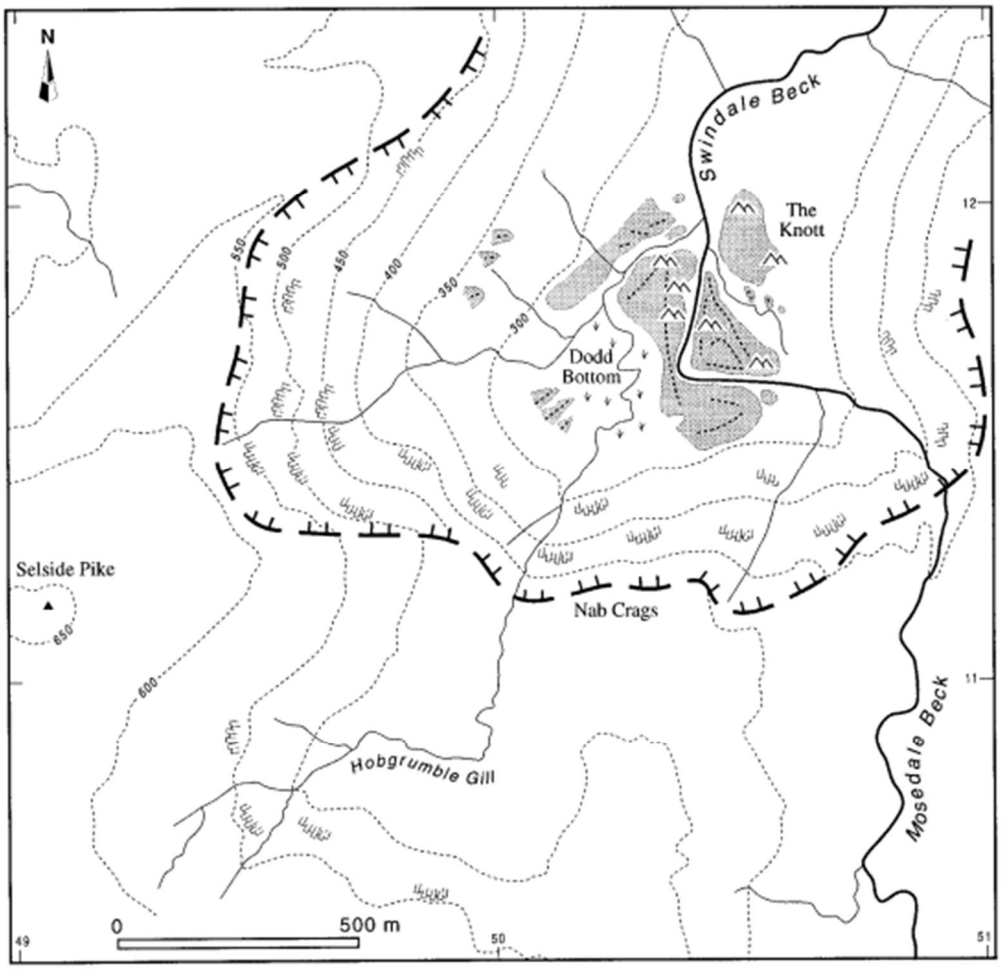
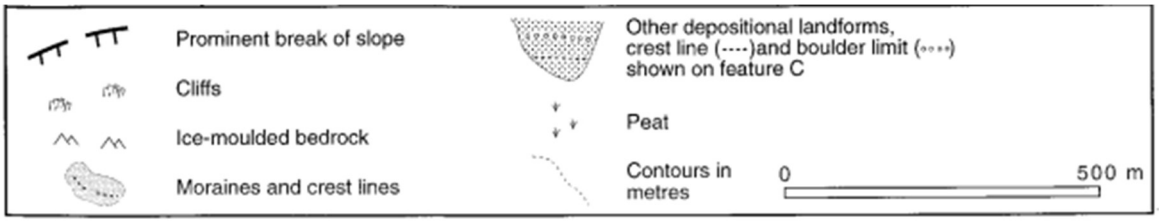
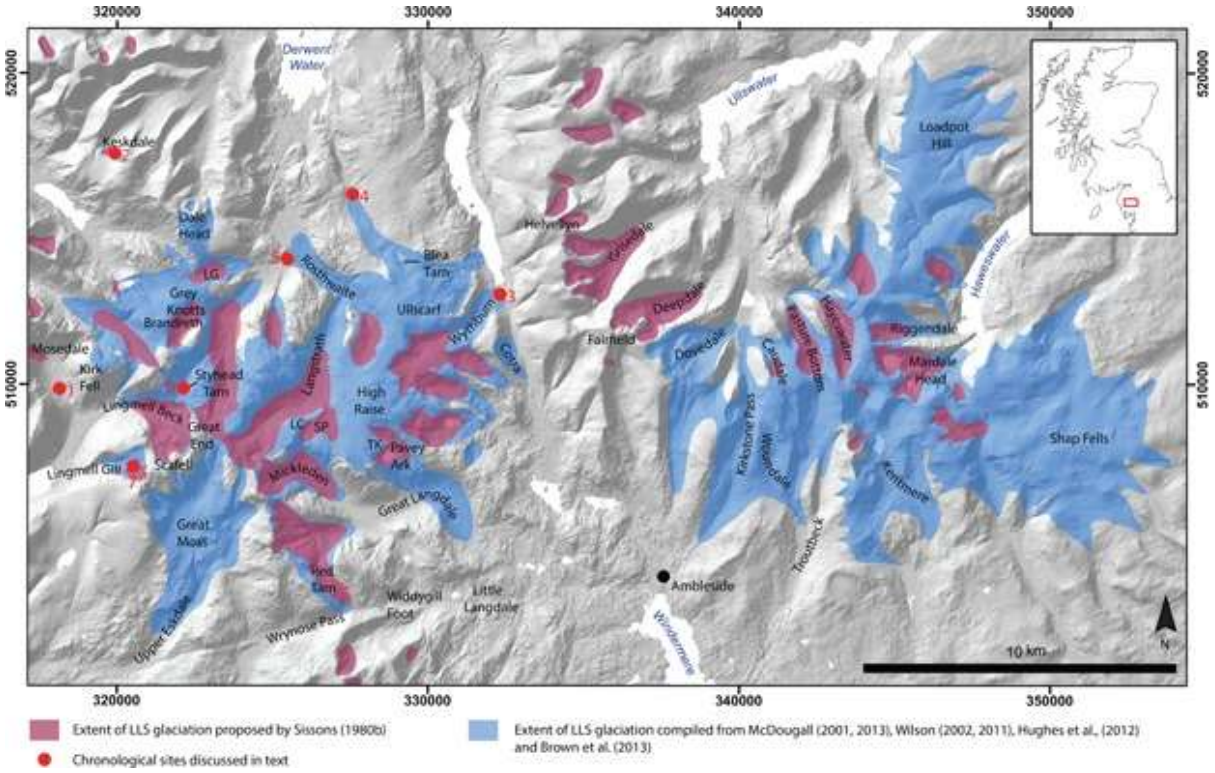


Figure 6. Moraine ridges at Dodd Bottom, Swindale. Symbols as for Figure 2





Bickerdike et al 2018, *Journal of Quaternary Science* Fig 22

Mapping by McDougall 2001 shows a plateau icefield (labelled Shap Fells) with a cirque glacier extending north eastwards into upper Swindale