Wasdale, Cumbria

[NY 16 07], [NY 17 07], [NY 18 06]–[NY 18 18], [NY 19 07]–[NY 19 09], [NY 20 07]–[NY 20 09], [NY 21 07]–[NY 21 09]

Potential GCR site

Highlights

This site comprises a steep mountain catchment issuing into Wastwater, with a rich variety of post-glacial erosional and depositional landforms (Figure 4.4) and (Figure 4.5).

Introduction

The Lake District was intensively glaciated during the Devensian glaciation by ice-cap and then by valley glaciation, creating the classic glaciated mountain topography of the Wasdale Valley. These glaciers had probably melted by *c.* 13 000 BP, but small glaciers formed at the Head of Wasdale and Lingmell Valleys during the Loch Lomond stadial (Sissons, 1980). The freshly deglaciated, steep mountain forms have been dissected by an active fluvial system during the Holocene. This site includes a rich variety of mountain fluvial forms, including erosional bedrock channels of Piers Gill and Gable Beck. Also included are the gullies and scars on Lingmell. Depositional forms include debris cones, braided channels, alluvial fans and fan deltas.

Despite their obvious interest and their dynamic character, there have been no serious recent studies of either the Holocene geomorphic sequence or the contemporary process system. A short summary is provided by Boardman (1988).

Description

The fluvial features include erosional forms at the valley heads, the steep headwater ravine of Piers Gill, the waterfall- and gorge-dominated bedrock channel of Gable Beck, and the hillslope gullies and scars on Lingmell in the catchment of Lingmell Gill. Further downstream, depositional features dominate, a bouldery braided channel on Lingmell Back below Piers Gill, a small debris cone where Gable Beck joins Lingmell Beck, an extensive former braid-plain and a more restricted modern braided channel along Wasdale, and a large delta where Mosedale and Lingmell Becks empty into the head of Wastwater. This adjoins the steep fan delta of Lingmell Gill. There are also two small fan deltas on the north shore of the lake at Netherbeck and Overbeck. These fan deltas each include a subaqueous portion and a subaerial alluvial fan portion.

Interpretation

Although there has been little work on the Holocene geomorphic sequence, the Holocene regional vegetation sequence is well-known (e.g. Oldfield, 1963; Pennington, 1970; Gale, 1985) and inferences about erosional history can be made from lake diatom sequences (e.g. Haworth and Allen, 1982). Both types of evidence suggest a relatively stable Early Holocene following an unstable Late Pleistocene, but increasing erosion rates in the later Holocene. No studies relate these sequences directly to land-form development. The modern active fluvial features are of late Holocene age, but the fan deltas have probably been developing throughout the late Pleistocene and the Holocene. Apart from an early study of the Lake District deltas by Hay (1926), there have been no detailed studies of their sedimentology, stratigraphy or morphometry.

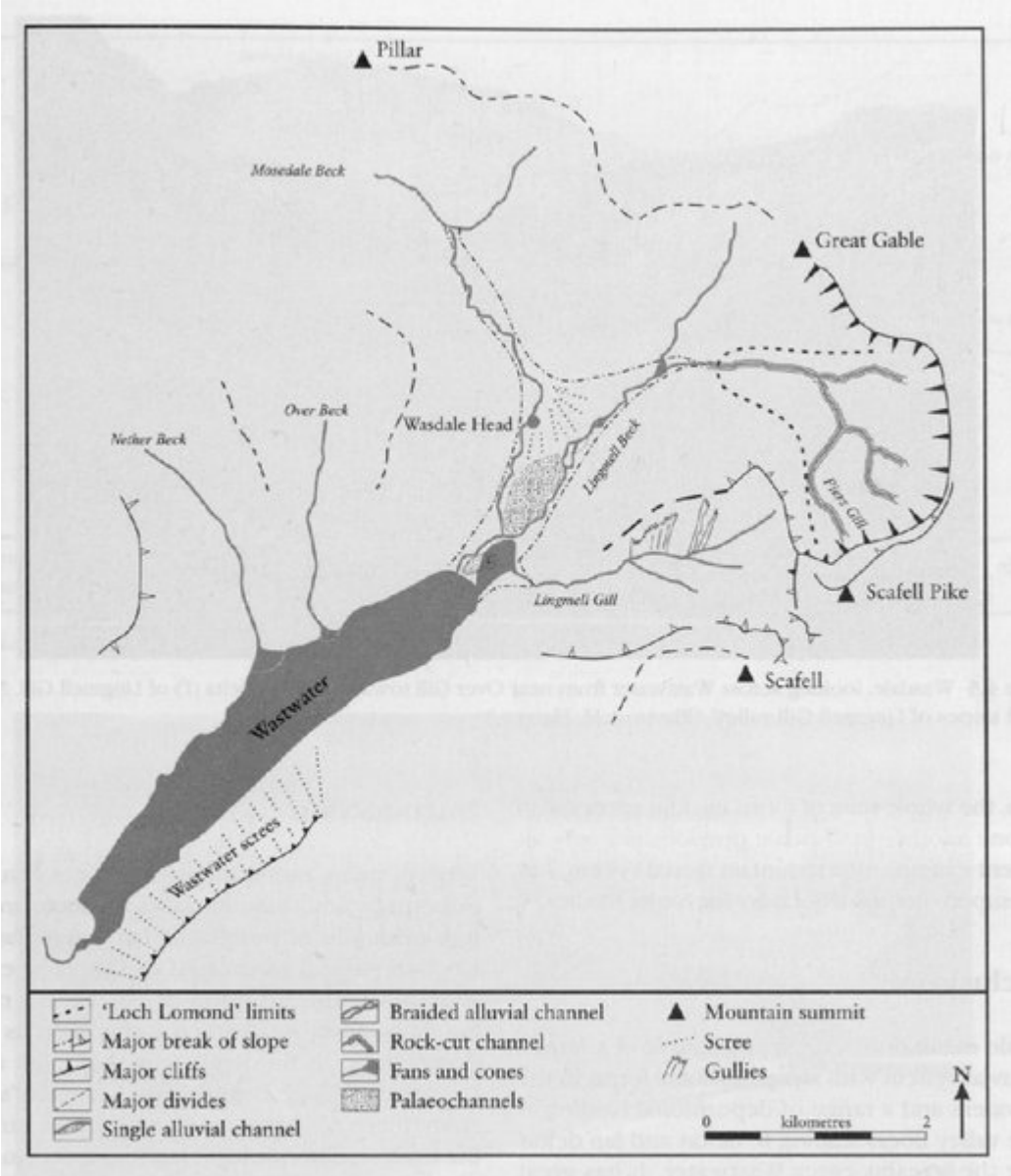
Wasdale includes an excellent suite of mountain fluvial landforms, and despite the lack of recent work on the fluvial landforms has the potential to provide evidence to link lake sediment studies directly with erosional and depositional landform development. Although individual landform types may be better developed in other Lake District valleys, the

whole suite of forms in close relationship with one another in Wasdale provides not only an excellent example of a mountain fluvial system, but also a superb natural laboratory for future studies.

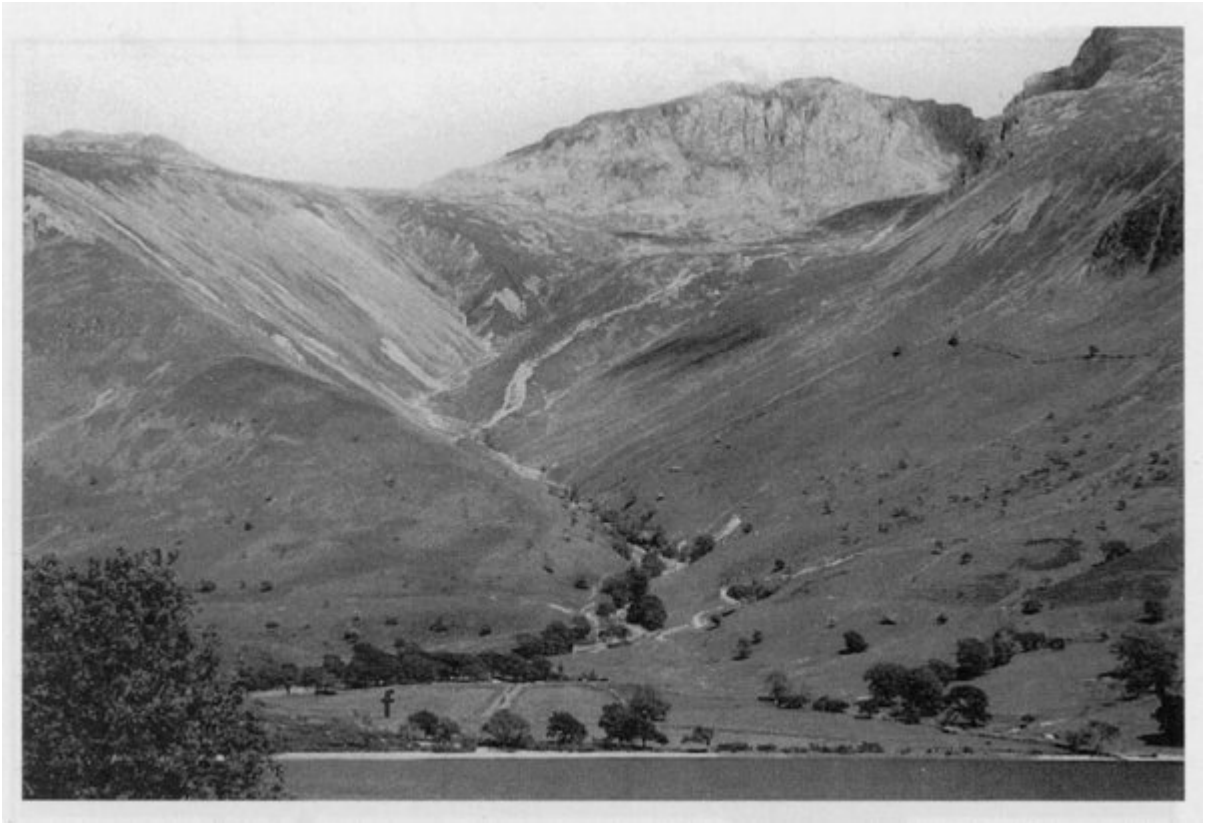
Conclusions

Wasdale exhibits an excellent example of a mountain fluvial system with steep erosional forms in the headwaters and a range of depositional landforms on the valley floors leading to deltas and fan deltas where the streams enter Wastwater. It has great potential for the study of mountain fluvial systems but also contains in its sediments a record, so far unexplored, of the Late Pleistocene and Holocene geomorphic sequence.

References



(Figure 4.4) Wasdale: a geomorphological map.



(Figure 4.5) Wasdale, looking across Wastwater from near Over Gill towards the fan delta (f) of Lingmell Gill. Note the gullied slopes of Lingmell Gill valley. (Photo: A.M. Harvey.)