Battery (Castle Down), Tresco

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Highlights

This site contains the finest exposure on Scilly of Late Devensian meltwater sediments. Head deposits interbedded with the meltwater sediments demonstrate that solifluction was active on the slopes of the meltwater channels. Rounded granite tors on Castle Down have been interpreted as the products of glacial erosion.

Introduction

Pebbles of probable glacial derivation on the northern Isles of Scilly (Figure 8.1) have been known since the middle of the last century. Smith (1858) was the first to record these erratics, or 'foreign pebbles', making a collection of chalk-flints and greensand from Castle Down, Tresco. In reporting their occurrence to the Royal Geological Society of Cornwall he commented that 'The flints and greenstones varied little in size ranging from that of a hen's egg to that of a blackbird — How they got to Scilly was a mystery which it was for gentlemen of more scientific knowledge than he professed to explain' (Bishop, 1967; p. 91). Such a gentleman proved to be Whitley (1882), who interpreted these foreign stones as glacial in origin.

More recently, Scourse (1991) described an important site of interbedded glaciofluvial and solifluction sediments from an embayment on the north-eastern side of Castle Down known as the Battery section.

Description

Castle Down is an expanse of undulating heath moorland forming the northern part of Tresco. Small eroded granite tors, locally called 'cams', in and around the moor rise to *c.* 40–45 m OD, and the coastal fringe of the moorland consists of granite headlands and small exposures of Pleistocene sediments in cliffs backing embayments and coves. The northern part of Castle Down lies to the north of the glacial limit identified across the northern islands by Mitchell and Orme (1967) and Scourse (1991) (Figure 8.1). The tors in this area are of the 'smoothed', 'rounded' or 'eroded' form (form D; (Figure 8.6)) defined by Scourse (1987), and contrast markedly with the elaborate 'castellated' or 'mam-inflated' forms found to the south of the proposed ice limit and typified by those at Peninnis Head (see above). Scourse (1987) regards this rounded form as the product of direct glacial erosion.

Erratics similar to those described by Smith (1858) are still abundant on Castle Down. They can be observed in small patches on the ground surface where the heath is being eroded. The stratigraphical context of the erratics, and the associated glaciofluvial and solifluction sediments, are exceptionally well exposed in the Battery section [SV 887 165] which backs the small embayment on the north-eastern side of Castle Down immediately to the south of Piper's Hole. At the extreme northern end of this section a 5.8 m-thick complex of sandy gravels and head deposits is exposed (Figure 8.12). In all, nine sedimentary units have been identified in this section, units 1, 3, 5 and 7 comprising coarse granitic head, and units 2, 4, 6 and 8 sandy gravels. All the contacts in the centre of this section are erosional. The sandy gravels, especially units 6 and 8, occur as channel-fills with very coarse, clast-supported basal lags, and they fine and become matrix-supported upwards. The head units form lobate rather than channelized bodies, most being continuous with the more massive bodies of head on either side of the section. Unit 7, however, is a lens entirely enclosed by gravel units 6 and 8 (Figure 8.12). The sequence is capped by unit 9, a moderately well-sorted sandy silt containing an erratic clast assemblage similar to that in the underlying sandy gravels.

The head units are extremely poorly sorted and contrast with the well-sorted sandy gravels. However, the gravels are even more distinctive in containing a rich and diverse erratic assemblage that is strikingly similar to that obtained from the stratotype of the Scilly Till at Bread and Cheese Cove (Scourse, 1991). Unit 6 has also yielded a clast of green Miocene

glauconitic micrite, a distinctive lithology which occurs in the Scilly Till and which is thought to be derived from the offshore Jones Formation (Pantin and Evans, 1984; Scourse, 1991). The head units contain more clasts than the sandy gravels.

Interpretation

The head units within the Battery section are interpreted as solifluction deposits comprising material derived largely from the breakdown of the local granite, whereas the gravels are interpreted as glaciofluvial outwash material. The erratic assemblage and stratigraphic context of these gravels suggest that they were deposited during the same (Late Devensian) glacial event responsible for the Scilly Till (Scourse, 1985a, 1987, 1991).

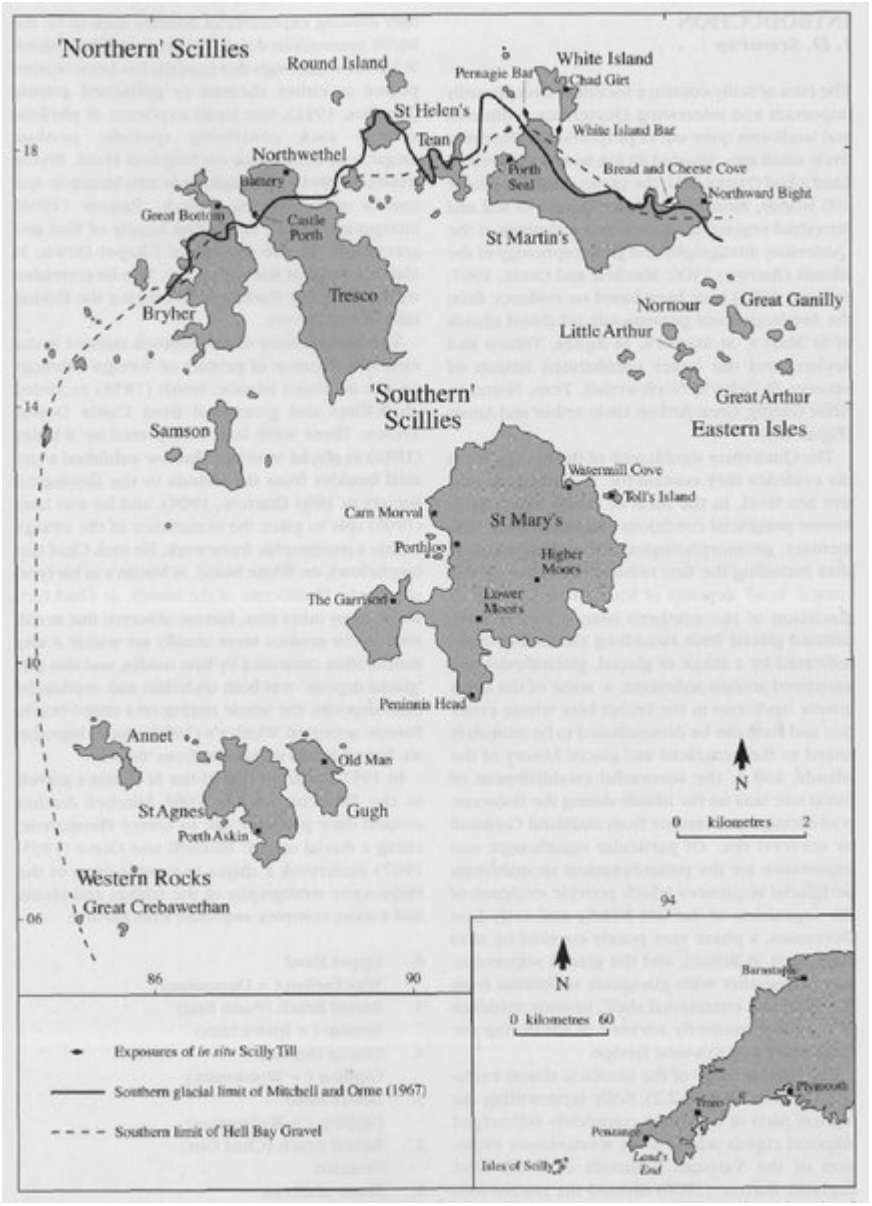
The sequence demonstrates that solifluction occurred penecontemporaneously with pulses of glaciofluvial deposition. The outwash palaeocurrent is estimated to have been in an easterly direction on the basis of the bed geometry, with solifluction lobes flowing normal to this from the south and north. Head unit 7, however, represents a solifluction lobe moving downslope parallel with the dominant outwash direction; it is perhaps significant that this particular head unit contains a relatively high sand content, for this sand must have been incorporated from the underlying gravel during longitudinal movement down-channel. Solifluction lobes crossing the channels transversely had less opportunity to rework underlying material. At the base of the sequence, solifluction was clearly the dominant process, but gradually the solifluction lobes were overwhelmed by outwash activity.

The sandy gravels at this site were selected by Scourse (1991) as the composite stratotype for the Tregarthen Gravel (Figure 8.3); he assigns the head units to the Bread and Cheese Breccia, and the uppermost pebbly silt to the Hell Bay Gravel members of his lithostratigraphic classification.

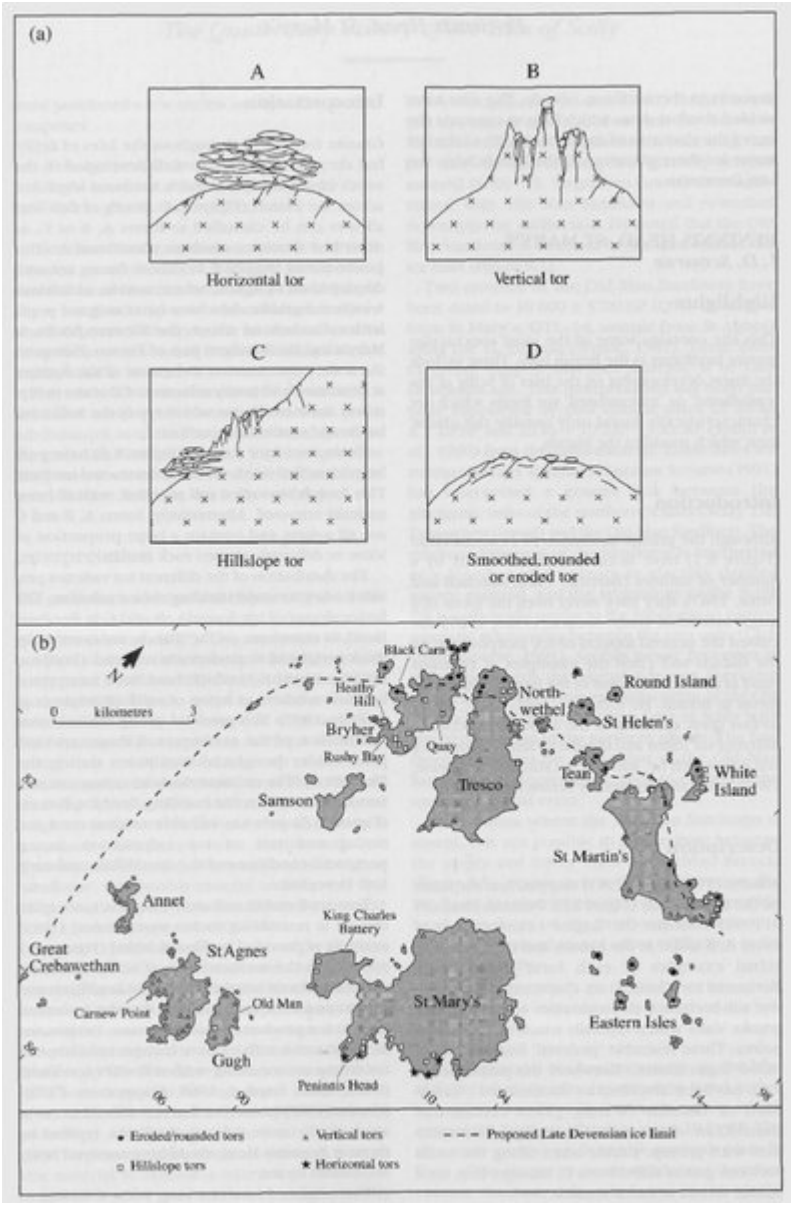
Conclusion

This site shows the best evidence on Scilly for the meltwater activity associated with the advance of a glacier to the northern islands at about 19 ka BP. Granite tors on Castle Down were eroded and smoothed by this glacial advance, and the Battery section demonstrates that the relatively rapid downslope movement of materials (solifluction), a common feature of Arctic environments, occurred at the same time as the meltwater deposits were accumulating. Castle Down is also of historical importance because pebbles transported to Scilly by glacier ice were first discovered here during the middle of the last century.

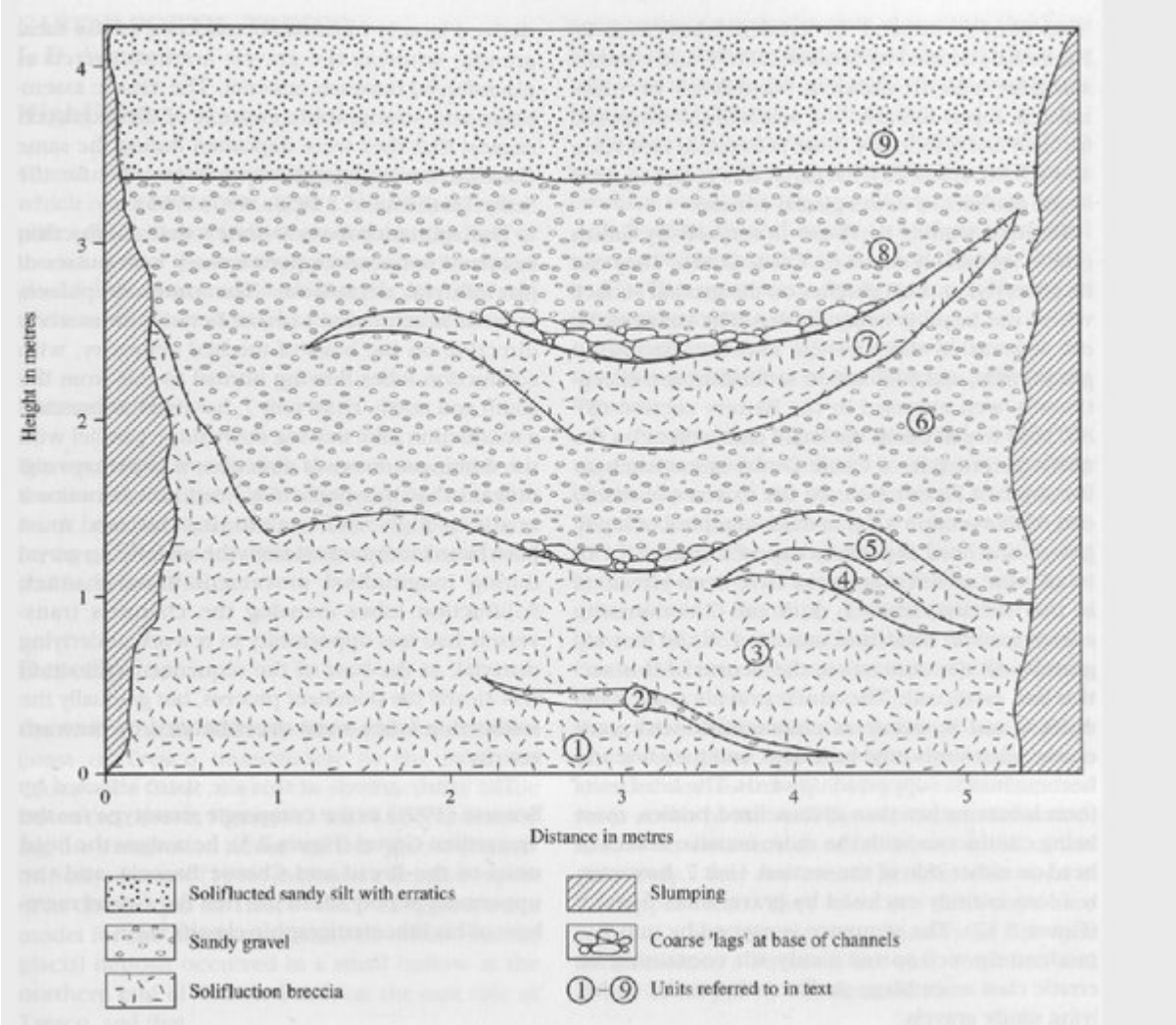
References



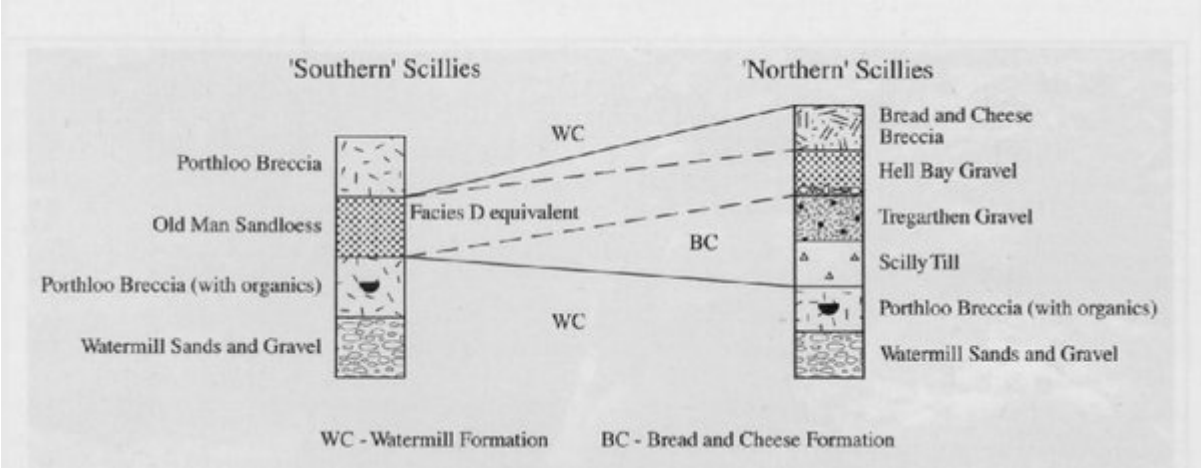
(Figure 8.1) The Isles of Scilly: critical sites, exposures of the Scilly Till, the southern limit of the Hell Bay Gravel and Mitchell and Orme's (1967) glacial limit. (Adapted from Scourse, 1991.)



(Figure 8.6) (a) Variations in tor morphology. (b) Their distribution across the Isles of Scilly. (Adapted from Scourse 1986.)



(Figure 8.12) The Pleistocene Sequence at the Battery section. (Adapted from Scourse, 1986.)



(Figure 8.3) A lithostratigraphic model for the Isles of Scilly. (Adapted from Scourse, 1991.)