Cheviot Tors

[NT 956 215]–[NT 967 220]–[NT 943 180]

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Introduction

The Cheviot Hills are a large expanse of mountainous land on the English–Scottish border that support a wide range of glacial, pre-glacial and periglacial landforms, including tors, slope deposits, meltwater channels, and evidence for deep weathering. The Cheviot Tors site includes the tors at Long Crags [NT 956 215], Langlee Crags [NT 967 220] and Great Standrop [NT 943 180] (Figure 7.18). The Cheviot tors, together with the surrounding landforms and sediments provide a detailed picture of landscape evolution in the area. One of the defining characteristics of the geomorphology of the Cheviot Hills is a landform and sediment association comprising tors on interfluves and hillsides, above smoothed valley-bottom slopes that are underlain by mass-wasting deposits of Quaternary age. The tors and slope deposits of the Cheviot Hills are important elements of the landscape because of the information they provide regarding the pattern of Devensian glaciation and deglaciation in the region and the impact of the return to cold conditions during the Younger Dryas.

Descriptions of Quaternary events in the Cheviot Hills are numerous. The tors have featured in a debate concerning the extent to which the Cheviot Hills supported an independent ice cap and the extent to which the mountains were inundated by external ice derived from ice centres farther to the west. Geikie (1876), Clough (1888), Smythe (1912), Raistrick (1931b), Carruthers *et al.* (1932), Common (1954), Sissons (1964), Clark (1970, 1971) and Clapperton (1970, 1971a) have all contributed to this longstanding debate concerning the nature of glacial events in the area. The Cheviot massif also supports an excellent variety of glacial meltwater phenomena, descriptions of which are provided by Kendall and Muff (1903), Common (1953, 1957), Derbyshire (1961) and Clapperton (1966, 1968, 1971a, b), as well as a range of drift deposits comprising material derived from weathered granite. Douglas and Harrison (1985) and Harrison (1994, 1996) have described these deposits in sections at Linhope and Leech Burn. Finally, Clapperton (1967) and Awujoola (1987) have described the nature of the deep weathering on the granite bedrock.

Description

The Cheviot Hills form the southern limb of a 650 km^2 belt of high ground that girdles the Tweed drainage basin. The main body of the massif consists of a chain of broad summits aligned in a generally south-west to north-east direction. The solid geology of the Cheviot Hills is formed by an almost circular expanse of andesitic lava of Devonian age, into which is intruded a body of pink augite-granite. The granite core now forms the twin summits of the Cheviot Hills at 716 and 815 m OD. The mountains support evidence of both deep weathering and tor formation, with patches of weathered bedrock on the higher slopes and well-developed tors at various levels between 395 and 660 m OD (Clapperton, 1970). Two of the most impressive of these features are the tors at Standrop (525 to 530 m OD). A number of other tors and bedrock outcrops are found on the hillsides and hilltops overlooking the Harthope Valley. The largest of these (up to 10 m in height) are the andesitic Langlee tors that are developed on the granite–andesite boundary. The Langlee tors in particular show the effects of frost-shattering on tor morphology. The tors are angular in shape, although the products of such weathering are not immediately apparent downslope of the outcrops and clitter generally is absent. Deep weathering of the granite bedrock is extensive and can be seen to underlie glacial till in several places in the Cheviot range (Clapperton, 1967; Awujoola, 1987).

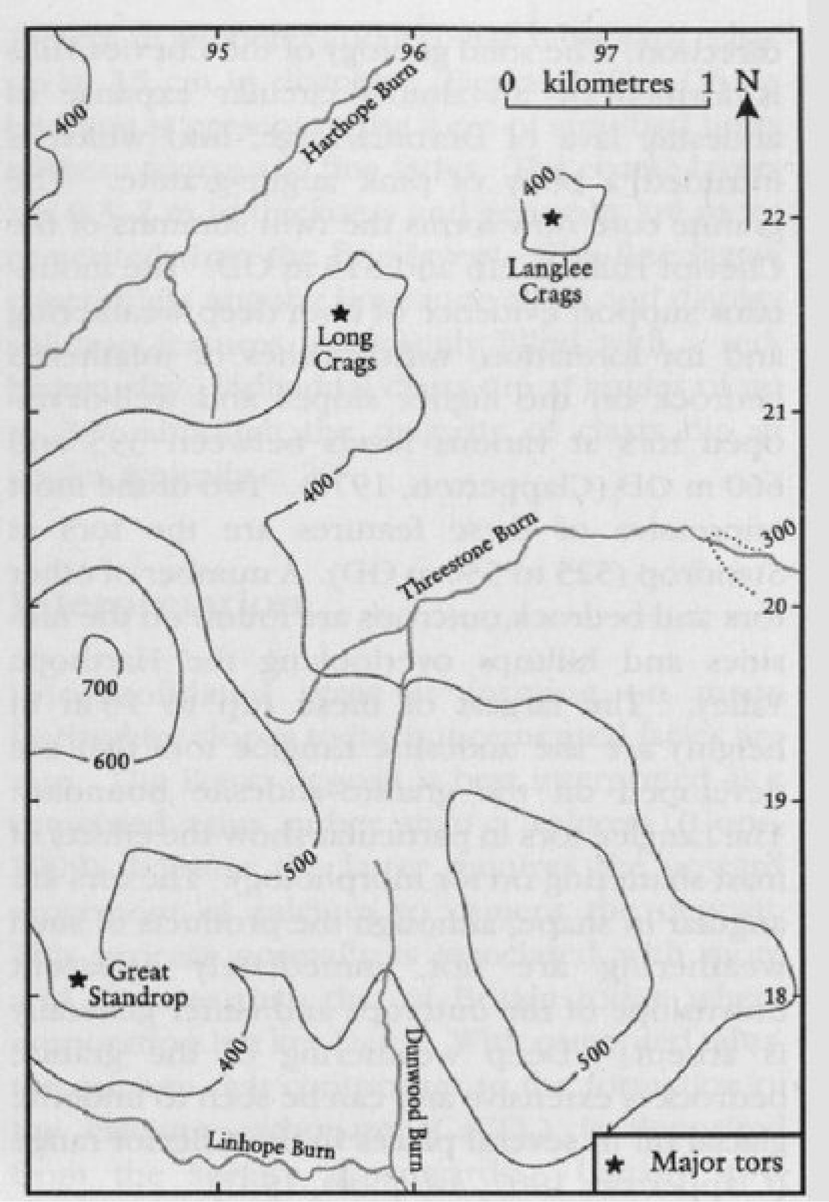
Interpretation

The Cheviot tors demonstrate exceptional preservation of tors on the higher summits of the mountains. Linton (1955) argued that tors were unlikely to survive in areas covered by glacier ice because the passage of the ice would remove such features. Clapperton (1970) maintained that the Cheviot tors should not be taken as indicators of an unglaciated area and suggested that such features could survive beneath a relatively thin and slow-flowing local ice cap. Indeed, Clapperton (1970) further argued that had the tors been exposed to severe periglacial conditions in ice-free enclaves surrounded by glacier ice, then their complete removal by mass wasting processes might be expected. Such an interpretation fits well with the geomorphological evidence for the preservation of pre-glacial landscape elements beneath glacier ice in other upland areas of Great Britain, such as the Cairngorms (Sugden, 1968; Gordon, 1993; Ballantyne, 1994). Here the preservation of tors and related phenomena has been linked to the basal thermal regime of the last ice sheet, which was warm-based and erosive in valleys but cold-based and protective over summits (Glasser, 1995). Indeed, the widespread preservation of pre-glacial landscape elements has now been identified beneath cold-based sectors of both the Laurentide ice sheet (Dyke, 1993; Kleman *et al.,* 1994) and the Scandinavian ice sheet (Kiernan, 1992, 1994; Kleman *et al.,* 1992; Kleman and Borgström, 1994).

Conclusions

In England, the Cheviot Hills contain an unrivalled range of glacial, pre-glacial and periglacial landforms. The landform and sediment assemblage in the mountains includes tors, glacial deposits, reworked glacial deposits, meltwater channels, and evidence for deep weathering. The long-standing controversy over the vertical and lateral extent of glaciation in the area is important for our understanding of the dynamics and thermal regime of the last ice sheet in this area. The Standrop and Langlee tors and the associated slope deposits at Linhope and Leech Burn provide important information about the sequence and nature of geomorphological events in the Cheviot Hills following glaciation.

References



(Figure 7.18) The location of Long Crags, Langlee Crags and Great Standrop. Numbers around margins refer to the UK National Grid.