Western Hills of Rum

C.K. Ballantyne

Highlights

This upland site is important for an assemblage of periglacial landforms developed on different rock types in an exposed maritime environment and includes both active and fossil features.

Introduction

The Western Red Hills of Rum, Sròn an t-Saighdeir [NM 323 989], Orval [NM 334 991] and Ard Nev [NM 346 986], do not exceed 571 m OD in altitude and occupy an area of only 5 km^2. However, they contain a remarkable assemblage of periglacial landforms, including some of the few examples of large-scale patterned ground known on Scottish mountains (Clark, 1962; Godard, 1965; Ryder, 1968, 1975; Ryder and McCann, 1971; Ballantyne and Wain-Hobson, 1980; Ballantyne, 1984). As the Late Devensian ice-sheet apparently overrode these hills (Harker, 1908; Charlesworth, 1956; Clark, 1962; Peacock, 1976), all of the features present post-date its downwastage, and the formation of large-scale periglacial forms can be attributed to the operation of periglacial processes during ice-sheet decay or the Loch Lomond Stadial. During the latter, two small glaciers occupied corries on the north side of these hills (Peacock, 1976; Ballantyne and Wain-Hobson, 1980). Small-scale periglacial forms including sorted stripes and circles are active at present.

Description

The Western Hills are underlain by acid igneous rocks and basalts and have broad, rounded outlines. Lithology has been of paramount importance in determining the nature of the frost-weathered regolith on the high ground. The microgranite of Sròn an t-Saighdeir has yielded the openwork, clast-supported, 'Type 1' regolith of Ballantyne (1981, 1984), whereas the basalt of Orval and, to some extent, the granophyre of Ard Nev have weathered to produce matrix-supported, 'Type 3' regolith. This latter type has a sufficient proportion of silt and fine sand to make the detritus frost-susceptible, so that periglacial features dependent upon ice-segregation for their formation occur on the last two hills.

Relict periglacial features are best represented on the Type 1 regolith of Sròn an t-Saighdeir, which is almost entirely covered by an openwork blockfield of large angular boulders (Figure 11.8). The blockslopes that surround the summit are partly vegetation-covered; they descend westwards to an altitude of only 270 m OD, where they terminate at sea cliffs. The lack of bedrock outcrops testifies to the susceptibility of the well-jointed microgranite to large-scale frost wedging, as does the remarkable cover of frost-shattered rocks in the corrie north of Sròn an t-Saighdeir. Former solifuction on these slopes has resulted in the formation of terraces and lobes of large boulders (Ballantyne and Wain-Hobson, 1980). On the summit plateau the blockfield detritus has been frost-sorted into circles 2–3 m in diameter and, on gentle slopes, into stripes of similar width. Sorted features of this size are generally regarded as indicative of permafrost conditions (Williams, 1975; Goldthwait, 1976).

The basalt and granophyre regoliths on Orval and Ard Nev support a completely different suite of periglacial features. On these hills, frost weathering has produced fine as well as coarse material and, where wind has stripped the vegetation cover, active sorted circles and polygons up to 0.5 m in diameter have developed under present conditions (Figure 11.8) (Ryder, 1975; Ballantyne and Wain-Hobson, 1980). Active sorted stripes 0.2 m in width are found on nearby slopes. Although the boulder sheets and lobes that occupy the gentler slopes around these hills are apparently inactive, the presence of 'ploughing' boulders (Figure 11.8) indicates that limited solifuction is still taking place.

Interpretation

There is a notable contrast between the debris-mantled slopes and blockslopes that fringe much of the Western Hills and the bedrock slopes partly covered by active talus within the limits of the two Loch Lomond Readvance glaciers in the corries on the northern face of Sròn an t-Saighdeir (Ballantyne and Wain-Hobson, 1980). This implies that the production of almost all of the frost-weathered debris pre-dates the Holocene. It is possible that much of the debris was formed during the decay of the Late Devensian ice-sheet, as the Rum hills may have been deglaciated at a time when the climate was still severe (see Sissons, 1983c; Sutherland, 1984a). However, the final morphology of the relict periglacial features developed on such debris probably reflects cryogenic activity during the Loch Lomond Stadial (Sissons, 1976b, 1983b).

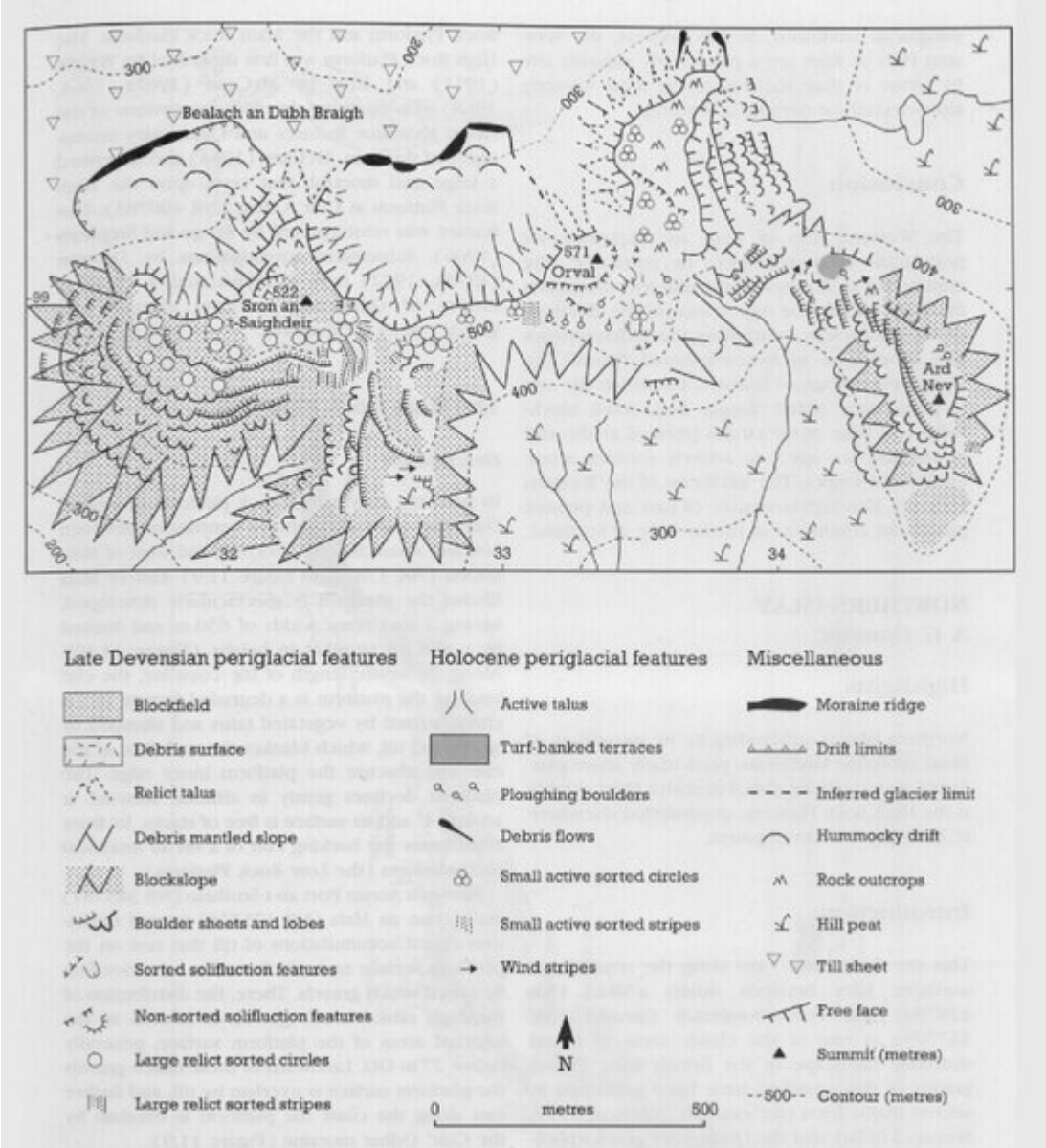
Kotarba (1984) has also noted that major slope processes have been relatively inactive during the Holocene and that slow mass movements have been dominant on the slopes of the western Rum hills. According to Kotarba (1987) this contrasts with the situation in the Cairngorms, where high-magnitude processes have been more common.

The Western Hills of Rum support one of the most varied assemblages of fossil and active periglacial features of any Scottish mountain. The types of landforms occur at apparently low altitudes by comparison with similar features on the mountains on the mainland (see An Teallach, Ben Wyvis and the Cairngorms) but, as Ballantyne (1984, 1987a) has demonstrated, this is part of a general pattern in the decline in altitude westwards of periglacial features across the Scottish Highlands and Islands. The reasons for such a decline relate to both past and present climatic variation and the limits of former glaciers, and emphasize the role of a network of national sites in understanding the genesis of periglacial landforms. In this context, the Western Hills of Rum are a particularly valuable site by virtue of their location as the most westerly site selected for periglacial features.

Conclusion

The Western Hills of Rum are important for periglacial geomorphology. In particular, the contrasting rock types on the different mountains illustrate clearly the importance of the lithology of the bedrock in controlling the characteristics and appearance of frost-weathered debris. The varied assemblage of features, for which the site is particularly noted, ranges from fossil block-fields and large stone circles (formed at the end of the last ice age), to actively forming stone circles and stripes. The landforms of the Western Hills are also representative of past and present periglacial conditions in the far west of Scotland.

References



(Figure 11.8) Periglacial features on the Western Hills of Rum (from Ballantyne, 1984).