

South-west Eigg

OS Grid Reference: NM442876

Highlights

The Sgurr of Eigg pitchstone lava flow dominates the site. The flow fills a valley system, floored with fluvial sediments, which was carved into Tertiary basaltic lavas. The pitchstone is one of the youngest igneous rocks in the British Tertiary Volcanic Province.

Introduction

The south-western part of Eigg lying between Rubha an Fhasaidh and An Sgurr provides good exposure through a Tertiary lava succession (Fig. 3.15). The site is dominated by the unique columnar pitchstone outcrop forming the Sgurr (Fig. 3.16) and also demonstrates intercalated sediments in the lava pile, together with both acid and basic minor intrusions.

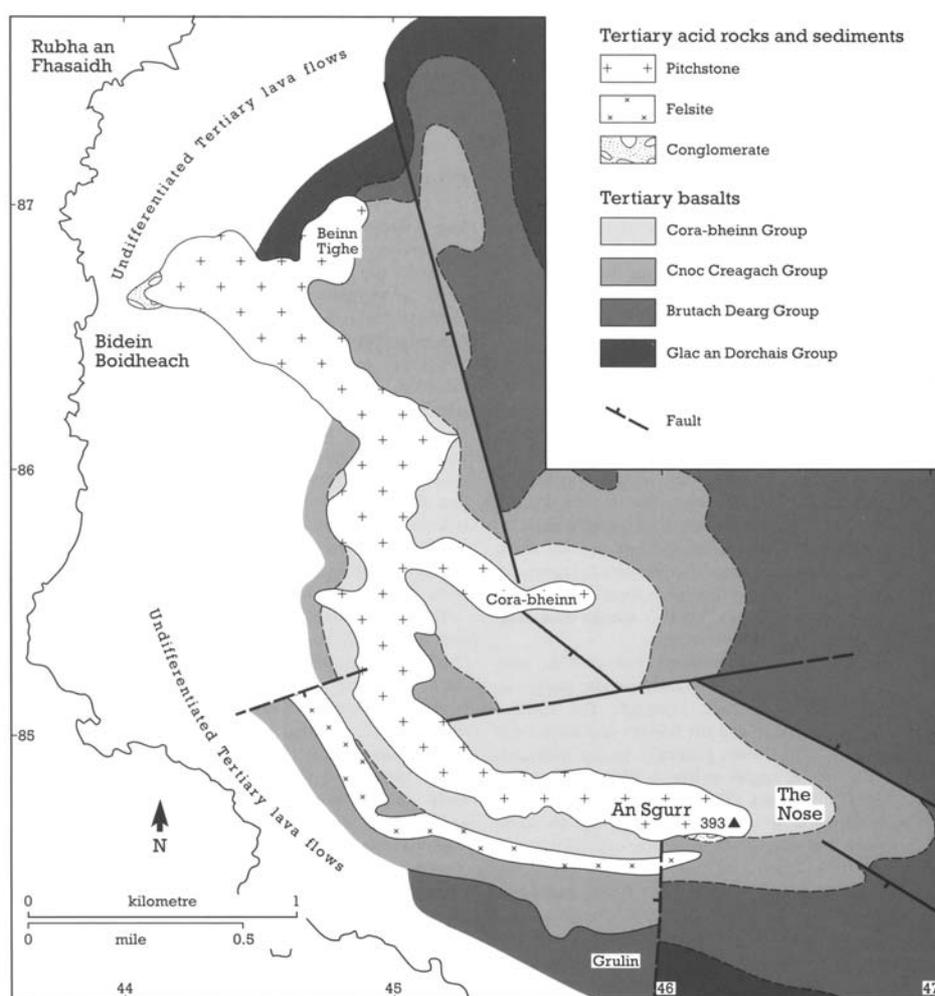


Figure 3.15: Geological map of south-west Eigg (after Allwright, 1980, fig. 2.3.2)



Figure 3.16: Ridge of the Sgùrr of Eigg, formed by an Eocene pitchstone flow filling a valley eroded from Palaeocene basalt lavas. South-west Eigg site. (Photo: C.H. Emeleus.)

On Eigg, the basaltic lavas show slight differences from those on Skye, but vary little in detail from those on Mull. The most striking and controversial geological feature is the relatively young pitchstone forming An Sgurr and adjoining hills. Geikie (1897) regarded the pitchstone as a subaerial lava flow which had occupied a system of small river valleys eroded into the underlying lavas, but Harker (1908) reinterpreted it as an intrusion. Bailey (1914) subsequently supported Geikie's view but invoked auto-intrusion to explain some features. Ridley (1973) supplied new mineralogical and geochemical data from both An Sgurr and the earlier lavas but remained uncommitted as to the nature of the pitchstone. Recent research, however, favours an extrusive origin for the Sgurr pitchstone (Allwright and Hudson, 1982).

Description

From Laig cliffs (NM 463 880) to the outcrops of pitchstone at Beannan Breca (NM 448 865) or Cora-bheinn (NM 457 856), the exposure in the crags displays a full sequence, at least 200 m in thickness, through the lavas of western Eigg. The flows are predominantly alkali to transitional olivine-phyric or olivine-rich basalts. The only exceptions are several flows of feldspar-phyric basalts near to the top of the sequence.

The lavas are typical Palaeocene basalts containing olivine phenocrysts in a groundmass of labradorite, clinopyroxene and titanomagnetite. In hand specimen, they commonly weather with rusty crusts. In contrast, the pitchstone is black and lustrous and carries alkali-feldspar phenocrysts and glomeroporphyritic aggregates of clino- and orthopyroxene, titanomagnetite and alkali feldspar in a pale-brown, glassy matrix (Ridley, 1973; Allwright, 1980).

A thick pitchstone sheet forms the ridge from An Sgurr westwards to Siabh Beinn Tighe and rests, often with spectacular unconformity, upon the basaltic lavas. At several localities along its base, the pitchstone is seen to be brecciated, flow banded, and to contain possible flattened shards (*fiamme*). It lies upon a conglomerate possibly produced by fluvial reworking of agglomerate. Fragments of wood and other plant remains have been found hereabouts. A thick lens of fluvial conglomerate underlies the pitchstone at Bidein Boidheach (Fig.3.17; NM 441 867).

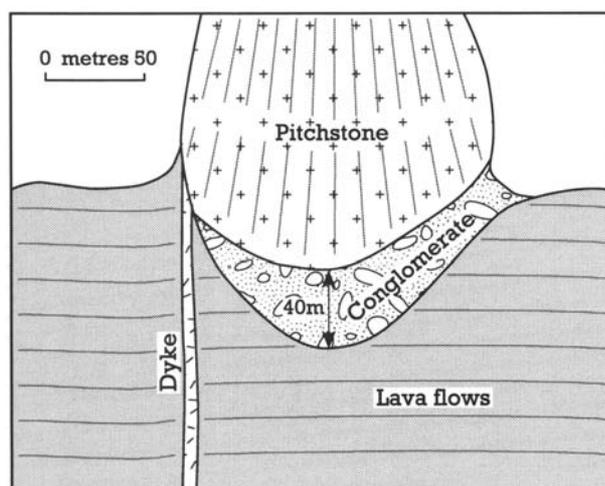


Figure 3.17: . Section through pitchstone and lava flows, near Bidein Boidheach, south-west Eigg (after Allwright, 1980, figure 6.4b)

Along the south face of An Sgurr (NM 460 846) several felsite sheets intrude the pitchstone. These are interpreted as being due to the back-injection of residual acid magma since they are mineralogically identical to the pitchstone, differing only in their well-crystallized matrices (Ridley, 1973; Allwright, 1980). Below the ridge of An Sgurr another major felsite—the Grulin Felsite – intrudes the basaltic lavas and is demonstrably later than some of the basic dykes. The Grulin Felsite has been regarded as the feeder for the Sgurr pitchstone, although this view is now discounted (for example, Dickin and Jones, 1983). Petrographically, this rock is a quartz microsyenite.

The pitchstone post-dates the NW-trending basic dykes of Eigg as can be seen at the east end of An Sgurr (NM 464 847) and in the cliff section near Bidean Boidheach. Radiometric age determinations on the pitchstone indicate an age of c. 52 Ma; it is thus one of the youngest igneous rocks in the British Tertiary Volcanic Province (Dickin and Jones, 1983).

Interpretation

The basaltic lavas of this site are cut by an extensive swarm of NW-trending basaltic dykes (Speight *et al.*, 1982; Allwright, 1980). The probable continuation of the dyke swarm appears in south-east Rum where it is cut by the layered complex. The Eigg (and Muck, see below) lavas thus predate the Rum central complex and their equivalents appear to have been caught up in the Rum Main Ring Fault (Smith, 1985, 1987).

The site illustrates how it is possible for eminent geologists to come to diametrically opposed interpretations despite excellent exposure. Harker (1908) held firmly to his view of the intrusive origin for the Sgurr pitchstone despite the earlier work of Geikie (1897) and a vigorous defence of Geikie's views by Bailey (1914). The careful work of Allwright (1980) leaves no doubt as to the correctness of Geikie's and Bailey's general interpretations; at Bidean Boidheach, the site contains an excellent example of a valley system which has been filled by a pitchstone flow. The fluvial conglomerates exposed at the base of the pitchstone at Bidean Boidheach have yielded clasts of arkosic and other sandstones of Torridonian age. Since the Eigg Tertiary lavas overlie a thick Jurassic succession it is likely that the provenance of these sediments was high ground west of the Camasunary Fault's southern continuation (Binns *et al.*, 1974). In this connection, it is of interest that a petrographically identical pitchstone is present well to the west of this fault, forming the islets of Oigh-sgeir (or Hyskeir; NM 156 963). The possible connection between these two pitchstones requires further investigation, as does the possibility that the pitchstones may be welded ash flows.

Conclusions

The lavas on Eigg represent some of the earliest volcanic activity in the BTVP, predating the nearby Rum central complex. As in the Fionchra site on Rum, the pitchstones, which are of

special interest in this site, have interacted with a fluvial system and provide an excellently exposed example of the filling of a valley system which was carved into the earlier Tertiary basaltic lavas which now cover much of Eigg. An Eocene age (52 Ma) has been obtained from the pitchstone which is one of the youngest igneous rocks of the province.

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