Laggan Bay

OS Grid Reference: NM451415

Highlights

A columnar-jointed basalt flow is overlain by a well-exposed ash band and a mugearite lava flow. The mugearite flow and the ash are closely associated with mugearite which forms a volcanic plug, attesting to a phase of localized vent activity.

Introduction

The coastal and inland exposures about 1.5 km north-east of Ulva Ferry at the head of Loch Tuath provide a demonstration of columnar basaltic and mugearitic lava flows at the base of the Mull lava pile. The mugearites are associated with a volcanic plug, now infilled by ash and cut by a mugearite vent intrusion. As with most of the Mull sites, there have been no detailed studies specific to the lavas exposed at Laggan Bay, although brief descriptions of the area are contained in the Mull Memoir (Bailey *et al.*, 1924). Mugearites collected from the site have, however, been incorporated into the geochemical reconnaissance study of the Mull lavas (Beckinsale *et al.*, 1978).

Description

Columnar, transitional olivine basalts, including pyroxene-rich variants and basaltic hawaiites, occur at the base of the lava succession at Laggan Bay (Fig. 5.10). At Ulva Ferry (NM 445 400) a basaltic hawaiite is exposed in the coastal cliffs and is overlain by an ash which, in places, is altered to a pinkish-grey bole. The ash forms the lower parts of the raised sea cliffs and, although poorly exposed, can be traced northwards and westwards around Laggan Bay. Near Na Torranan (NM 452 415) it attains a thickness of 10 m in places. The ash is overlain by a fissile, mugearite lava flow and the whole sequence is intruded by a mugearite plug, 800 m in diameter. The plug displays vertical flow-banding and forms the headland of Na Torranan and the flat ground to the east. Northward, at Camas an Lagain (NM 448 418), the irregular scoriaceous and rubbly base to the mugearite is exposed above the ash which is much reduced in thickness here.

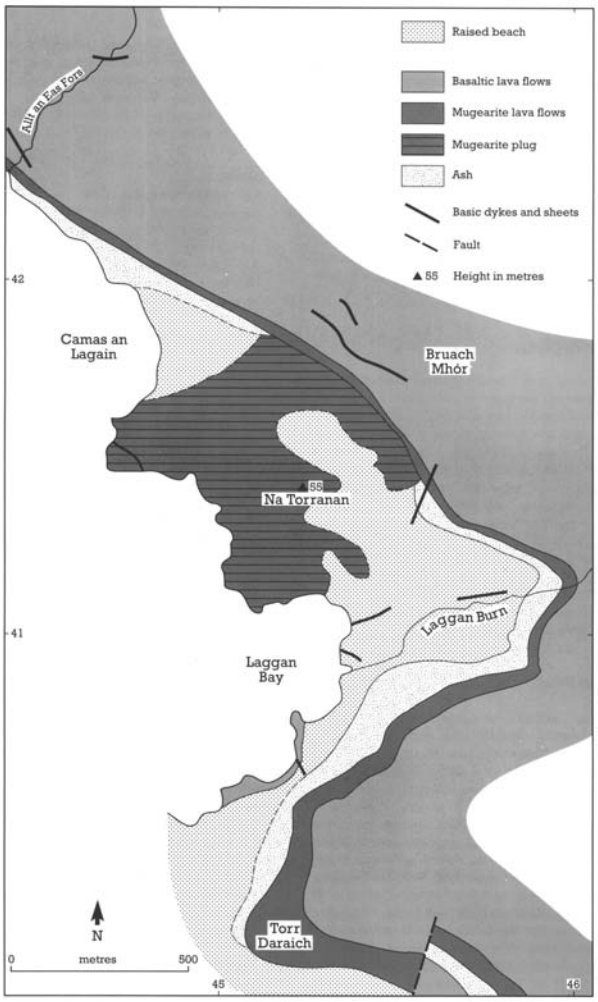

Figure 5.10: Geological map of the Laggan Bay site (adapted from the British Geological Survey 'One Inch' map, Sheet 43, Iona)

A section measured in the Allt an Eas Fors (NM 445 423) is as follows:

		thickness
10.	olivine basalt	3 m
9.	intermittently exposed bole	0.1 m
8.	massive, sparsely feldspar-phyric basalt with a vesicular, rubbly base	8–10 m
7.	red bole with banded clay-rich upper part	0.4 m
6.	scoriaceous lava with reddened top	5 m
	(gap in exposures in stream bed 8 m)	
5.	irregular, platy-jointed transgressive basic sheet	2–5 m
4.	pinkish, fissile ash with massive indurated bands	1.5 m
3.	columnar mugearite with rubbly base and pipe amygdales	12 m
2.	main ash band	3–5 m
1.	cliff sequence – undetermined	10–12 m

South-east of the waterfall (NM 445 422), the mugearite lavas are exposed lower in the cliff sequence and the upper flow bears a close resemblance to that of the Na Torranan vent intrusion.

Interpretation

The site provides fine exposures of alkaline to transitional lavas which include basalts, basaltic hawaiites and more evolved mugearites which Bailey *et al*. (1924) considered to be close to the base of the Plateau Group lava succession. However, the geology of Ulva suggests that the mugearite could be as much as ten flows above the base; Staffa Magma-Type basalts have not been recorded from Ulva or this site (BGS Sheet 43 (Iona)). The sequence is part of the basalt–hawaiite–mugearite–benmoreite Group I trend of Beckinsale *et al*. (1978). Evolved lavas such as mugearites are relatively rare in this part of the lava succession and the field evidence here suggests that, although the basaltic lavas were erupted from fissures, the more evolved lavas were erupted from central vents (Beckinsale *et al*., 1978). The volcanic plug within the site provides such evidence; the vent intrusion could have been the source for the associated mugearite lava and the ash the result of earlier explosive activity which established the vent (Bailey and Anderson, 1925). A significant time interval must have intervened between the eruption of the ash and the mugearite lava, as the upper surface of the ash is weathered to a bole in many places. It appears that the plugs on Mull lie in linear arrays which were probably fissure controlled. The evolved nature of the mugearites suggests that small magma chambers, in which crystal fractionation occurred, were located beneath the plugs along the fissure length. In addition, some basaltic lavas were undoubtedly erupted from vents such as that of 'S Airde Beinn. Similar vents are lacking or rare in the other Hebridean lava fields, although they are common in the Palaeocene lava fields of Antrim where there is a clear association with the regional dyke swarm (Walker, 1959).

Conclusions

The early basaltic and rarer mugearite lavas, ash and the mugearite volcanic plug within this site provide evidence that:

1. the first lavas erupted on Mull were largely basaltic;

2. the eruptive style and products were notably different at different times and more-evolved lavas and ash were erupted from explosive central vents located along the regional fissure trend.

Shallow-level magma reservoirs, in which crystal fractionation occurred, probably existed beneath the vents.

Reference list

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Beckinsale, R.D., Pankhurst, R.J., Skelhorn, R.R. *et al*. (1978) Geochemistry and petrogenesis of the early Tertiary lava pile of the Isle of Mull, Scotland. *Contributions to Mineralogy and Petrology*, **66**, 415–27.

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