

## Ros a' Mheallain

OS Grid Reference: NG365415

### Highlights

The site contains excellent examples of trachyte, mugearite and benmoreite which are some of the most chemically evolved lavas in the Skye Main Lava Series. Chemical evidence shows that some (mugearite–benmoreite) formed under high-pressure conditions near the base of the crust; by contrast, others (iron-poor mugearites–trachytes) reflect lower-pressure conditions of formation high in the crust.

### Introduction

Exposures between Portree and Bracadale on the hills of Ros a' Mheallain (NG 375 405), Ben Scudaig (NG 357 410) and Beinn na Cloiche (NG 366 418) display some of the most petrogenetically evolved lavas found on Skye (Fig. 2.8). The flows are members of the Bracadale Group (Table 2.2; Anderson and Dunham, 1966) and are principally porphyritic and non-porphyritic mugearites with subordinate trachytes and benmoreites. Rare basaltic/lavas and trachytic tuffs also occur.

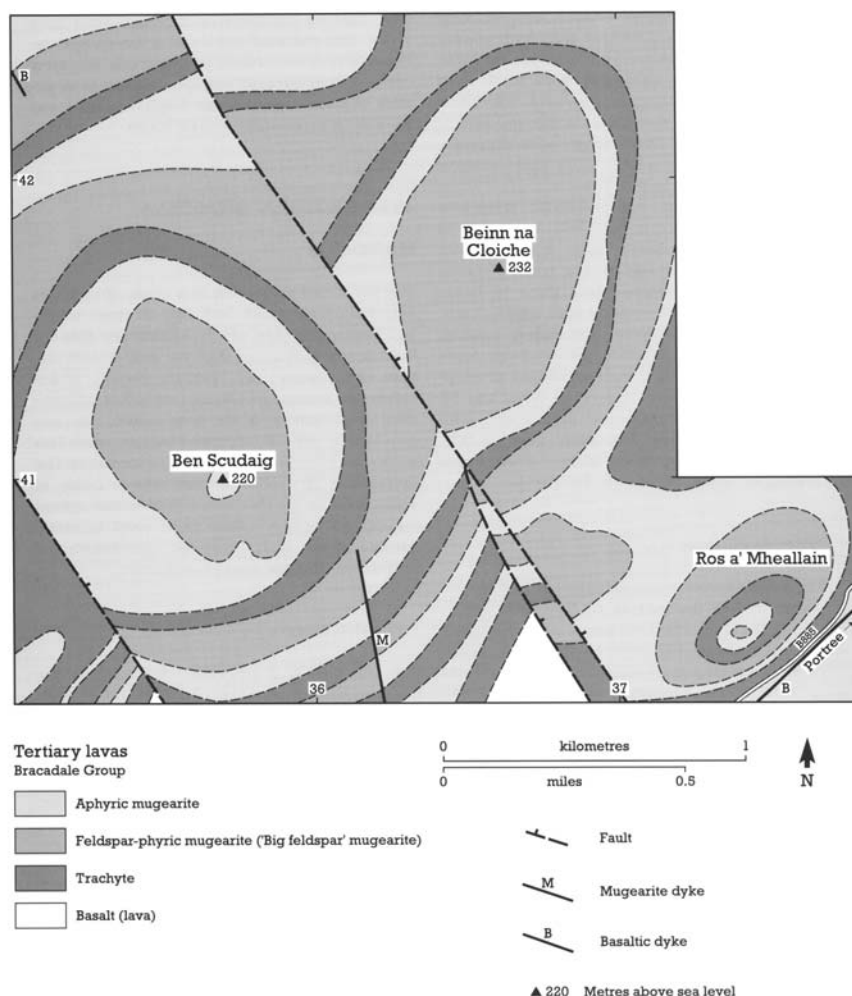


Figure 2.8: Geological map of the Ros a' Mheallain site (adapted from the British Geological Survey 'One-Inch' map, Northern Skye Sheet 80 and parts of 81, 90 and 91)

### Description

The summit of Ros a' Mheallain (Fig. 2.8) consist of a strongly feldspar-phyric mugearite which

is petrologically allied to the composite flow of Roineval and Druim na Criche. The flow is underlain by scoriaceous mugearite and perhaps two trachyte flows, the lower of which is admirably exposed nearby in a small quarry and in cuttings along the Portree–Bracadale road. This trachyte is rather leucocratic and, although often deeply weathered, original flow banding, reasonably fresh alkali-feldspar and biotite phenocrysts and amygdales containing stilbite, mesolite, chabazite and heulandite are present. A short distance to the north-east, a melanocratic trachyte or benmoreite overlain by a thin red bole is exposed at the roadside. Large, often flattened, amygdales filled by quartz, agate and pyromorphite are common in this flow.

The conspicuous feldspar-phyric mugearite forms scarps on Ros a' Mheallain and Beinn na Cloiche where another, higher feldspar-phyric mugearite forms the hilltop. The rocks of Beinn na Cloiche are separated from those of Beinn Scudaig by a NW–SE-trending fault which downthrows to the north-east. On Beinn Scudaig, although exposure is poor, the trachytic flows here are seen to reach their maximum development and four or five individual flows can be distinguished. The lavas are intercalated with mugearites and they thin away from a NW-trending axis lying along a line from Beinn Scudaig to Beinn Aketil (NG 327 463).

## Interpretation

The flows of trachyte, mugearite and benmoreite within the site are part of the Bracadale Group, high in the Skye Main Lava Series, and are some of the most chemically evolved members of this basalt-dominated series. According to Thompson *et al.* (1972), the hawaiite–mugearite–benmoreite suite evolved from transitional basalts by crystal fractionation under high-pressure conditions at the base of the crust. Conversely, the iron-poor mugearites and trachytes evolved from a similar magma, but this took place under low-pressure conditions in small magma chambers established at higher crustal levels. The diversity of lava compositions, the compositional evidence for both high-pressure and low-pressure controls on magmatic evolution and the apparently random distribution of the compositionally varied lavas through the pile, provide strong support for the complex model of magmatic plumbing proposed by Thompson *et al.* (1980) and Morrison *et al.* (1985).

## Conclusions

The site is of particular value because it contains excellent examples of some of the most chemically evolved members of the Skye Main Lava Series. The chemical evidence is interpreted by Thompson *et al.* (1980) to show that the lavas evolved from parental basaltic magmas in reservoirs situated at both deep (high-pressure) and shallow (low-pressure) crustal levels.

## Reference list

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- Thompson, R.N., Esson, J. and Dunham, A.C. (1972) Major element chemical variation in the Eocene lavas of the Isle of Skye, Scotland. *Journal of Petrology*, **13**, 219–53.
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