

Fiurnean to Rubha na h-Airde Glaise

OS Grid Reference: NG510475

Highlights

The site provides excellent sections through the sediments and volcanoclastic rocks which form the base of the Skye Main Lava Series (SMLS, see Table 2.2). The presence of pillow lavas, glassy lava fragments and water-lain, plant-bearing volcanogenic sediments shows that the initial lava eruptions were into shallow water.

Introduction

The cliff exposures between Fiurnean and Rubha na h-Airde Glaise (Fig.2.3), to the north of Portree Harbour, provide extensive sections through volcanoclastic rocks and associated lavas and sediments which mark the onset of Tertiary volcanism on Skye. Accordingly, the site represents the type locality for these rocks. Tuffs, including hyaloclastites produced by the eruption of magma into water, are associated with thin basaltic lavas and fossiliferous sediments; these lie between Jurassic sediments and the lavas of the Beinn Edra Group of northern Skye (Table 2.2; Anderson and Dunham, 1966).

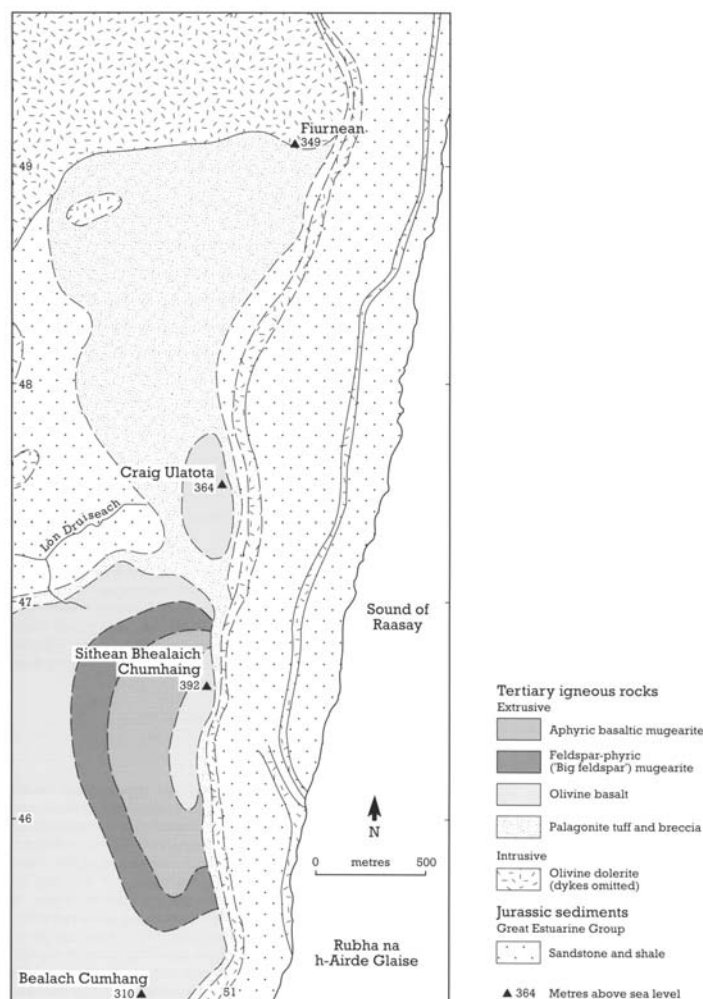


Figure 2.3: Geological map of the Fiurnean to Rubha na h-Airde Glaise site (adapted from the British Geological Survey 'One-Inch' map, Northern Skye Sheet 80 and parts of 81, 90 and 91)

Description

Good exposures of tuff crop out in the cliffs and scree between Rubha na h-Airde Glaise and Sithean Bhealaich Chumhaing (NG 509 467). The lower part of the succession is crystal-rich and contains well-formed and broken crystals of olivine, labradorite and augite in partly devitrified basaltic glass. Above this are somewhat amygdaloidal tuffs, with thin sandy mudstone horizons and impersistent, minor lava flows. The lower portions of the flows show a limited development of pillow-like structures and, in places, well-formed pillows occur throughout the whole thickness of the flow. Where this happens, the individual pillows are separated by thin skins of red, lateritic material. The higher parts of the succession are largely scree-covered, but occasional exposures reveal tuffs containing basalt bombs several centimetres in diameter. These exposures resemble the upper tuffs of Camas Bàn (NG 493 423) on the south side of Portree Harbour.

Sections at, and up to 500 m to the north of, Craig Ulatota (NG 510 475) expose bedded tuffs, palagonite layers and thin basalt lavas, all of which may show reddening. The sequence, which attains a maximum thickness of about 60 m at Fiurnean, can be summarized as follows:

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|----|--|------------|
| 6. | Thin shales and tuffaceous sandstones in which the bedding has been disturbed by massive basalt bombs. | > 15 m |
| 5. | Brown, vitreous tuff with plant fragments. | 10–15 m |
| 4. | Impersistent olivine-basalt lava flow. | 0–1.5 m |
| 3. | Coarse, fragmental tuff with large, pillowed masses of basalt with glassy selvages. | about 25 m |
| 2. | Pale greenish-brown sandstone containing wind-rounded quartz grains. | up to 5 m |
| 1. | Jurassic strata. | |

Plant remains occur in thin, grey, ashy mudstone near the middle of the Fiurnean section.

A much condensed sequence of tuffs and lavas occurs about 700 m WSW of Craig Ulatola in a southern tributary of the Lon Druiseach (NG 502 471). The sequence is as follows (after Anderson and Dunham, 1966 and Brown, 1969):

- | | | |
|----|---|---------|
| 6. | Basalt lava with pipe amygdales at its base | |
| 5. | *Palagonite tuff with pillow lava | 6.7 m |
| 4. | Thin lava flow with pipe amygdales | |
| 3. | *Thin-bedded brown tuff | 0.71 cm |
| 2. | *Hard, olive-green tuff | 0.05 cm |
| 1. | Soft Jurassic sandstone with calcareous bands | 4.3 m |

*contain charred fragments of wood and other obscure plant remains (Wilson, 1937).

Interpretation

The site provides clear evidence that the first Tertiary deposits were water-lain, fossiliferous sediments derived from the weathering of contemporaneous volcanic debris, with some contributions from weathering of Jurassic rocks. There was an abundant flora, and plant remains are preserved in the finer-grained sediments which probably accumulated in shallow lakes. Initially, the basalt lavas erupted into the lakes to form hyaloclastite deposits, pillow lavas and thin, impersistent flows. In the hyaloclastites some of the original basaltic glass remains; this is crowded with microphenocrysts of olivine, feldspar and pyroxene. However, subsequent circulation of heated waters caused most of the basaltic glass to degrade to palagonite and the rocks to become heavily impregnated by zeolites. Sometimes these deposits appear to have been subjected to subaerial weathering, for individual pillows are occasionally

coated by red lateritic material ("bole").

The overlying olivine-basalt lavas are probably similar to the transitional basalt flows found at the base of the Storr succession (q.v.). Individual flows often have reddened tops attesting to subaerial accumulation and vigorous weathering between successive eruptions. However, Anderson and Dunham (1966) quote an analysis of a (somewhat altered) pillow lava from Creag Mor, a few hundred metres south-west of the site, which they compare with tholeiitic basalts from Staffa and Antrim. If correct, this would imply that the first basalt magma formed under different conditions to the large number of overlying flows in the Ben Edra Group.

Conclusions

The site provides excellent opportunities for the study of sediments, volcanoclastic deposits and thin lava flows which mark the commencement of Tertiary igneous activity on Skye. In particular, it provides conclusive evidence that the initial activity was mildly explosive and that the deposits accumulated under shallow water, in contrast to most of the overlying lava flows which were erupted subaerially. The precise age of the deposits is not known. Late Oligocene or younger ages have been suggested from studies on these and similar plant remains elsewhere (for example, Simpson, 1961) but palaeomagnetic studies and radiometric age determinations on the Tertiary lavas elsewhere in the BTVP indicate an age about 60 Ma, about the middle of the Palaeocene.

Reference list

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- Simpson, J.B. (1961) The Tertiary pollen-flora of Mull and Ardnamurchan. *Transactions of the Royal Society of Edinburgh*, **64**, 421–68.
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