
4. Vogesite (hornblende-rich lamprophyre)

Introduction

Rocks of the vogesite suite occur only in the Moine thrust belt, but are widespread in Assynt. They are found from Beinn Lice [NC 330 350] near Loch More in the north, to near Ullapool, 45 km to the SSW. A map showing the location of vogesites near Ullapool is provided by Sabine (1953, fig. 6); here they occur not far below the Moine thrust plane north and south of the Ullapool River at [NH 147 958] and around [NH 142 940], in an embayment structure in the Moine known as the Achall Culmination (Figure 7.1) (Elliott and Johnson, 1980), which is somewhat like a miniature version of Assynt. The structural implications of the vogesite suite in Assynt are essentially the same as those of the 'hornblende porphyrites' to which they have a similar distribution, although they tend to be most abundant in the Sole thrust sheet. Although vogesites are often altered, fresh examples include some of the most attractive rocks among the minor intrusions. Petrographically they are relatives of the 'hornblende porphyrites' but with more hornblende and in some instances diopsidic pyroxene. The hornblende phenocrysts, which may be very abundant, are characteristically 3 mm in length and are set in a finer-grained matrix of euhedral plagioclase feldspar (albite-oligoclase), alkali feldspar, hornblende and a small amount of interstitial quartz. Some contain diopsidic pyroxene in glomero-porphyratic clots 3 mm across, or as euhedral phenocrysts.

The vogesites almost all occur in the form of sills, with a few dykes mainly in the Lewisian gneiss. They are almost all emplaced in Cambro-Ordovician rocks, particularly in the Durness Group. The thickest are over 20 m but there are also thin sheets less than 1 m thick. Some sheets can be traced laterally for more than 3 km, for example in the limestone cliffs above Stronchrubie [NC 252 192], south of Inchnadamph. An historically interesting suggestion was made by Teall in 1886, pre-empting later arguments concerning the role of limestone in alkaline rock genesis in general, and the petrogenesis of pyroxene syenites in the Loch Ailsh intrusion. Teall noted that the pyroxene in the vogesites is nearly pure diopside (calcium-magnesium silicate) and that the pyroxene-bearing rocks usually intrude dolomitic limestones (dolomite is calcium-magnesium carbonate). He therefore suggested that the presence of the calcium-magnesium silicate mineral might be 'due to the absorption by the igneous magma of a certain amount of the dolomitic limestone into which the rock has been intruded'. Sabine (1953) revisited this problem and, from a study of 141 vogesite specimens, concluded that there is indeed a high correlation between the presence of diopside in a vogesite and injection into the Durness Group, although pyroxene does not occur exclusively in such rocks. He did not find field evidence for vogesite–dolomite reactions, however. Nonetheless, the chemical composition of the vogesites is similar to that of pyroxene syenites in the Loch Ailsh intrusion. There is some strong field and petrographical evidence for the importance of magma–dolomitic limestone reactions in the genesis of at least some of the pyroxene syenites (Parsons, 1968).

Allt nan Uamh

[NC 256 179]

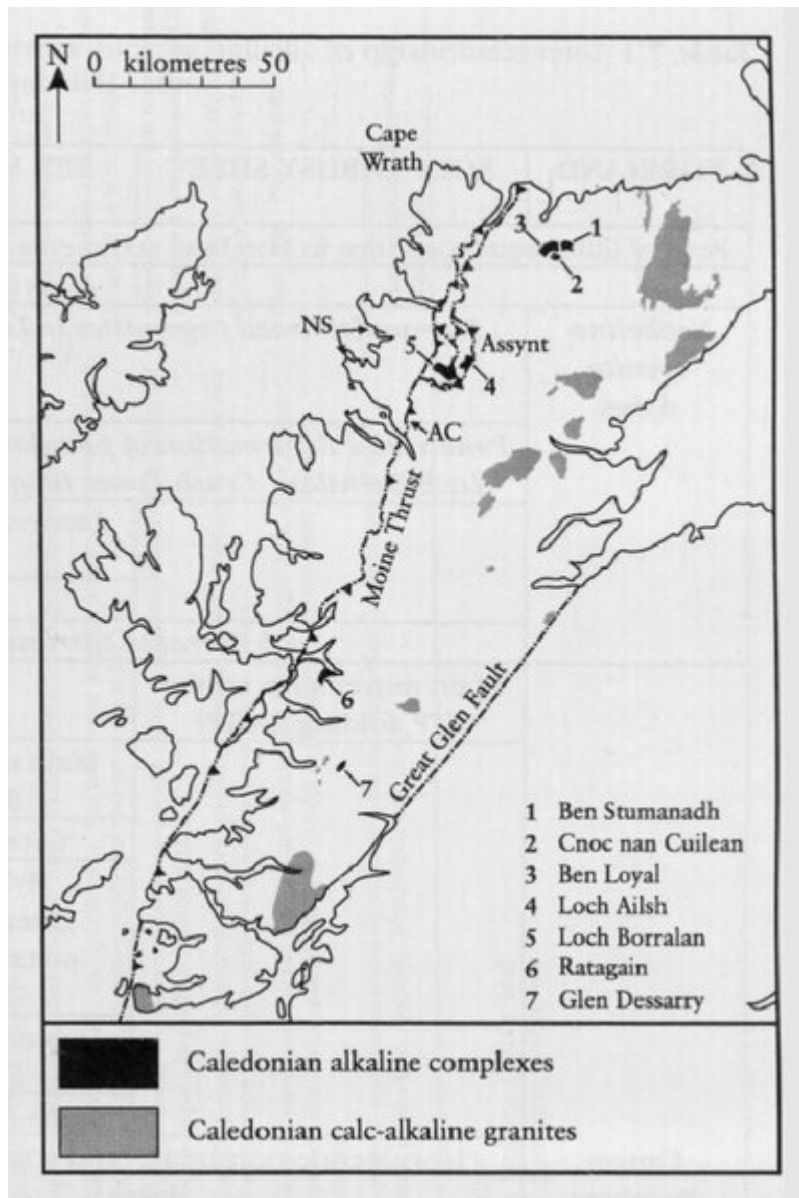
Description

A thick sill of a fresh vogesite with a high proportion of large prismatic hornblendes as much as 10 mm long, set in pink feldspar, occurs close to the A837 and can be reached by a maintained path in the beautiful valley of the Allt nan Uamh, best known for its bone-caves. The locality, slightly above the fish-farm, is shown on (Figure 7.16). It has hardened the Salterella Grit which forms an attractive waterfall (Figure 7.17). The sill dips gently to the east and is about 20 m thick. According to Sabine (1953) this is one of the two thickest vogesite sills in Assynt. The other is on the A837 just north of Inchnadamph.

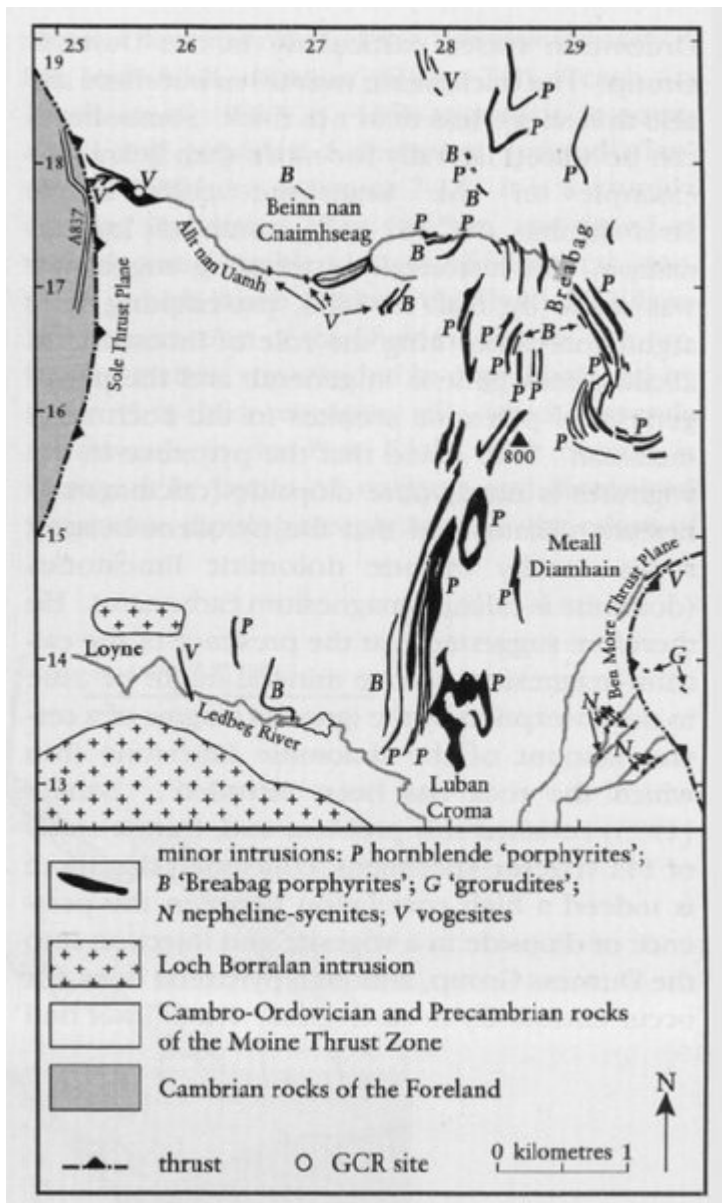
Conclusions

The sill exposed in the Allt nan Uamh GCR site is a readily accessible, coarse-grained example of the most widespread hypabyssal intrusive rock type in Assynt, excellent for teaching purposes as an example of the lamprophyre family.

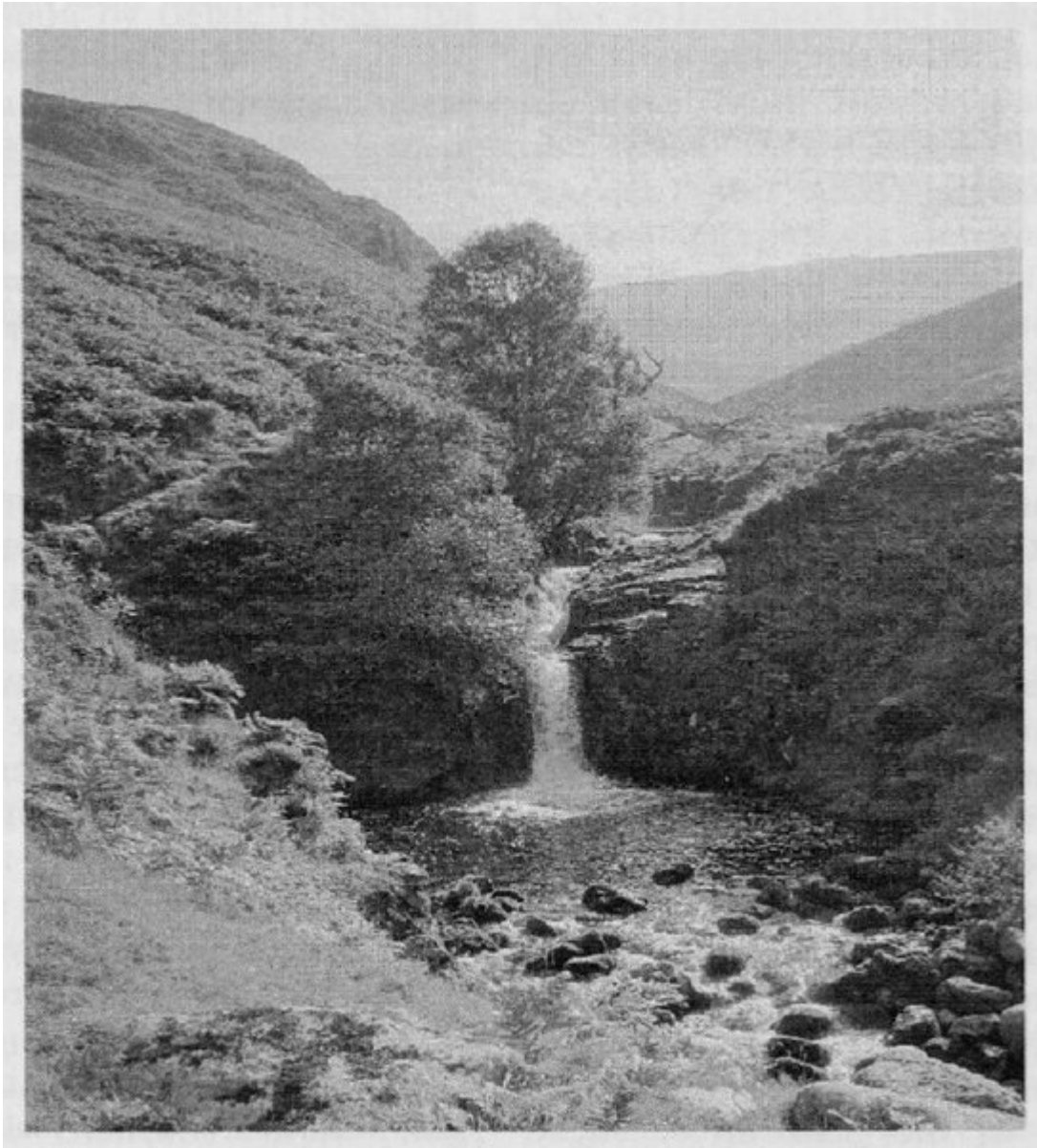
References



(Figure 7.1) Map of NW Scotland showing localities of alkaline intrusions, aligned roughly parallel to the Moine Thrust. Many alkaline dykes and sills occur in the Assynt district and also near Ullapool in the Achall Culmination (AC). GCR sites exemplifying nepheline-syenite dykes in the Foreland are indicated by NS. Caledonian calc-alkaline granites NW of the Great Glen are also shown. The Ratagain intrusion is largely calc-alkaline in character but has minor syenitic members (after Halliday et al., 1987, fig. 1).



(Figure 7.16) Distribution of sills and dykes between the Luban Croma and Allt nan Uamh sites, north of the Loch Borralan intrusion. (After Sabine, 1953, fig. 8.)



(Figure 7.17) Waterfall in Salterella Grit hardened by vogesite sill below, Allt nan Uamh (see Figure 7.16). (Photo: I. Parsons.)