Cuillin Hills

Highlights

Excellent exposure of a wide variety of arcuate ultrabasic and gabbroic intrusions allows the sequence of intrusion and the shape of individual bodies to be established in detail (Figure 2.20) and (Figure 2.21). Igneous layering, xenolith suites and other internal features of the Cuillin Hills provide evidence for consolidation mechanisms in the intrusions. There are superb examples of cone-sheet swarms. The site is the best area in the British Tertiary Volcanic Province where the roots of a major volcanic complex may be examined in detail. The Strath na Creitheach vent provides evidence of subaerial activity after emplacement of the gabbros.

Introduction

The Cuillin Hills site is dominated by a major basic/ultrabasic central complex forming the Cuillin mountain range (Figure 2.1). The intrusion, which is one of the largest of all the British Tertiary plutonic/volcanic centres, contains a series of arcuate bodies of coarse-grained gabbros, eucrites, dunites, peridotites and allivalites, some of which display strong layering. These are cut by numerous minor intrusions including basic dykes, cone-sheets and agglomerate pipes. The site also contains part of the later acidic Strath na Creitheach centre comprising volcaniclastic deposits and several granite intrusions. The igneous succession is outlined in (Table 2.5).

The site has attracted attention since the earliest days of geology but it was not until the latter part of the nineteenth century that the broad outlines of the geological structure were elucidated through the studies of Judd (1874), Geikie and Teall (1894) and Geikie (1897). Harker completed the first comprehensive field survey of central Skye between 1895 and 1901 which was published in his classic memoir, *Tertiary Igneous Rocks of Skye* (Harker, 1904), with accompanying maps (on both the One-Inch and Six-Inch scales). Further detailed studies were not carried out on Skye until the mid-1940s, many of which were reviewed by Wager and Brown (1968) and by Bell (1976). Further assessment of the Cuillin centre is made. by Gass and Thorpe (1976), Sutherland (1982) and Bell and Harris (1986).

The term eucrite, as used in this site description, applies to a gabbro rich in bytownite plagioclase. Although the term has been criticized (Le Bas, 1959) and is not now recommended as a rock name (Le Maitre, 1989), it has been retained here as it is still commonly employed in the literature relating to the site, as well as in Rum and Ardnamurchan.

Description

The site has been selected to include much of the Cuillin basic and ultrabasic centre as well as representative parts of the later Strath na Creith-each centre (Figure 2.22). Exposure is generally excellent on the great ridges of the Cuillin range which rise to almost 1000 m elevation and extend in a horseshoe rampart about Loch Coruisk (Figure 2.22).

The geology of the site is considered under three principal headings:

1. The Cuillin basic/ultrabasic centre.

(a) The Outer Marginal Gabbros and Eucrites and their relationship with the country rock.

(b) The layered basic and ultrabasic members of the central part of the intrusion, which are divided into the Outer Layered Series and the Inner Layered Series.

2. The Strath na Creitheach centre.

3. Minor intrusions.

The country rocks surrounding the Cuillin centre are almost entirely lavas belonging to the Skye Main Lava Series (Thompson *et al.,* 1972). However, on the southern edge of Sgurr na Stri [NG 501 193] Torridonian strata occur and, to the east of the site at Camasunary [NG 517 188] and to the south of Blaven (Bla Bheinn, [NG 530 217]), both Torridonian sediments and Jurassic limestones have been metamorphosed to high grade (Coire Uaigneich; Almond, 1960). Good examples of metamorphosed basalts occur close to a lochan to the north-east of An Sguman ([NG 438 189]; Harker, 1904, p. 52 and plate 16).

Outer Marginal Gabbros and Eucrites

Largely massive gabbros and eucrites extend in a broad arc from Glen Sligachan, south-west to the vicinity of Glen Brittle, and south-east to Gars Bheinn [NG 468 188] and Loch Scavaig. These intrusions are cut off to the east by the Glamaig Granite of the Western Red Hills centre in Glen Sligachan, and by younger mafic rocks to the south.

The published One-Inch geological map (Sheet 70, Minginish) and the Six-Inch sheets depict extremely irregular contacts between the Outer Marginal Gabbros and the lavas north-west of Bruach na Frithe [NG 461 253], NNE of Glen Brittle, and on the southern slopes of the Cuillin ridge near Gars Bheinn. These relationships have been interpreted as showing the gabbros fingering into the lava succession, with fairly flat-lying screens of metamorphosed basalt (and vol-caniclastic rocks) caught up between (frequently fine-grained) gabbro. Harker (1904) considered that these features were a consequence of the laccolithic form of the Cuillin intrusions, but in the vicinity of Coire na Banadich [NG 435 219], at least, some of these fine-grained rocks are intrusive sheets of amygdaloidal tholeiite (Hutchison, 1966b).

(Table 2.5) Succession in the Cuillin Hills site (after Bell and Harris, 1986, pp. 45–6)

Granites of the Strath na Crèitheach Centre
Volcaniclastic deposits of Strath na Crèitheach dolerite cone-sheets
Coire Uaigneich Granite
Intrusive tholeiites of the Outer and Main Ridge Complexes
Inner Layered Series
Inner Layered Gabbros
(?vent agglomerates in Harta Corrie)
Inner Layered Eucrites
Inner Layered Allivalites
Druim nan Ramh Eucrite
Agglomerates and explosion breccias of diatremes
Dykes
(Gars Bheinn ultrabasic sill?)
Outer Layered Series
Outer Layered Gabbros
Outer Layered Eucrites
Outer Layered Allivalites
Layered Peridotites
Border Group (including White Allivalite)
Cone-sheets
Dykes
Outer Marginal Gabbros and Eucrites
?**Early Granites (may pre-date Palaeocene basalts of south-west Skye)**
Basalt lavas
Torridonian sediments

In the Gars Bheinn area, Weedon (1961) showed that the southern margin of the Outer Unlayered Gabbros is formed by a 200 m wide, steep-sided intrusion termed the Ring Eucrite which intervenes between the wide Gars Bheinn Gabbro and the basalt lavas. To the north, the Gars Bheinn Gabbro assumes a distinctive dull matt-black appearance caused by intense clouding of the plagioclase feldspars. This clouding, caused by thermal metamorphism, was attributed by

Weedon to alteration by the younger ultra-basic rocks which are in contact with the Gars Bheinn Gabbro on the south side of An Garbh-choire [NG 470 200]. In this same area, south of Loch Coire a' Ghrunda [NG 452 203], an east-west striking eucrite (termed the Ghrunda Eucrite) intrudes darkened Gars Bheinn Gabbro. The eucrite has been correlated with the Border Group of allivalitic ultrabasic rocks which extend to the north and north-west (Hutchison and Bevan, 1977; Bell, 1976).

The layered basic and ultrabasic rocks of the central part of the intrusion

These intrusives may be divided into an outer, earlier sequence of layered peridotites, eucrites and allivalites known as the Outer Layered Series, and an inner later sequence of allivalites, eucrites and gabbros called the Inner Layered Series. The two are separated by the Druim nan Ramh eucrite ring-dyke. These layered rocks have been investigated by Carr (1952), Weedon (1961, 1965), Zinovieff (1958), Wager and Brown (1968), Hutchison (1966a, 1968), and Hutchison and Bevan (1977).

(a) The Outer Layered Series

Zinovieff (1958) and Hutchison (1968) recognized a Border Zone to the Outer Layered Series at the contact with the outer gabbros which is well exposed in Coire Lagan. The Border Zone consists mainly of unlayered allivalites known collectively as the White Allivalite which displays wispy banding near to the contact (Hutchison, 1968). Intrusive tholeiites containing eucrite xenoliths occur at the contact. The White Allivalite is between 200 m and 600 m thick, thinning upwards and outwards, with the incoming of cumulate rocks marking the start of the Outer Layered Series (Bell and Harris, 1986). The Outer Layered Series is banked up against the White Allivalite along a steep contact.

The outermost part of the Outer Layered Series consists of a suite of dunites, peridotites and allivalites with layered structural and textural features typical of igneous cumulates (Wager and Brown, 1968). Weedon, who worked between Loch Coruisk and Loch Coire a' Ghrunda, showed that the dunites give way upwards to the allivalites found in the lower part of An Garbh-choire [NG 468 200]. The lower, more mafic part of this succession of layered rocks was termed the Sgurr Dubh Peridotite (Weedon, 1965). To the east, the Outer Layered Series rocks are succeeded by a broad, cross-cutting, well-layered eucrite intrusion containing inclusions of earlier mafic rocks from the Outer Layered Series. These eucrites extend north-west from Sgurr na Stri and Loch Scavaig to the upper part of Harta Corrie [NG 470 235]. The inner margin of the layered eucrites is marked by the highly transgressive Druim nan Raimh ring-dyke which marks the boundary between the Outer Layered Series and the Inner Layered Series.

(b) The Inner Layered Series

The outer perimeter of this group is formed by the 100–300-m-wide unlayered Druim nan Raimh eucrite ring-dyke. The ring-dyke is highly transgressive towards the older rocks, allivalites immediately next to the outer edge are crushed and there is some thermal metamorphism of pre-ring-dyke rocks.

Zinovieff (1958) mapped three zones of layered allivalitic rocks to the east of the ring-dyke, comprising the Inner Layered Series which is best exposed on the high ground to the east of Sgurr nan Gillean and on the summit of Sgurr Hain. The layering in these rocks, as in Outer Layered Series rocks, dips at between 20° and 40° towards a focus beneath Meall Dearg and the total thickness of allivalite has been estimated to be *c.* 500 m (Wadsworth, 1982). Different units were distinguished by Zinovieff on the basis of modal mineralogy and within each unit, basal plagioclase–clinopyroxene cumulates give way upwards to feldspar–olivine cumulates. Rhythmic layering also becomes increasingly pronounced up through the sequence. These allivalites were so similar to those in the Outer Layered Series that Zinovieff considered them all to be part of the same layered sequence and numbered two zones mapped on the main Cuillin ridge at Bidean Druim nan Raimh [NG 456 239] as units 1 and 2; those within the ring-dyke were numbered 3, 4 and 5. The allivalite units 3–5 appear to have been succeeded by a layered eucrite which transgresses the allivalites in the lower part of Harta Corrie. An elongate vent cuts these units on the south-east side of the layered eucrite which is, in turn, transgressed by a north–south elongated mass of strongly layered gabbros, termed the Inner Layered Gabbro. This appears to have been the last major mafic intrusion in the Cuillin centre. It crops out around Druim Hain [NG 495 224]. The western and southern margins of the Inner Layered Gabbro are unusual since there is a marked development of

mylonite and brecciation, suggesting that the gabbros were emplaced along an arcuate, steeply inclined fracture when in a solid state. They are truncated to the east by two granite intrusions.

(c) Agglomerates and explosion breccias

Zinovieff (1958) recorded at least forty small vents and diatremes in various stages of development cutting the rocks of the intrusive centre. The vents are particularly common in the northern Cuillins. These range in size from a few metres in diameter to major bodies over a kilometre across. It is clear that the agglomerates within these vents represent one of the youngest events in the Cuillin centre, post-dating the basic and ultrabasic intrusives which contribute the majority of clasts found in the volcaniclastic rocks. Small agglomerate masses occur immediately west and south-west of Sgurr nan Gillean [NG 472 253] and Harker (1904) noted that the highest point of the Cuillins, Sgurr Alasdair [NG 450 208] was formed by volcanic breccia. A large agglomerate body also crosses lower Harta Corrie cutting members of the Inner Layered Series and the Inner Layered Eucrite; it is in turn cut by the Inner Layered Gabbros and basaltic cone-sheets.

The Strath na Crèitheach Centre

The members of this small centre cut some of the youngest intrusions in the Cuillin basic and ultrabasic centre and in turn are cut by members of the Western Red Hills centre (Figure 2.20) and (Figure 2.21). The centre marks a major change in the composition of the intrusions; in contrast to the earlier basic and ultrabasic rocks of the Cuillin centre, the Strath na Crèitheach centre is acidic and the major intrusions are granophyres. The centre also post-dates the majority of minor intrusions which are so abundant in the Cuillin centre (see section on 'Minor intrusions', below).

The centre can be divided into four principal units:

Loch na Crèitheach vent

Rudha Stac Granite Meall Dearg Granite Blaven Granite

(a) The Loch na Crèitheach vent

The vent, which is about 2 km in diameter, forms the hillsides north and north-west of Loch na Crèitheach [NG 514 205] and extends to Druim Hain, crossing the path between Loch Coruisk and Glen Sligachan. It also extends to the east side of Strath na Crèitheach on the lower slopes of Blaven. The vent is filled with a mixture of gabbroic, doleritic and basaltic agglomerates, coarse tuffs and finer-grained bedded tuffs, the latter being evidence for contemporaneous sub-aerial activity. The bedded tuffs are best exposed about 0.5 km north-west of the head of Loch na Crèitheach consisting of alternating bands, on a millimetre scale, of coarse- and fine-grained fragments. Large sheets, or rafts, of gabbro up to 250 m long and 2–10 m thick are also found within the vent concordant with the bedding in the volcaniclastic rocks. It is highly likely that many of the basaltic clasts in the Loch na Crèitheach vent originated from minor basic intrusions rather than from the plateau lavas.

The vent deposits are up to 450 m thick and have contacts with older rocks which show signs of crushing and injection of basaltic magma into fractures and crush lines. It is possible that the margins mark the site of a small ring-fault and the volcaniclastic rocks may be lying within a caldera whose centre has subsided between 750 and 1000 m (Jassim and Gass, 1970).

(b) The granites

Three granite intrusions form the northern part of this centre. All are alkali granites; the Rudha Stac and Meall Dearg granites are feldspar-phyric and contain fayalite and hedenbergite or alkali amphibole; the Blaven Granite is amphibole-bearing. The Rhudha Stac Granite cuts the Loch na Crèitheach vent in the crags south of Loch an Athain [NG 512 227] and the Blaven Granite intrudes the vent on the lower north-west side of Blaven. The two granites are separated by a thin screen of gabbro along the course of the Allt Teanga Bradan, south-east of Rudha Stac [NG 515 333]. Exposures on the eastern edge of this site, on the lower north-west side of Blaven, give a clear view of the pale-weathering Blaven Granite in contact with the darker, overlying (and older) gabbros and eucrites which form most of

Blaven; this is one of the most visually striking igneous contacts in the BTVP.

The Meall Dearg Granite is probably the youngest of the three acid intrusions (Thompson, 1969). Its chilled contact with earlier gabbros is superbly exposed along the western edge of its outcrop. Fine-grained, flow-banded, spherulitic apophyses at the granite contacts were described by Harker (1904, p. 285) cutting the gabbros at Druim an Eidhne (Druim Hain).

There is a notable lack of minor intrusions in the Strath na Crèitheach centre, apart from a few NW-trending dolerite dykes which intrude the granites.

Minor intrusions

There are two principal types of minor intrusion associated with the Cuillin centre within this site:

1. abundant suites of centrally-focused inclined sheets, or cone-sheets, of basalt and dolerite; and
2. numerous radial dykes, generally of basaltic compositions but some ultrabasic, trachytic, felsitic examples also occur.

The minor intrusions frequently develop close-set joints which render them more susceptible to weathering than the surrounding massive intrusions, thus, many of the gullies and the serrated outlines of the Cuillin ridges owe their origins to the presence of easily-weathered dykes and cone-sheets (Figure 2.1) and (Figure 2.17).

A major NW–SE swarm of dominantly basaltic dykes crosses Skye from the Sleat Peninsula in the south-east, to the area around Waternish Point [NG 233 670]. A subsidiary NE–SW swarm has been identified at Glen Brittle and on Scalpay (see Speight *et al., in* Sutherland, 1982; especially figs 33.4 and 33.5) which appear to radiate about the Cuillin centre. From the field relationships of the dykes with the other intrusions in the Cuillin centre, it is clear that the injection of the NW–SE swarm occurred throughout the life of the centre and their inception probably pre-dated that of the centre. However, the majority of dykes in this swarm were intruded prior to the Strath na Crèitheach centre.

Several suites of exceptionally well-developed cone-sheets have also been recognized within the Cuillin centre, the latest of these intruding vent rocks in Harta Corrie but not the agglomerates or granites of the Strath na Crèitheach centre. The sheets focus on a centre beneath Meall Dearg and therefore have the same focus as the layering within the basic/ultrabasic cumulates of the Cuillin centre. Cone-sheets cutting the Outer Layered Series eucrites are exceptionally well exposed in the bare, glaciated slabs around the outlet to Loch Coruisk and on the southern face of Sgurr na Stri. The cone-sheets are frequently fine-grained, olivine-free dolerites and some, particularly those in the vicinity of Gars Bheinn, are strongly feldspar-phyric. The sheets dip at angles between 25° and 50° or more, with a tendency for steeper dips closer to the focus area of Meall Dearg. Bell (1976, table 1) has distinguished several generations of cone-sheets.

Ultrabasic minor intrusions represent the latest activity in the Cuillin centre and probably all belong to the same intrusive episode (Wyllie and Dreyer, 1963). Such intrusions include the Gars Bheinn layered peridotite sill (Weedon, 1960), an irregular body forming An Sguman [NG 436 188], and sparse ultrabasic dykes and sheets occurring in an arc from north of Sgurr nan Gillean to Sgurr nan Gobhar [NG 427 224] and Gars Bheinn, and on Soay, to the south of the site. The dykes seem to focus on a centre towards the eastern side of the main body of the Cuillin intrusion. The Gars Bheinn sill is of significant interest as it demonstrates the presence of mineral and textural layering in feldspathic peridotite within a fairly thin intrusion, where it is difficult to envisage an origin by crystal settling. It seems likely that an explanation for layering within this sill may be one of double-diffusive convection (cf. McBirney and Noyes, 1979).

Interpretation

The Cuillin intrusion is one of the largest and most elaborately developed Tertiary central complexes in the British Isles, representing a major event in the evolution of the British Tertiary Volcanic Province. The great variety of igneous rock types gives this site its scientific importance; of particular note are the frequent, clear age relationships shown by the different intrusive members and the great variety of layered and other internal structures discussed above. The site therefore provides one of the best opportunities to establish the intrusive history of a central complex in the Province.

Like many of the central complexes, the Cuillin centre has been strongly affected by structural activity during and after magmatism; the tectonics of the intrusion, however, remain poorly understood and require comprehensive reappraisal. The intrusive history of the site is summarized in (Table 2.5) (based on Bell and Harris, 1986).

Reassessment of the Cuillin centre following the unrivalled field investigations of Harker (1904) has been aided by the work of Zinovieff (1958), Weedon (1960, 1961, 1965), Hutchison (1964, 1966a, 1966b, 1968), Wager and Brown (1968), J.D. Bell (1976), and Hutchison and Bevan (1977). Present interpretations of the Cuillin centre stem mainly from the syntheses of Wager and Brown (1968), Gass and Thorpe (1976) and Bell and Harris (1986). The high-level shape of the Cuillin centre is interpreted to be funnel-like, centred on Meall Dearg and intruding earlier unlayered gabbros and Tertiary lavas. The upward pressure caused by the emplacement of the centre to high structural levels probably caused inflation and doming of the overlying country rock, with the formation of cone-sheets and dykes radiating from the centre of the intrusion. Caldera-like subsidence within the intrusion probably occurred after its emplacement (Gass and Thorpe, 1976). Indications of surface or subsurface explosive volcanic activity are suggested by the prolific presence of vent agglomerates in pipes produced by gas fluidization cutting the layered rocks (Zinovieff, 1958). Some of the agglomeratic pipes may not have broken through to the surface but the presence of bedded tuffs in other pipes indicates that some were probably associated with subaerial volcanism; the bedded tuffs would represent air-fall or waterlain deposits. Variation between agglomerate bodies in respect to size, mixing and rounding of blocks and the nature and proportion of the matrix led Zinovieff to suggest that different stages in the evolution of a typical vent can be recognized:

1. country rock is brecciated and veined by the injection of basaltic material involving no movement of adjacent blocks;
2. a rise in vapour pressure results in a process of fluidization causing blocks and magma to expand and rise as one fluid-like phase;
3. blocks become rounded by attrition and mixed as the fluidized system develops with a tuffaceous matrix.

Wager and Brown (1968) proposed a relatively simple interpretation for the evolution of the centre, relating all of the layered rocks to a single episode of crystal accumulation in a basaltic magma chamber resulting in modal and cryptic layering from dunites/peridotites to gabbros. The mechanism of layering within igneous rocks is discussed in detail for the Askival–Hallival site on Rum. It was envisaged by Wager and Brown that an initial intrusion of the outer unlayered gabbro was succeeded by the intrusion of basic magmas from which the layered rocks formed at a high structural level. Complex tectonic activity during and after the emplacement and crystallization of the intrusion was suggested by Wager and Brown to be responsible for the disruption' of the sequence. This explained the present configuration of the units, many of which are transgressive and have steep-sided contacts. The Druim nan Ramh Ring Eucrite was recognized by Wager and Brown (1968) to have important structural implications, separating the Outer Layered Series, towards which it transgresses, from the Inner Layered Series. It was postulated that the Inner Layered Series may either be a fault-controlled repetition of the Outer Layered Series, or the result of a later, separate intrusion of basic magma, bordered by the unlayered ring eucrite. Since a massive central uplift of *c.* 1 km is required to repeat the succession, the latter explanation is preferred (Wager and Brown, 1968; Bell, 1976; Wadsworth, 1982).

Hutchison and Bevan (1977) however, have suggested a multiple intrusion model in preference to the model of tectonic emplacement and crystallization from a single basaltic magma proposed by Wager and Brown. Several episodes of magma injection of ultrabasic and basic composition (Hutchison, 1968; Gibb, 1976) and subsequent accumulation processes have been proposed to account for the relationships between the different components of the layered intrusion. The high structural level of the formation of layered ultrabasic rocks in the intrusion precludes their accumulation from basic tholeiitic magmas as suggested by Wager and Brown, because this would require a magma chamber 9000 m thick, together with massive uplift for which there is no evidence. Hutchison (1968) has therefore suggested that the ultrabasic layered rocks accumulated from ultrabasic magmas. In addition, the dykes and ultrabasic minor intrusions of Skye and Soay have been considered by Dreyer and Johnston (1966) to provide unequivocal evidence for the presence of liquids appreciably more mafic than basalt, a view also advanced by Gibb (1976).

From a study of the Outer Layered Series on the western side of the Cuillin centre, Hutchison and Bevan (1977) have suggested the following sequence of events:

1. Injection of tholeiitic cone-sheets into earlier, unlayered gabbro during inflation caused by rising magma.

2. Major intrusion of ultrabasic magma producing a funnel-shaped magma chamber.
3. Outer and upper margins of the magma chamber chilled to form the allivalitic, un-layered chilled border zone. In the central part of the intrusion crystal accumulation occurred, producing dunites and peridotites followed by allivalites which banked up against the border series.
4. A second pulse of ultrabasic magma was injected into the chamber to produce an essentially allivalitic unit.
5. The cumulates were later cut by eucritic magmas injected into the chamber (Outer Eucrite Series).

Such a model of multiple magma injection is also supported by J.D. Bell (1976) who concluded that the Cuillin centre is likely to represent a series of partly confluent intrusions, each of which fractionated to varying degrees (cf. Walker, 1975). Wadsworth (1982) postulated a series of 'nested' layered intrusions, each bounded by ring fractures controlled by central subsidence of the funnel.

Gravity surveys of the Skye intrusive complex by Bott and Tuson (1973) indicated that there is a substantial volume of basic–ultrabasic rocks beneath the Cuillin centre. This study modelled an intrusive body widening downwards, from 6 km across at the top to 9 km wide at the base some 14 km below the surface. The volume of this intrusion was estimated to be in the region of 3500 km (assuming the rocks to be of gabbroic composition) with granites occupying, at most, 5% of this volume. Bott and Tuson suggested that the magma rose from the lower crust by piecemeal stoping; this is consistent with the downwards widening of the intrusion but conflicts somewhat with the funnel-shaped form postulated from surface exposure (see above).

The later intrusion of the acidic Strath na Crèitheach centre involved the emplacement of several granite bodies after the formation of a subaerial vent. The dilemma of the origin of the Skye granites is discussed in the Marsco site account.

Conclusions

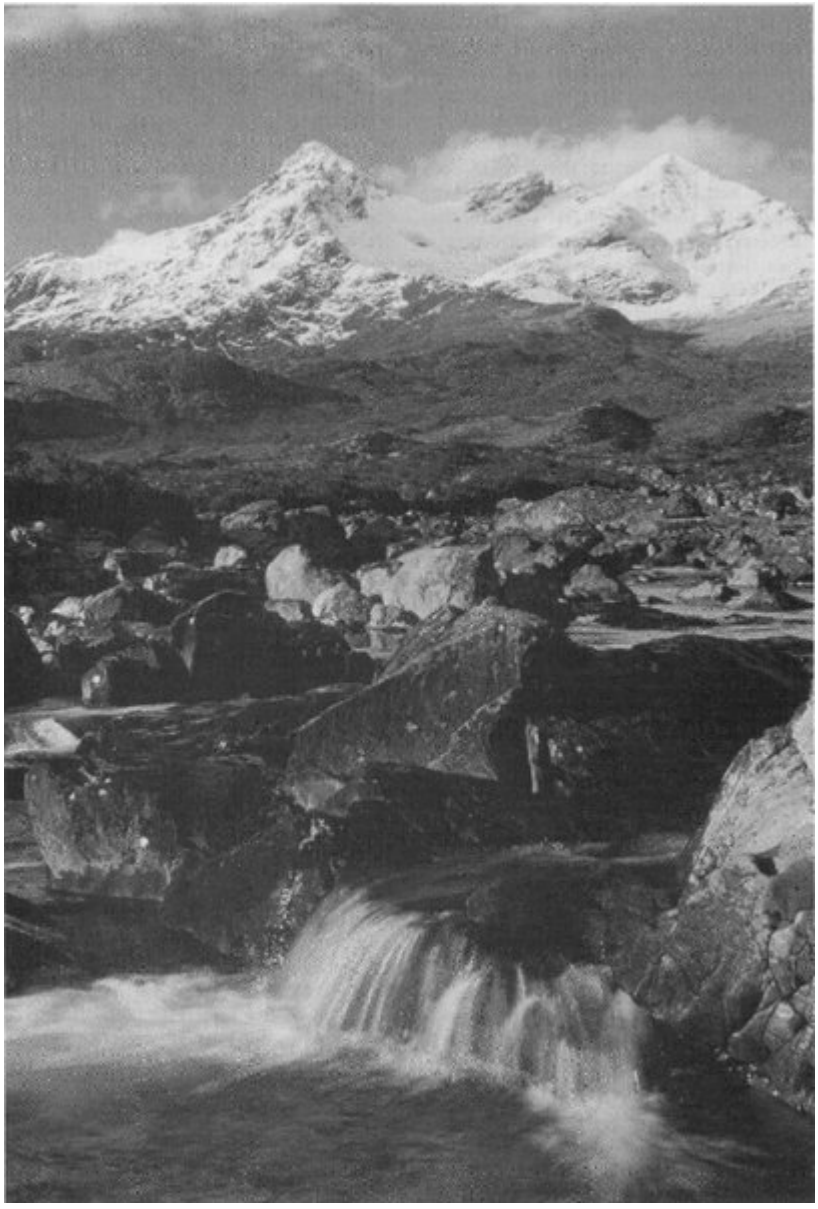
The Cuillin Hills site is of special geological significance for the following reasons:

1. The Cuillins contain one of the largest and most elaborately developed of the Scottish Tertiary basic/ultrabasic intrusive complexes — the Cuillin centre. The relationships between this centre and a younger granitic centre are well demonstrated.
2. The site contains the first of the Scottish centres to be examined in detail and the Memoir (Harker, 1904) and the One-Inch and Six-Inch geological maps arising from these investigations are geological classics.
3. The intrusive relationships between the different rock types are very clearly displayed allowing unequivocal establishment of the history of intrusive activity. The Cuillin centre is thought to be composed of several superimposed phases of intrusion in association with complex tectonic activity.
4. The systems of inclined sheets, or cone-sheets, are among the best known anywhere.
5. Geochemical investigations on the rocks from this site show, when combined with detailed field studies, that there are grounds for seriously considering the existence, at high crustal levels, of magmas significantly more mafic than basalt.
6. Geophysical studies show that this site is the surface expression of a very large, steep-sided body of dense, mafic rocks underlying central Skye and extending deep into the Earth's crust (to at least 14 km depth).

References

(Figure 2.20) Gabbros of the Cuillin centre form rough ground around Loch na Crèitheach in foreground, gabbro peak of Sgurr nan Gillean on left, and smooth-weathering mass of Marsco (Western Red Hills granites) on right. Cuillin Hills and Marsco sites, Skye. (Photo: C.H. Emeleus.)

(Figure 2.21) Rough-weathering gabbro on Bla Bheinn (right) contrasting with smooth-weathering granites of the Strath na Crèitheach centre (left). Jurassic sediments occupy the right foreground. Cuillin Hills and Marsco sites, Skye. (Photo: C.H. Emeleus.)



(Figure 2.1) Sgùrr nan Gillean and the Cuillin Mountains viewed from Sligachan, Isle of Skye. (Photo: David Noton Photography.)

Granites of the Strath na Crèitheach Centre

Volcaniclastic deposits of Strath na Crèitheach dolerite cone-sheets

Coire Uaigneich Granite

Intrusive tholeiites of the Outer and Main Ridge Complexes

Inner Layered Series
- Inner Layered Gabbros
- (?vent agglomerates in Harta Corrie)
- Inner Layered Eucrites
- Inner Layered Allivalites

Druim nan Ramh Eucrite
- Agglomerates and explosion breccias of diatremes
- Dykes
  - (Gars Bheinn ultrabasic sill?)

Outer Layered Series
- Outer Layered Gabbros
- Outer Layered Eucrites
- Outer Layered Allivalites
- Layered Peridotites

Border Group (including White Allivalite)
- Cone-sheets
- Dykes

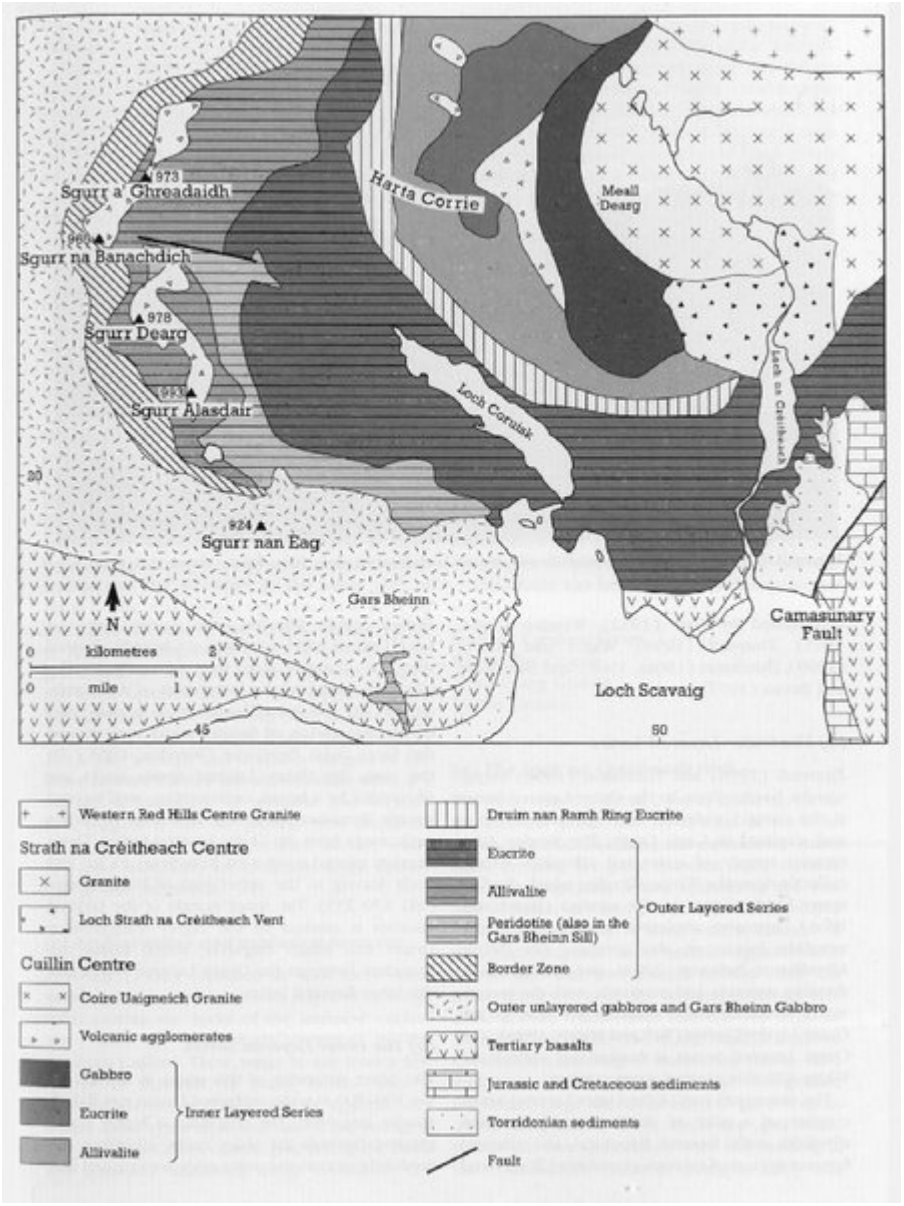
Outer Marginal Gabbros and Eucrites

?Early Granites (may pre-date Palaeocene basalts of south-west Skye)

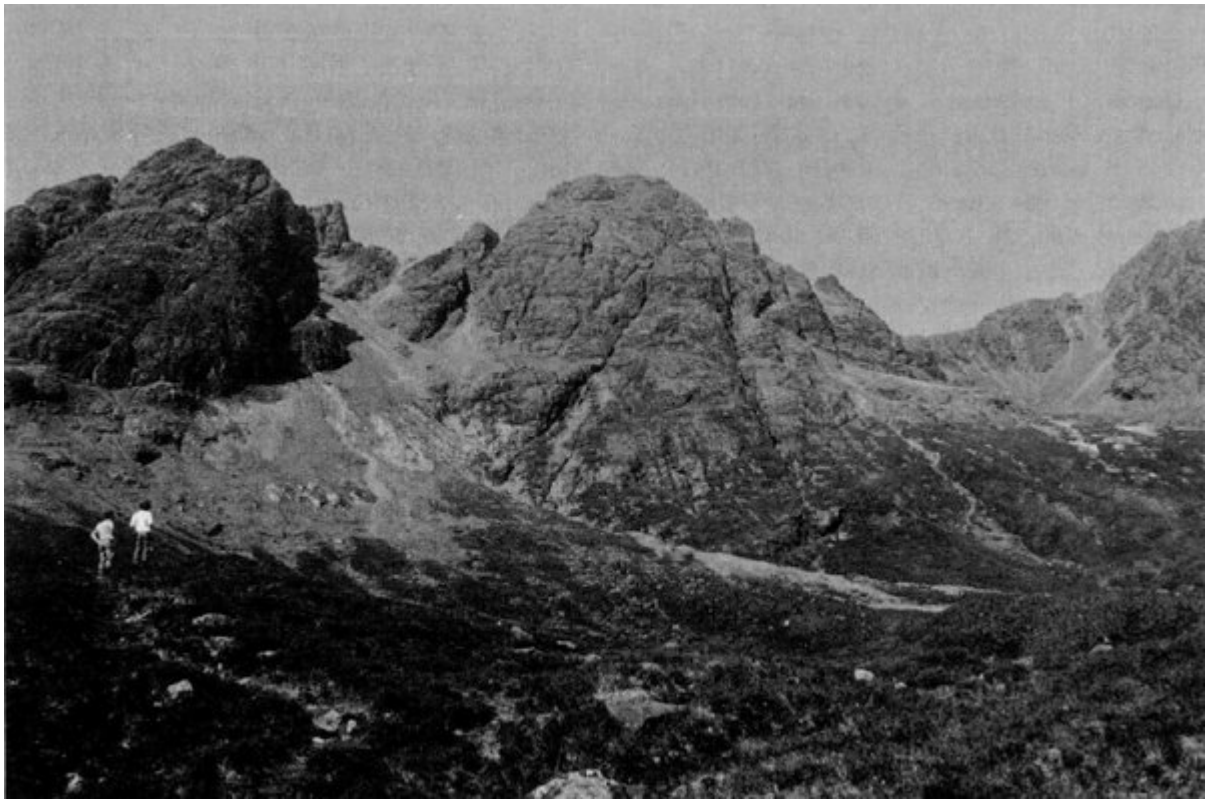
Basalt lavas

Torridonian sediments

(Table 2.5) Succession in the Cuillin Hills site (after Bell and Harris, 1986, pp. 45–6)



(Figure 2.22) Geological map of the Cuillin Hills site (after Gass and Thorpe, 1976, figure 6).



(Figure 2.17) East face of Bla Bheinn formed by gabbros cut by later dykes (weathering to give notches) and cone-sheets (forming terraces on faces). Pale rocks at lower levels are the Coire Uaigneich Granite and Mesozoic sediments against the gabbros. Coire Uaigneich site, Skye. (Photo: A.P. McKirdy.)