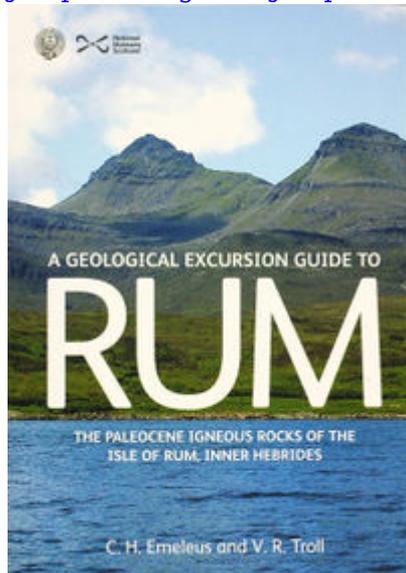


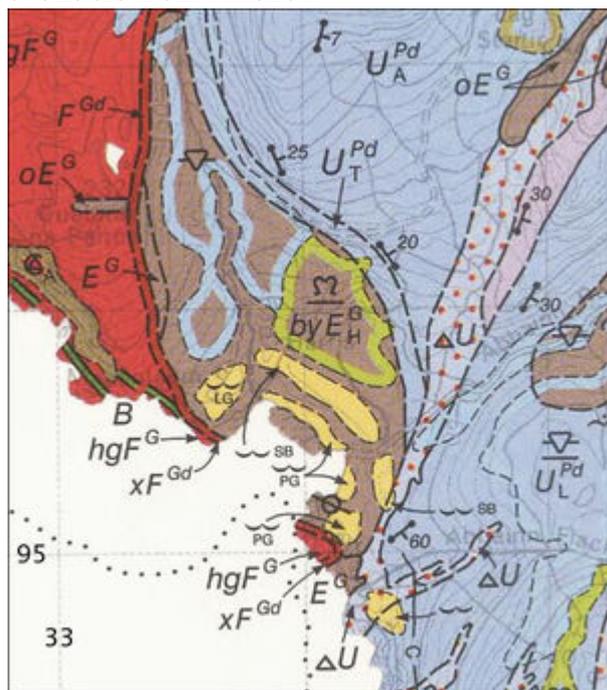
Central Intrusion, Harris, Rum - an excursion

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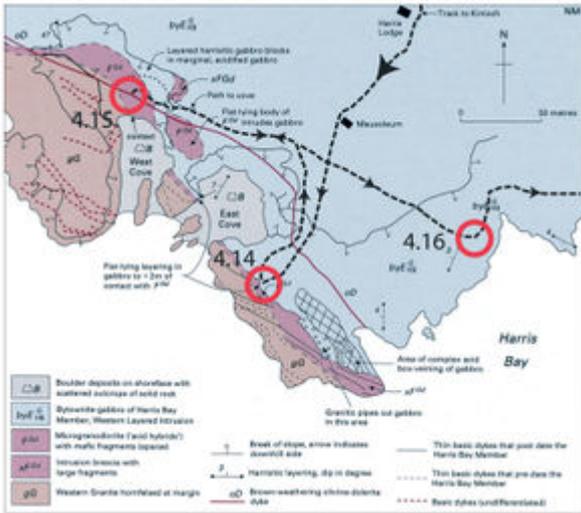
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Geological map of the Harris Bay area, Excursion 4b. Extract from BGS 1:50,000 map of Rum © NERC [Full map and key](#).



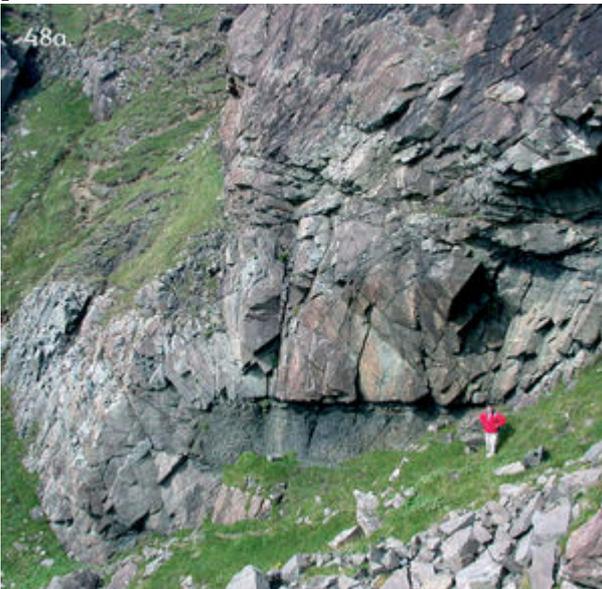
Geological map of western Harris Bay, showing details of the contact between the Western Layered Intrusion and the Western Granite (after Emeleus, 1997 /© NERC) (see pp. 148-49 for full key).



Layer of coarse-grained harrisitic olivine in bytownite gabbro of the Western Layered Intrusion, Harris Bay. Scale: hammer shaft c.35 cm.



Sea-cliffs of granite intruded by numerous north-west-trending basaltic dykes and inclined sheets. Western Granite on the west side of Harris Bay. The shelf at the top of the cliffs is a pre- Late Devensian rock platform.



Tongues of harrisitic gabbro in bytownite gabbro (Western Layered Intrusion) extending into hybrid granite zone to the left. Locality 4.15, Cove west of mausoleum, Harris Bay.



Close-up of contact, about 8 m to left of person in Figure 48a. Scale: hammer c.30 cm. The contact is highly irregular in detail, with some intrusion breccia in places.



Zone of intrusion breccia at the contact of the Western Granite with bytownite gabbro of the Western Layered Intrusion, Locality 4.17, East end of Harris Bay. The line of dark blocks is a dyke broken up in the remobilised acid (felsic) matrix. (Photo: Emeleus/BGS © NERC)



Layered gabbro in the Western Layered Intrusion intruded by rheomorphic felsic

veins derived from remobilisation of the earlier Western Granite in this area. The felsic magma has been channelled along planes of weakness provided by the layered structures. Locality 4.17, east side of Harris Bay. Scale: hammer shaft 30 cm.

Excursion 4B from: Emeleus, C. H. and Troll, V. R. [A geological excursion guide to Rum: the Paleocene igneous rocks of the Isle of Rum, Inner Hebrides](#). Edinburgh : Edinburgh Geological Society in association with NMS Enterprises Limited, 2008.

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Introduction

Highlights(Excursion 4A) Exposures in the Central Intrusion close to the road to Harris and to the west and south of the Long Loch include excellent examples of layered troctolite, apparent erosion of troctolite by 'debris flows' crowded with peridotite 'cobbles' and 'pebbles', and blocks of layered troctolite and feldspathic peridotite ranging in size from a metre to many tens of metres in breccias with highly disturbed feldspathic peridotite matrices. Further south, unusual feldspar and olivine growth structures occur in the Central Intrusion and also in the Western Layered Intrusion, which may be visited in the latter part of the day. The excursion may be extended (**Excursion 4B**) by continuing to Harris Bay (a long walk), where layering in gabbros extends to within a few metres of the contact with microgranite and where the complicated contact between the Western Layered Intrusion and the Western Granite is excellently exposed in sea cliffs.

Excursion 4B

Locality 4.12 North of Harris Bay - roadside exposures of harrisitic structures [NM 341 963]

Roadside exposures in crags at the transition between the gabbroic Harris Bay member and the

overlying peridotites of the Ard Mheall member contain excellent examples of harrisitic structures (Wadsworth, 1961).

Locality 4.13 Harris - spectacular layering in gabbros north of bridge [NM 3377 9602]

On the approach to Harris, strongly contrasting, flat-lying, feldspathic and mafic layering occurs in gabbro on the east side of the Glen Duian Burn, close to the bridge. Continue to Harris Lodge [NM 3366 9574], and cross the flat ground south to the low cliffs about 100 m south-south-west of the mausoleum.

Locality 4.14 West end, Harris Bay - contact of layered gabbro (with harrisite) and microgranite [NM 3350 9560]

To the south-south-west of the mausoleum, the layered rocks are separated from microgranite by a thin zone of gabbro, and basic and acid hybrid rocks. There is a limited development of intrusion breccia and some intricate felsic net-veining of the gabbro (Greenwood, 1987). Flat-lying harrisitic layers ([See image](#)) crop out to within a metre or so of the contact zone; some layers appear to bifurcate. Numerous hornfelsed basaltic dykes cut the microgranite, and dykes and sheets are common in the microgranite exposed in the sea cliffs to the north-west ([See image](#)). It is difficult to verify that the dykes are truncated by the mafic rocks, since most appear to die out close to the contact, but the dykes are commonly cut by thin felsic veins in the contact zone. Microgranite at and near the contact has a dull, matt-grey appearance, contrasting with the usual cream-white colour elsewhere in the Western Granite. Thin section examination shows that the rock has been extensively recrystallised; fingerprint textures are present in the plagioclase phenocrysts and aggregates of hypersthene, augite and opaque minerals pseudomorph the original mafic minerals.

Locality 4.15 Cove west of Harris Bay - contact between gabbro and hybridised microgranite [NM 3348 9565]

West of the mausoleum a path leads down to a cove where the contact zone is exposed ([See image](#)), ([See image](#)). Cliffs on the west of the cove expose grey microgranite cut by numerous sheets and dykes of dolerite and basalt striking approximately parallel to the coast (i.e. north-west). The microgranite is in contact with a felsic hybrid rock characterised by an acicular development of mafic minerals. Near the west end of a small cliff next to the path on the north side of the cove, the felsic hybrid is in fairly well-defined contact with contaminated (silicified) gabbro characterised by a patchy pegmatitic crystallisation. A few metres east of the contact the silicified gabbro contains xenoliths of layered gabbroic rock. Faint layering occurs in gabbroic rocks at the eastern end of this face and a thick band of gabbro, similar to that in the xenoliths in the contaminated gabbro, crops out at path level.

The contact between layered gabbros of the Harris Bay Member and microgranite belonging to the Western Granite is also extremely well exposed at the east end of Harris Bay. To reach this locality from the mausoleum, cross the Glen Duian burn near the shore (or go upstream and use the road bridge [Locality 4.13] if the river is high), and continue east, either along the layered gabbro benches on the rocky foreshore or walk along the low cliffs, on the magnificent late-glacial storm beaches at the back of the bay. There is a bridge over the Abhainn Rangail at [NM 3450 9555], although it is normally possible to cross the river close to the shore. The contact is exposed on a promontory about 350 m to the south and is most easily approached over the grass-covered storm

beach. Note that here, and elsewhere, the boulders and cobbles in these beach deposits consist largely of microgranite and (Torridonian) sandstone. Gabbro and peridotite are virtually absent, presumably having disintegrated under the turbulent conditions when the beaches formed.

Locality 4.16 Harris Bay - shelves eroded in well-layered gabbro [NM 373 958]

Slabs and cliffs on this part of the coast and for some hundreds of metres to the east, provide the best exposures of the gabbroic rocks of the Harris Bay member, including good examples of harrisitic structures (cf. Donaldson *et al.*, 1973; [\(See image\)](#), [\(See image\)](#)).

Locality 4.17 East end Harris Bay - intrusion breccia at gabbro/microgranite contact [NM 3405 9505]

Gabbro with flat-lying layering occupies most of the promontory, but a small area of baked, bleached microgranite crops out on the south side. The gabbro and microgranite are separated by a zone of intrusion breccia several metres in width, consisting of angular and subangular blocks of basalt, dolerite, gabbro and rare peridotite, from 0.5 to 2 m in diameter, in a felsic matrix which is continuous with the microgranite ([\(See image\)](#), [\(See image\)](#)). The breccia appears to be in steep contact with the layered gabbros and transgresses the layering. Felsic net-veining is widespread and extends for several metres into the mafic rocks where it forms flat-lying sheets and zones conformable with the layering ([\(See image\)](#)). Within the breccia zone there are trains of even-textured basaltic fragments which represent dykes in various stages of disintegration, and in one instance a dyke in microgranite may be followed into a train of blocks ([\(See image\)](#)). A few fragments of dolerite have rounded, lobate, fine-grained selvages against the felsic matrix, suggesting that there was limited co-existence of mafic and felsic magmas.

From the rocks of the Harris Bay localities it is clear that the emplacement of hot, mafic material into earlier granitic rocks resulted in generation of rheomorphic silicic magma, with the formation of intrusion breccias and felsic net-veining, a phenomenon that is common throughout the central complexes of the Palaeogene volcanic districts (e.g. Blake *et al.*, 1965). Return to the Abhainn Rangail bridge and walk upstream for 150 m.

Locality 4.18 Abhainn Rangail - peridotite breccia in Central Intrusion, with chromite seams [NM 3450 9557]

At the junction of the Abhainn Rangail with the Allt Lag Sleitir, which enters from the north-west, ultrabasic breccias belonging to the Central Intrusion crop out in the stream bed ([\(See image\)](#)). The breccias consist of angular and subangular blocks of peridotite and feldspathic peridotite in a feldspathic peridotite matrix containing thin seams of black, lustrous chromite. They were interpreted by Wadsworth (1961) to have formed at fault-scarps in a magma chamber and by Donaldson (1975) to be intrusive breccias. Walk due north for 800 m to regain the road near Hugh's Brae [NM 345 964]. Return to Kinloch (c. 8 km), examining Localities 4.9 and 4.10 on the way (see above).

References

At all times follow: [The Scottish Access Code](#) and [Code of conduct for geological field work](#)

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