

Moine geology of the Ross of Mull. Itinerary B. Eastern limb of the Assapol Synform (2) - an excursion

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By Tony Harris

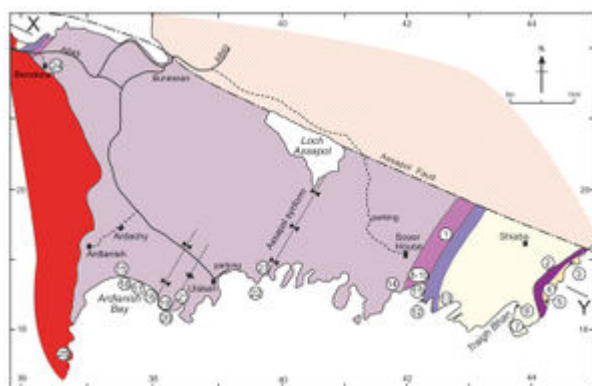


Fig. 1.1 Simplified geology map of the Ross of Mull, showing the localities described in the text.

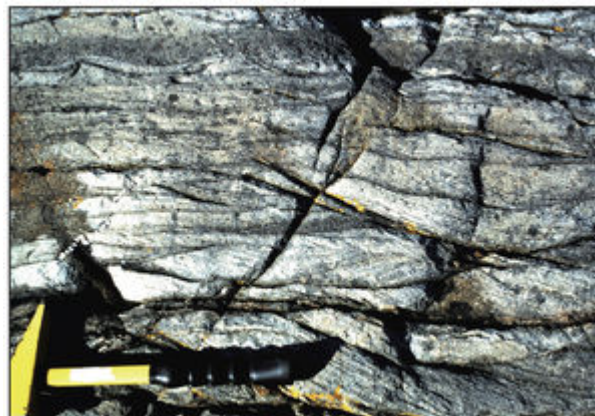


Fig. 1.3 Cross-bedding and cross-lamination within the Upper Shiaba Psammite at Locality 1.13.

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Excursion 1 Ross of Mull is composed of the following articles:

- [Excursion 1 Ross of Mull - introduction](#)
- [Itinerary A. Eastern limb of the Assapol Synform \(1\). Localities 1.1 to 1.7.](#)
- Itinerary B. Eastern limb of the Assapol Synform (2). Localities 1.8 - 1.14.
- [Itinerary C. Structure and lithologies within the Ardalanish Striped and Banded Formation, western limb of the Assapol Synform. Localities 1.15 - 1.20.](#)
- [Itinerary D. Western limb and core of the Assapol Synform. Localities 1-21 - 1.25.](#)

Itinerary B - Eastern limb of the Assapol Synform (2); access via Scoor House.

Distance is either 3 or 4.5km, depending upon inclusion of Localities 1.13 and 1.14, taking 4-6 hours.

Access is via Scoor House and Farm (for the route to the house see Itinerary A). Turn right (south) in front of the house, passing the old steading on your right; following the path around you arrive at a gate, adjacent to a cottage, that leads on to the hill. This area is very wet in bad weather. The adjacent rocks and smooth rock surface that are passed on the way to the gate form the top of the same 2-3m-thick dolerite sheet on which Scoor House stands and which you will have encountered in several places on Itinerary A.

Locality 1.8 - Geological viewpoint. [NM 4208 1884]

Pass through the gate and turn left, skirting the side of the hill towards the fence that runs south-southeast up the hill from a large modern (2002) shed. Follow the fence on its western side until it reaches the top (~100m O.D.) of the very steep slope running down to Traigh na Sgurra - a beautiful sandy bay, flanked by large rock slabs ([Fig. 1.1](#)). From a suitable vantage point to the west of the bay (Locality 1.8) and looking east along the coast, the control of the configuration of the headlands by the strike of the subvertical Moine rocks can be appreciated. Note also the brown colouring and distinctive columnar jointing of the same dolerite sheet that crops out at Scoor.

Locality 1.9 - S_0/S_2 relationships within the Ardalanish Striped and Banded Formation. [NM 4215 1882]

In high crags some 50m east of the fence [NM 4215 1882] alternating subvertical stripes and bands of somewhat gneissose pelite and semipelitic micaceous psammitic schist can be seen striking approximately 50° east of north and dipping 70° west. This is Locality 1.9. S_2 is marked by a preferred orientation of micas, producing a foliation dipping westwards at ~60°. Looking northeast

at the subvertical surfaces, the foliation appears to lie a few degrees clockwise of the bedding/banding; this implies that the F_2 folds are very tight and may have an interlimb angle as low as 20° . If the foliation is axial planar to the F_2 folds and the line of bedding/foliation intersection is not very steeply plunging, it also implies that there is an F_2 synform to the east and an F_2 antiform to the west. Although the distance to these inferred structures is unknown, it may be significant that the relationship is the same as that in the psammites at Locality 1.6, nearly a kilometre to the east.

Locality 1.10 - Scoor Pelitic Gneiss. [NM 4214 1876]

Return to the fence and follow it down towards the beach to the point where it bears round to the right [NM 4214 1876] and walk eastwards to Locality 1.10 ([Fig. 1.1](#)) where a large crag displays very well the characteristics of the Scoor Pelitic Gneiss. Here the psammitic bands that had been a feature of Locality 1.9 are absent and the exposure consists of alternating stripes and bands of pelitic and semipelitic somewhat gneissose material, showing clear indications of original compositional layering, probably bedding. The mineral assemblage comprises quartz, plagioclase feldspar, biotite, muscovite and almandine garnet. The S_2 foliation dips generally west and looking northeast at steep faces, appears to lie slightly clockwise of the subvertical banding, i.e. as at Locality 1.9. Here the relationship, so clear at Locality 1.9, has been complicated by the overprinting by D_3 open crenulations of the S_2 planes and the planes of bedding/banding. The axial surfaces of the crenulations dip gently eastwards, while the hinges of the crenulations plunge shallowly seawards.

Locality 1.11 - S_0/S_2 relationships within the Scoor Pelitic Gneiss; Tertiary intrusion. [NM 4231 1873]

Looking back up the hill and eastwards across the Blown Sand on the narrow low raised beach, the relationships of the major dolerite sheet with the Moine can be appreciated. At the eastern end of the bay, to the west of a fault gully trending 060° [NM 4231 1873], there is an exposure of interbanded pelitic gneiss and micaceous psammite which is Locality 1.11 ([Fig. 1.1](#)). Looking north-northeast, the S_2 foliation again dips clockwise of the dip of bedding and is weakly crenulated. The dolerite sheet above and to the north-northeast of this locality carries xenoliths of a psammite different from that in the adjacent country rocks. These xenoliths were probably derived from the Upper Shiaba Psammite to the east, implying an east to west direction of flow of the magma.

Locality 1.12 - Top of the Lagan Mor Formation. [NM 4229 1854]

From the east end of the beach move south to the headland, a difficult scramble and, especially when wet, the fallen slabs of pelite and dolerite are extremely slippery. Near the headland at the traverse encounter a band of white pure quartzite, about a metre thick. This bed is Locality 1.12 ([Fig. 1.1](#)) and marks the stratigraphic top of the Lagan Mor Formation, the main outcrop of which is in the Lagan Mhor Bay to the east. At the headland there are excellent exposures of pelitic gneiss, of quartzite and of the dolerite sheet. A second, higher, dolerite sheet marks the top of the headland. Cross-bedding younging westwards has been recorded in the quartzites. These exposures are at the top of the transitional sequence between the Shiaba Group (= Morar Group) psammites to the east and the Shiaba Pelite of the Assapol Group (= Glenfinnan Group) to the west; thus they constitute part of the evidence for a stratigraphic transition from the Morar Group to the Glenfinnan Group (Holdsworth *et al.*, 1987, figures 3 and 4).

Locality 1.13 - Transition from the Lagan Mor Formation into the Upper Shiaba Psammite. [NM 4251 1834]

Lagan Mor Bay is Locality 1.13, and a traverse across the bay for some 60m ([Fig. 1.1](#)) shows the

intensely flaggy nature of the interbanded, subvertical N10°E-striking pelite/quartzite of the Lagan Mor Formation. Towards the east, quartzite passes into siliceous psammite, locally with cross-bedding in which the angles between sets of lamination have been severely reduced. At the headland on the eastern side of the bay [NM 424 183] the rocks have passed by transition into the rather flaggy, highly strained psammites with poorly preserved cross-bedding that have been referred to as the Upper Shiaba Psammite by Holdsworth *et al.* (1987). These psammites pass, also by transition, stratigraphically downwards into weakly strained psammites of fluvial or shallow marine origin (see also Glendinning, 1988). They carry complex sedimentary structures, including beautifully preserved cross-bedding with somewhat over-steepened cross-lamination, slumps and dewatering structures (Fig. 1.3). The best localities are around [NM 4251 1834]. *Please photograph, not collect.* Younging is unequivocally towards the west across bedding that strikes just west of north and is subvertical. Access to and within the immediate vicinity of this locality is difficult with strong fissuring that, on the landward side, can be treacherously covered by thick vegetation.

One locality (14) is especially valuable in demonstrating the complex structural history of the rocks on the eastern limb of the Assapol Synform; this is described below. Being accessible from Scoor House, the locality could be visited in conjunction with either Itinerary A or B.

Note: The note accompanying Locality 1.7 indicated that Itinerary B could be run in reverse, if time permitted at the end of Itinerary A. This would have the advantage of passing through the whole sequence from oldest to youngest. That note recommends joining Itinerary B at [NM 425 184]; this is only a few tens of metres east along the coast from Locality 1.13 described above. This precise location can be identified by the presence of a subvertical ~1m basaltic dyke approximately concordant with the bedding/banding in the psammite; the continuation of the dyke to the south is clearly visible across the Slochd a Mhuil inlet. The dyke itself is remarkable for the spinifex texture involving feathery pyroxene crystals at its margins.

Locality 1.14 - F₂/F₃ relationships within the Ardalanish Striped and Banded Formation on the eastern limb of the F3 Assapol Synform. [NM 4165 1847]

This can be accessed from Scoor House using the gate at [NM 4190 1905] mentioned at the start of Itinerary B. From the gate, walk southwest for about 200m, crossing a marshy burn/drain (do not follow this to the sea) and a low ridge trending north-south towards the sea. Using a gap in the substantial stone dyke, pass along the western side of the ridge, at the eastern edge of an extensive marshy area formerly cut for peat. This marshy area is drained by a small burn that plunges over a fall [NM 4169 1862] and flows via a narrow alluvial strip almost due south to the sea. (Please note that although the burn itself is not shown on either the 1:10,000 map or 1:25,000 map, the V-shaped contours defining its valley are shown.) The mouth of this valley, here some 25m wide, and in close proximity to the foreshore is Locality 1.14 (Fig. 1.1). Two parts of this locality are of particular interest: # on the east side in the subvertical wall of the valley, looking towards N25°E, is a pair of almost upright F₂ folds verging towards a synform to the east-southeast. The plunge of a D₂ lineation on the folded foliation surfaces is 30°NNE, unequivocally steeper than the crenulation lineations caused by the crumpling of the foliation surfaces by small-scale F₃ folds. Looking north-northeast, it can be seen that the S₂ foliation transects the banding clockwise, while the axial planes of the D₃ crenulations transect the banding and S₂ anticlockwise;

1. the rocky knoll in the centre of the valley mouth [NM 41655 18476],
2. just above HWM, can be used to demonstrate most of the structural history of the area. Looking at the seaward side of the knoll, a pair of tight F₂ folds, with S-shaped vergence, is disposed generally horizontally. These are transected by axial planes of F₃ crenulation cleavage dipping 70°E. A tight S₂ crenulation cleavage related to the F₂ fold pair is shallowly inclined/subhorizontal; these crenulations have crumpled an earlier penetrative mica fabric (

S₁).

3. on the western side of the valley, the banding and early foliation (S₂) have been bent down to become subvertical, and thus complete an F3 fold pair that verges westwards to a synform, the distant Assapol Syncline.

References

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

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