North Sandwick

[HU 550 957]–[HU 550 969]

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Introduction

The section at North Sandwick, on the east coast of the island of Yell, provides over 1 km of continuous coastal exposure of banded psammites and pelites of the Yell Sound Group, which underlies most of Yell, and is an easily accessible locality for the study of these rocks (Figure 9.8). In particular, this site provides excellent exposures of a unit of quartzite, pelite and semipelite known as the Cullivoe 'Lens' (Flinn, 1994). Rocks of the Hascosay Slide Zone are also exposed.

Description

Psammites and semipelites of the Cullivoe 'Lens' are especially well exposed on the beach at Sand Wick [HU 548 966] where they have been polished by the sea and sand. The bedding dips steeply to the west and the rocks are banded on a scale of about 10 cm, reflecting small variations in mica content (Figure 9.9). They have a strong schistosity parallel to the compositional banding, and a weak mica-fabric lineation that plunges northwards at about 10°, parallel to the axes of small-scale, intrafolial, tight to isoclinal folds. The layer-parallel schistosity is a characteristic of the rocks of Yell, whereas the lineation development is much more variable across the island (Flinn, 1994).

Exposure is continuous in the cliffs to the north and south, but there the rocks are less favourably weathered. The lithology remains constant to the south, but to the north the psammites become increasingly siliceous and eventually quartzitic, whereas the micaceous bands become more pelitic.

At the beach at Sand Wick the more mica-rich bands are somewhat coarser in grain size than the mica-poor bands, probably due to the onset of recrystallization, as described by Flinn (1995) and as seen in the Gutcher GCR site. This is supported by the presence in places of near-microscopic quartz-feldspar augen (proto-leucosomes). The coarser micaceous bands have a fissile schistosity causing them to break into flakes when hammered. This fissility increases gradually but continuously to the south, so that hammering the rocks close to the Bluemull Sound Fault produces only a handful of postage-stamp-like flakes. The rocks look sheared, but are shattered, with the fractures coincident with the schistosity.

At the northern end of Sand Wick [HU 551 970], quartzite beds varying from several centimetres to several metres in thickness are interbedded with coarse-grained, schistose pelite units that contain laths of blue kyanite up to 2 cm long, together with garnet and stauro-lite. Along the mica schist band to the north, there are coarsely crystalline quartz-kyanite segregation veins up to 10 cm across. Close to the Bluemull Sound Fault the rocks have been shattered, giving rise to crushing of the quartzites and highly fissile pelitic rocks. The shattering becomes extreme for a few metres adjacent to the broad band of powdered rock, probably deeply weathered cataclasite, which forms the fault zone, and which has been preferentially eroded to form a prominent bay at [HU 552 970].

A variety of early and late igneous rocks can be seen within the North Sandwick GCR site (Flinn, 1994). Sparsely dispersed among the metasedimentary rocks are conformable hornblende schist bands of sub-millimetre grain-size studded with *c.* 2 mm garnets. These early intrusive mafic sheets are characteristic of the Yell Sound Group. Later intrusions include late-metamorphic tonalite sheets, irregular thin cross-cutting red-feldspar pegmatite veins and conformable late Caledonian lamprophyre sheets, many of which are xenolithic.

At the south end of the section, some 100 m along the beach beyond the last exposure of fissile shattered psammite, and on the east side of the Bluemull Sound Fault, is an isolated exposure of the Hascosay Slide Zone. This structurally complex mixture of hornblende-rich rocks and pegmatitic veins is described in more detail in the Cullivoe and Hascosay

GCR site reports (this chapter). The outcrop here is composed of laminated amphibolitic mylonite, partially mylonitized hornblende-feldspar gneiss and pegmatitic veins cut by veins of fine-grained hornblendite. The contorted mass is cut by veins of red-microcline pegmatite, which in turn are cut by a thin lamprophyre dyke. This single small exposure provides an insight into the structure and lithology of the Hascosay Slide Zone. The Hascosay Slide Zone is also exposed in the cliffs at the north end of the site, again to the east of the Bluemull Sound Fault. These exposures are particularly instructive with respect to the residual coarse-grained hornblendic gneiss masses contained in the laminated and banded mylonites.

Interpretation

The psammites, pelites and quartzites of the Yell Sound Group represent a metamorphosed sedimentary succession, which has been correlated with the Moine Supergroup of mainland Scotland, and thus is considered to be Neoproterozoic in age. Flinn (1994) suggested that the sedimentary succession was deposited originally in a deep-water basin, possibly by turbidity currents, and that the pelites and quartzites probably represent original facies variations.

These sedimentary rocks subsequently underwent a regional metamorphism during the Caledonian Orogeny, leading to the formation of psammites and pelites. Before or during the early deformation and metamorphism, dolerite or basalt sheets were intruded into the sedimentary rocks and were subsequently metamorphosed to form the garnetiferous hornblende schists. These mafic meta-igneous rocks, which are abundant in the Yell Sound Group, are also seen in the Glenfinnan and Loch Eil groups in mainland Scotland.

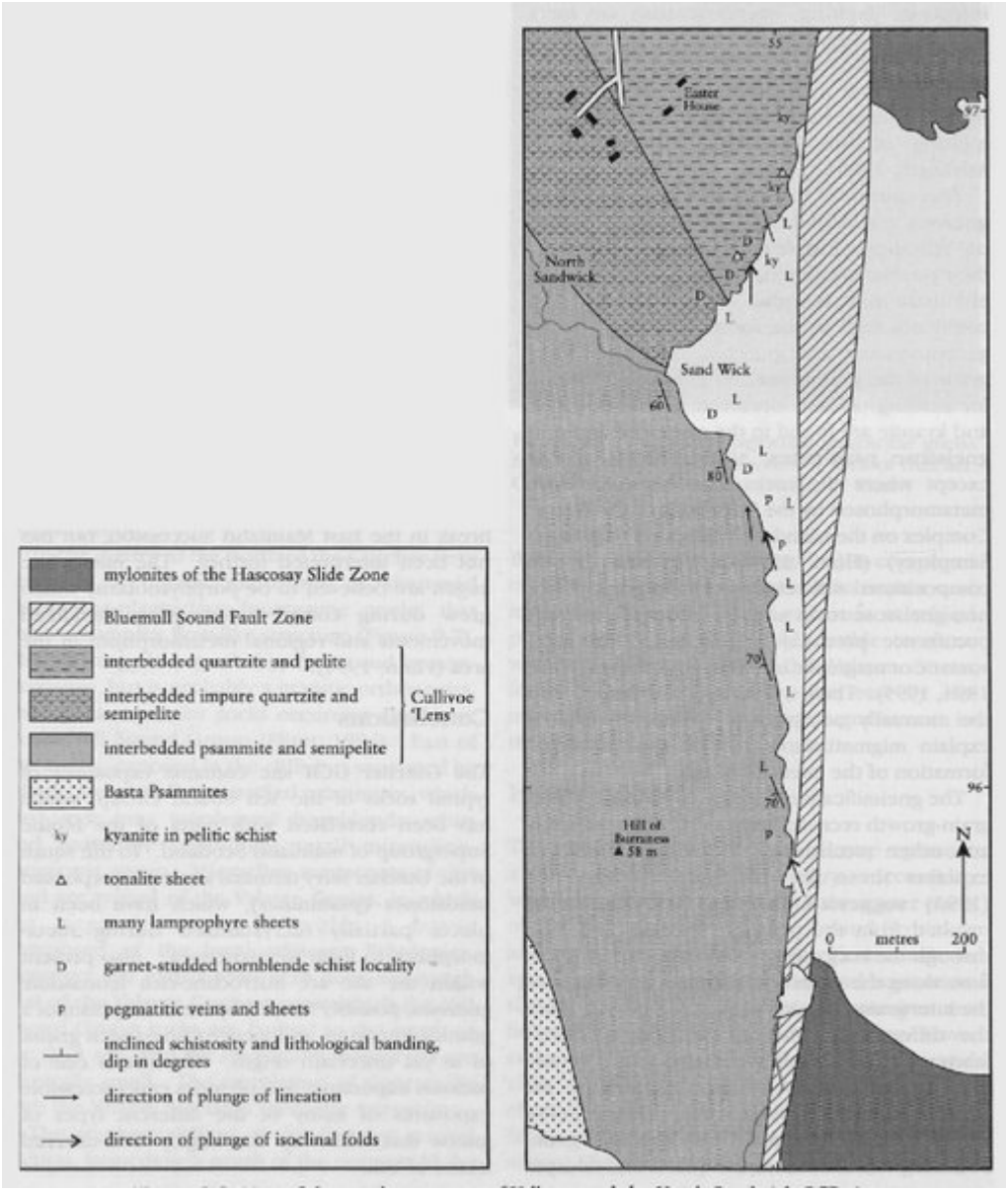
The main fabric formed in the rocks at North Sandwick during the regional metamorphism was the penetrative schistosity that developed parallel to the compositional layering and was subsequently reactivated a number of times (Flinn, 1994). The intrafolial folds seen at Sand Wick probably formed early in the metamorphism, but then continued to develop by becoming increasingly compressed. Associated with this deformation was the formation of the Hascosay Slide Zone, which appears to have formed through intense shearing of mafic and subsidiary felsic Lewisianoid gneisses, and minor psammites.

The Bluemull Sound Fault, which is seen in the North Sandwick GCR site, offsets the geological features of Yell by approximately 5 km dextrally (Flinn, 1994). Just to the south of Yell, this fault joins a major fault known as the Nesting Fault, which has an offset of some 16 km. These faults have probably been reactivated at several times, but their main movement is believed to be Jurassic in age.

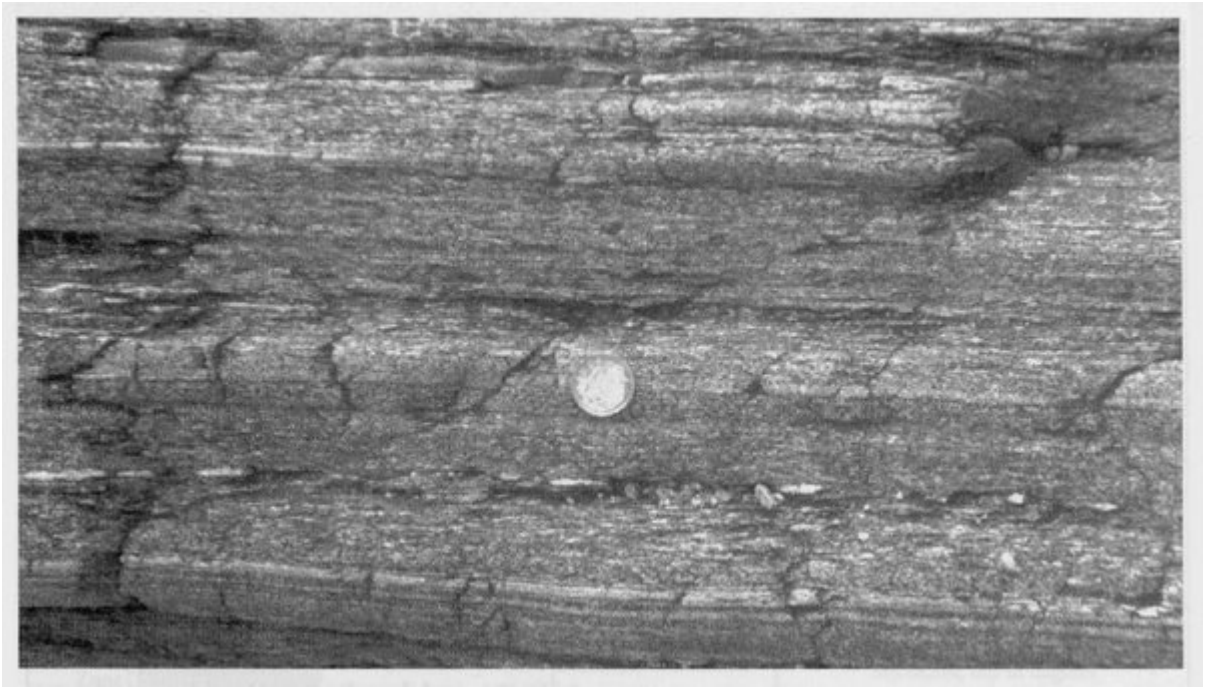
Conclusions

The North Sandwick GCR site is of national importance in that it contains excellent exposures of the more-uncommon lithologies of the metasedimentary Yell Sound Group, namely quartzite and kyanite-bearing pelite and semipelite of the Cullivoe 'Lens'. It also shows examples of the garnet-studded hornblende schists that represent early intrusive mafic sheets. These features assist its correlation with the Moine succession of the North-west Highlands of Scotland, and notably with the rocks of the Glenfinnan and Loch Eil groups. Also within the site are small, but instructive exposures of the Hascosay Slide and the Bluemull Sound Fault.

References



(Figure 9.8) Map of the north-east coast of Yell, around the North Sandwick GCR site.



(Figure 9.9) Interbanded mica-rich and mica-poor psammites in the Cullivoe 'Lens' on the south side of Sand Wick [HU 5487 9655]. Coin is 2.5 cm in diameter. (Photo: D. Flinn.)