Loch na Dal

[NG 703 160]–[NG 739 160]

A.D. Stewart

Introduction

The Sleat Group conformably underlies the Torridon Group in the Kishorn Thrust Sheet of Skye and is probably about the same age (*c.* 1000 Ma; Turnbull *et al.,* 1996). The lowest units of the Sleat Group, the Rubha Guall and Loch na Dal formations, are together about 1 km thick. The best and most easily accessible exposures of these formations are found on the Isle of Skye along the west coast of the Sound of Sleat and the east coast of Loch na Dal (Figure 4.10). This latter locality constitutes the type section (Peach *et al.*, 1907). It also exposes the immediately overlying Beinn na Seamraig Formation (see Kylerhea Glen GCR site report, this chapter). The Rubha Guail Formation was originally called the 'Epidotic Grit' by the Geological Survey (Peach *et al.,* 1907), but was renamed by Stewart (1975). The sequence dips north-west at angles ranging from 20° to 50° and lies on the lower right-way-up limb of the Lochalsh Syncline.

The Loch na Dal section shows interfingering alluvial-fan and lake deposits, the latter containing phosphatic laminae with acritarch microfossils. The rocks have been affected by very low-grade Caledonian metamorphism, which probably explains why they are grey rather than red. However, in spite of its structural position in the Lochalsh Fold of the Moine Thrust Belt, Caledonian deformation effects are weak and sedimentary structures are almost perfectly preserved.

Description

The Loch na Dal GCR site area covers a *c.* 4.5 ktn-long coastal section that stretches from Kinloch Lodge (Hotel) along the north-east shore of Loch na Dal to Ardnameacan [NG 715 148] and then ENE along the Sound of Sleat to *c.* 600 m beyond Rubha Guail [NG 7336 1556]. The base of the Rubha Guail Formation is not exposed in this GCR site, though it can be seen at Loch Alsh, where it overlies the Lewisian basement unconformably. The stratigraphically lowest beds in the Loch na Dal area occur on the coast 400 m north-east of Rubha Guail at [NG 7383 1595]. They are trough-cross-bedded coarse sandstones, arranged in what is essentially a single coset about 30 m thick. The next 70 m consist of sandstones interbedded with striped siltstones and mudstones (Stewart, 1962). The sandstone beds are trough cross-bedded and have erosional bases (Figure 4.11). Some of the striped beds have well-developed desiccation polygons. The rocks have been metamorphosed under greenschist-facies conditions and are all greyish-green in colour, due to the presence of chlorite in the mudstones and epidote in the sandstones.

South-westwards from Rubha Guail the coast section exposes grey and green, fine-grained sandstones and millimetre-laminated mud-stones, which overlie the sandstones described above. Sedimentologically these belong to the Loch na Dal Formation, but were included in the Rubha Guail Formation by the Geological Survey, presumably because of their green tints. They are about 170 m thick. The palaeocurrent directions inferred from trough-cross-bed fore-sets in the sandstones are tightly clustered around 073° (Sutton and Watson, 1960), suggesting that they were deposited on an E-inclined palaeoslope.

The overlying Loch na Dal Formation (800 m thick) consists of interbedded dark-grey mud-stones and grey sandstones. The contact with the Rubha Guail Formation is concealed by a shingle beach at the mouth of the Allt na Teanga Odhair [NG 7220 1504]. The sandstones of the Loch na Dal Formation are coarse grained, normally containing seams of quartz and K-feldspar grains up to 5 mm in size, and weather to a yellowish-grey colour. Grading is absent from the sandstones, but beds with ripple-drift lamination and rippled tops are common. Sorting is poor, so that many of the sandstones have textures similar to wackes, and wisps and fragments of mudstone are commonly incorporated. The mudstone units may be either massive or laminated on a millimetre-scale, and they contain rare phosphate laminae a few millimetres thick. W.L. Diver (pers. comm.) has reported acritarchs from the phosphate layers, but no details have been published.

The uppermost 200 m of the Loch na Dal Formation contains coarser-grained sandstone and less mudstone than the rest of the formation. The overlying Beinn na Seamraig Formation is not well exposed on the coast section, and its contact with the Loch na Dal Formation is concealed.

Interpretation

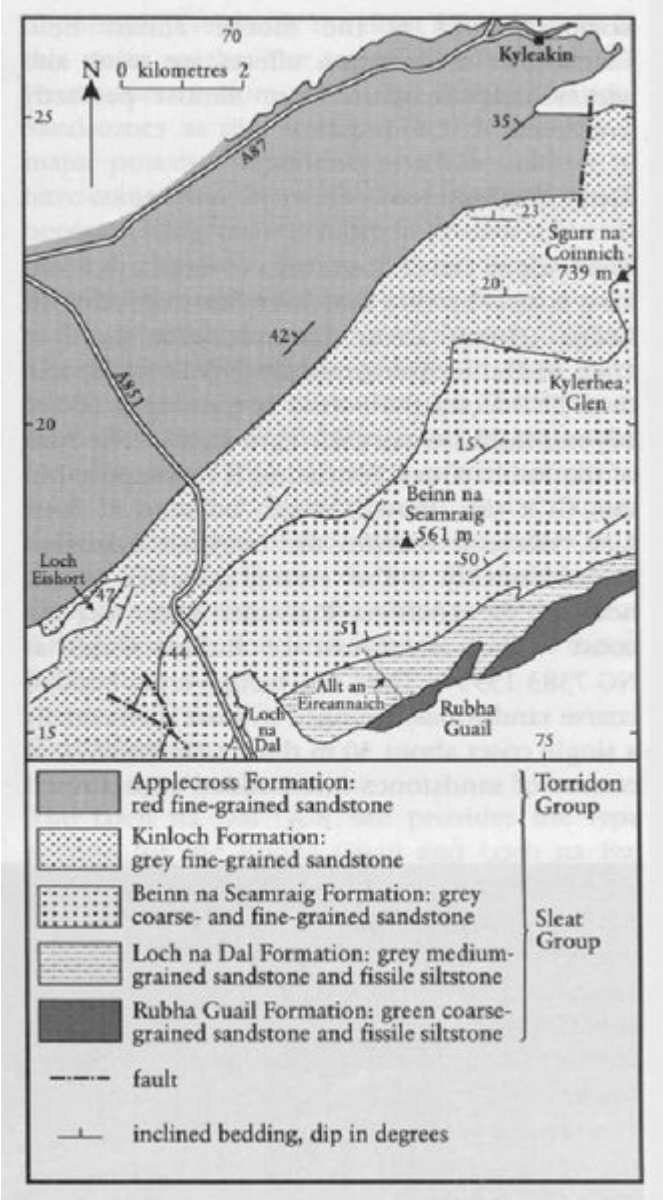
Substantial basement relief existed when deposition of the Sleat Group started. In Lochcarron, some 25 km north-east of Loch na Dal, both the Rubha Guail Formation and part of the Loch na Dal Formation are contained within palaeo-valleys eroded into Lewisian gneisses (Peach *et al.,* 1907). Farther south, in Skye, the Rubha Guail Formation contains gneiss blocks up to 30 cm across (Bailey, 1955). The basal breccias and trough-cross-bedded sandstones of this formation are thus interpreted as alluvial fans, which fine upwards and pass laterally into mud-stones deposited in lacustrine or shallow-marine conditions. This conclusion is confirmed by the normative mineralogy of the Rubha Guail sandstones, which is very similar to the local hornblende-biotite gneiss (Stewart, 1991a).

The coarse-grained nature of the sandstones in the Loch na Dal Formation indicates a nearby fluvial source. They are seen as having been deposited from the west by turbid underflovvs, close to a delta, which was building out into the lake or shallow sea in which the mudstones were deposited. Eventually the delta filled the lake at this point so that the top of the Loch na Dal Formation is dominated by channel sands. Sandstones at this stratigraphical level have a major potash component, which is unlikely to have come from the nearby basement and which becomes progressively more important upwards through the Sleat Group. These sands must have been contributed by a major fluvial system with a relatively distant source (Stewart, 1991a). The Sleat and Torridon groups in Skye have been carried as part of the Kishorn Thrust Sheet from their original position about 20 km to the east (Ramsay, 1969), where they are thought to have occupied a fault-bounded basin (Figure 4.2). Reactivation of the western boundary fault as the Kishorn Thrust during the Caledonian Orogeny may explain the absence of the Sleat Group from the foreland areas west of the thrust belt.

Conclusions

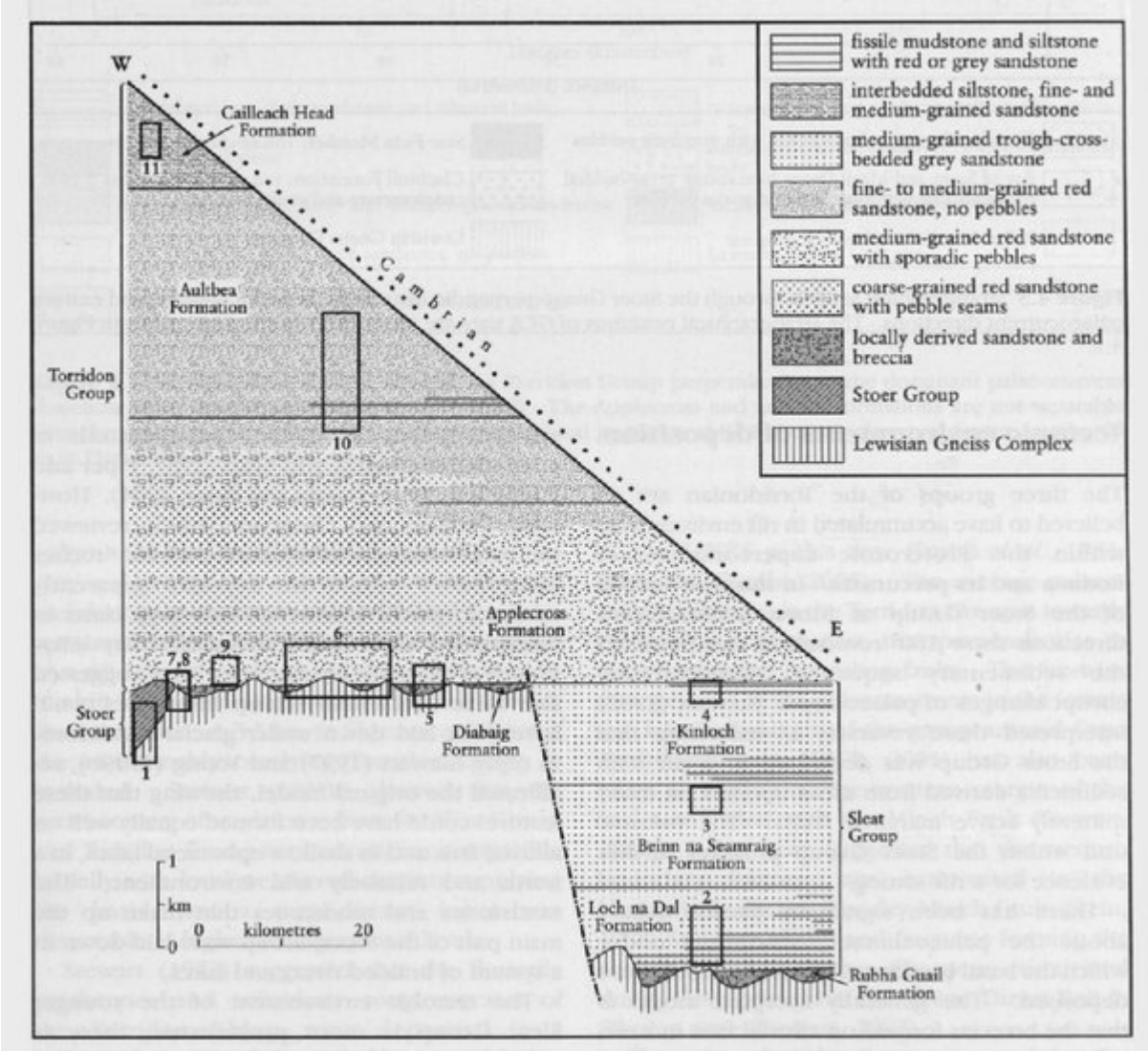
The Loch na Dal GCR site provides the type section for the Rubha Guail and Loch na Dal formations that make up the lower part of the Sleat Group. The sedimentary sequence in this site consists of alluvial sandstones and lacustrine or shallow-marine mudstones, deposited on an irregular surface of Lewisian gneisses during the initial subsidence of a rift-valley. The alluvial sands, supplied by streams coming from the west, gradually built out into a lake, generating a fining-upward sequence represented by the Rubha Guail and Loch na Dal formations. The site provides an important reference section through the older parts of the Torridon Group and is nationally important for teaching and research purposes.

References



(Figure 4.10) Geological map of the central part of the Sleat peninsula, Skye, showing the areas of the Loch na Dal, Kylerhea Glen and Loch Eishort GCR sites.

(Figure 4.11) Trough-cross-bedded epidotic sandstone, typical of the lower part of the Rubha Guail Formation in Skye. The grain size of the sandstone is coarse to very coarse, with a maximum of 5 mm. The observer looks roughly eastwards, parallel to the palaeocurrent direction. The locality is near high-water mark 60 m north-east of the mouth of Allt an Eireannaich [NG 7296 1535]. The hammer shaft is 50 cm long. (Photo: A.D. Stewart.)



(Figure 4.2) Diagrammatic section through the Torridonian, parallel to the dominant easterly palaeocurrent directions. The stratigraphical positions of GCR sites are shown as boxes, numbered as in Figure 4.1.