

North Skye 8:

Flodigarry to Staffin Bay



The coastal section between Flodigarry and Staffin in the NE part of Trotternish is dominated by Upper Jurassic marine shales and mudrocks. Sitting below the thick and extensive Paleocene lava field, they have been greatly disturbed by landslips that are still active, resulting in constant erosion of the foreshore.

Aspects covered: Upper Jurassic marine strata of the Staffin Bay and Staffin Shale formations; landslips; a section through a landslipped block of Paleocene lavas; historic exploitation of diatomite deposits.

Route: [Digg](#) – [Dunans](#) – [Kildorais](#) – [Lochan nan Dùnan](#) (-return [Digg](#)).

Distance: 6 kilometres (4 miles).

Time: 6/7 hours.

General comments: Coastal exposures are involved and, therefore, low (preferably Spring) tides are essential.

The foreshore (intertidal zone), due to a combination of the slippery rocks (mudstones and shales), the slippery boulders of basalt and dolerite that cover significant areas, and the slippery seaweed, is extremely slippery and demands that participants take extreme care not to slip whilst traversing parts of the foreshore. A walking pole is a sensible accompaniment. Additionally, the quality and quantity of exposure varies dramatically depending upon the amount of seaweed present on the foreshore. Exposures can disappear due to the movement of boulders during winter storms. On a longer timescale, marine erosion is constantly removing material from the back of the foreshore, as witnessed by fences that mark field boundaries above the foreshore collapsing onto the foreshore and requiring replacement as the land is slowly consumed as the landslips constantly push material seaward.

Access to the foreshore is another issue. The easiest access points are: [Digg](#) (An Dig); the end of the minor road east of [Loch Leum nam Bràdh](#); [Dunans](#); and, [SE of Flodigarry Hotel](#).

Locating some of the sections on the accompanying maps is difficult on what is a relatively featureless coastline. It is best achieved by reference to certain large boulders on the beach, sills within the sequence and some of the inland coastal features such as the entry points of small streams and manmade features such as disused boat slips.

Please be aware that dealing with this coastal section is difficult and can be, at times, frustrating. However, the reward is some interesting palaeontological, sedimentological and igneous intrusive features worthy of the effort made. These are illustrated, below, and no attempt is made to provide a location-by-location account.

If travelling by coach, the party can be dropped off and picked up from parking beside [Lochan nan Dùnan](#).

[Staffin Bay](#) is located in the NE part of Trotternish, 29km (18 miles) north of [Portree](#) on the main (A855/A835) coastal road. Along a narrow coastal section north of the bay, marine Upper Jurassic (Callovian, Oxfordian and Kimmeridgian) sedimentary rocks crop out between the High- and Low-Water lines. These strata dip at high angles and, in places, are severely faulted. The faults, with significant strike-slip displacements, are related to landslipping events since Quaternary times. Paleocene dolerite sills, plugs, and dykes also disrupt these rocks. Metamorphism of the Upper Jurassic strata is restricted to localised baking close to igneous contacts. Inland, to the west, unstable, landslipped material obscures the underlying geology, which appears to be dominated by Paleocene plateau lavas that dip to the west at a shallow angle. Boulder clay deposits also mask part of the underlying geology, especially SW of Staffin Bay.

Unless participants are experts in Upper Jurassic palaeontology, this excursion is best limited to a traverse of the section, to examine general features of the sequence and its marine fossil content, predominantly Boreal Realm ammonites and belemnites.

The sequence of Upper Jurassic sedimentary rocks that crops out in north Trotternish consists of:

[TOP OF SEQUENCE NOT EXPOSED]

STAFFIN SHALE FORMATION (Middle Callovian-Kimmeridgian)
(at least 113.60m):

Flodigarry Shale Member (41.15m)
Digg Siltstone Member (11.75m)
Glashvin Silt Member (16.35m)
Dunans Clay Member (37.20m)
Dunans Shale Member (7.15m)

STAFFIN BAY FORMATION (Lower Callovian)
(at least 18.75m)

Belemnite Sands (7.55m)
Upper Ostrea Beds (11.20m)

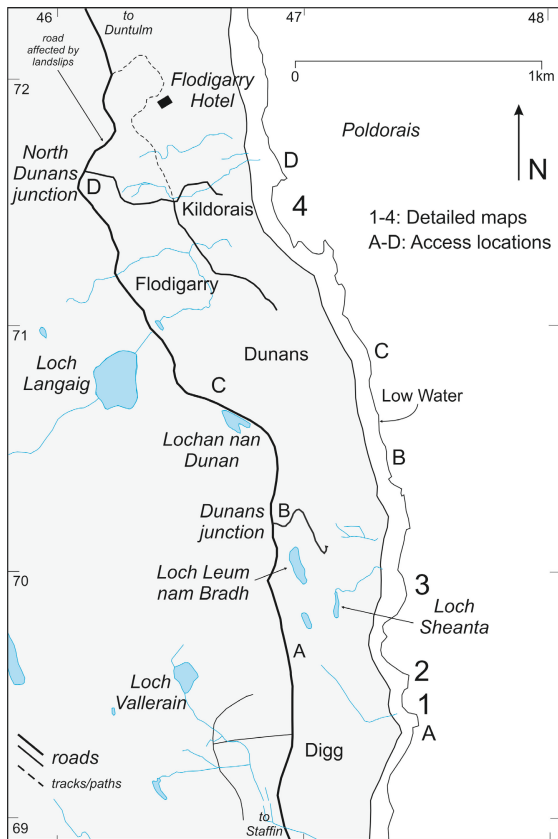
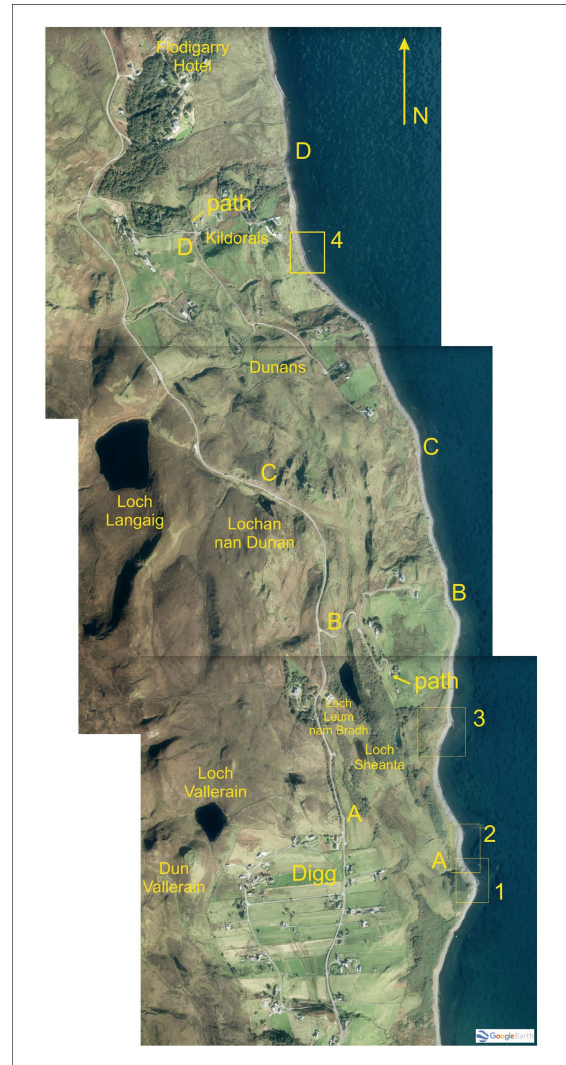


Figure North Skye 8.1: Location map and annotated oblique Google Earth® image for the Flodigarry – Staffin coastal section.



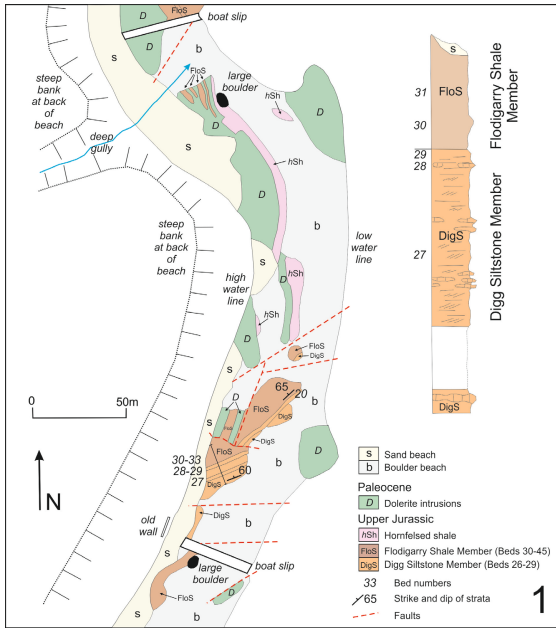


Figure North Skye 8.4: Costal section of areas 1 and 2.

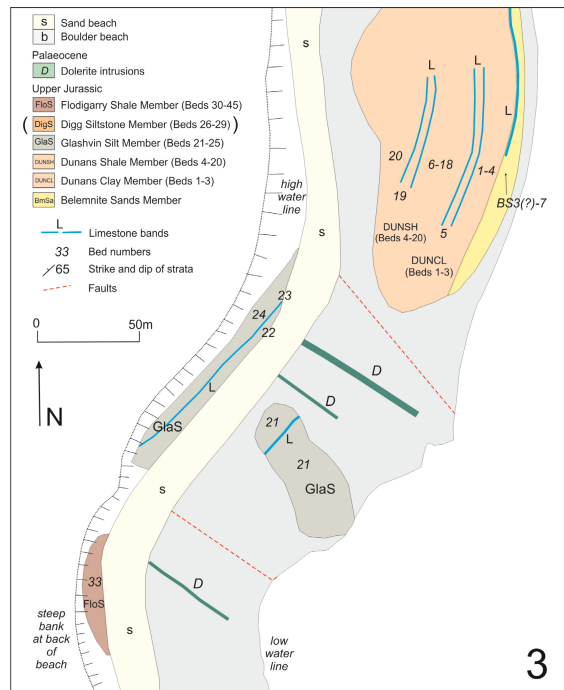
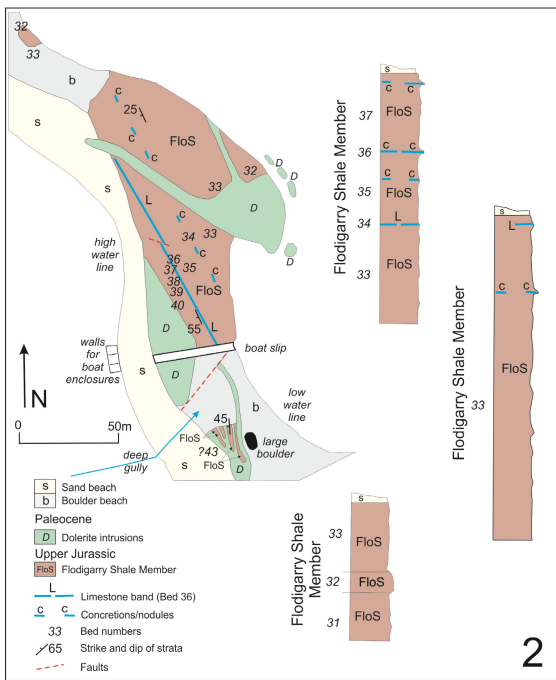


Figure North Skye 8.2: Map and stratigraphic columns for areas 1 and 2.

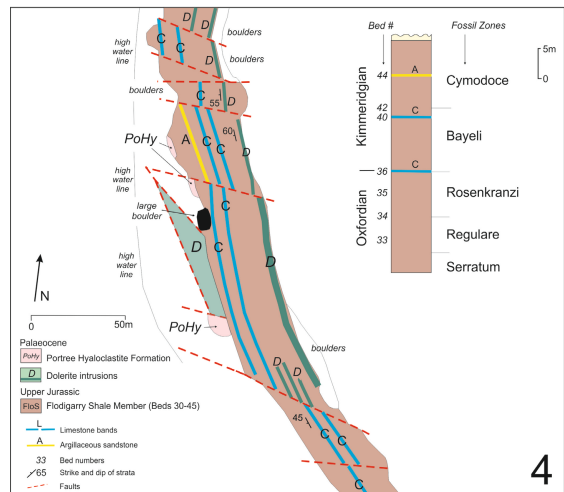


Figure North Skye 8.5: Map and stratigraphic columns for areas 3 and 4.

Figure North Skye 8.3: Annotated oblique Google Earth® image for areas 1 and 2.



Figure North Skye 8.6: Coastal section of Area 1.

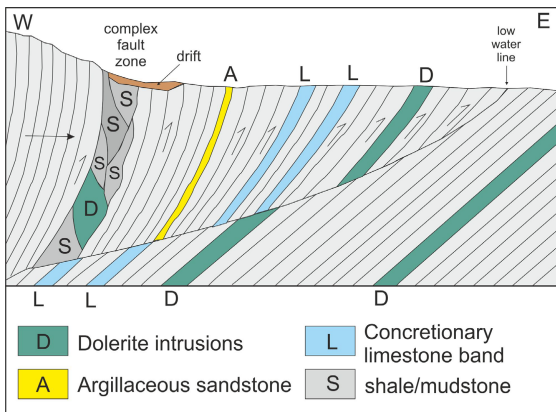


Figure North Skye 8.7: Schematic cross-section illustrating the general structural relations in a west-east section in the Flodigarry – Staffin coastal section.

Access points to the beach are indicated on **Figure North Skye 8.1**.

Below, are field photographs of some of the sedimentological, palaeontological and igneous intrusive features of the Flodigarry-Staffin coastal section. The dominant lithology is, in all cases, predominantly poorly/weakly lithified shale/claystone. The dip of the strata is typically steep, and faults can be bedding parallel. Parts of the sequence are relatively bituminous. Locations are not given, and these photographs should be treated as general images of the most common features.



Figure North Skye 8.8: Ammonite. Coin diameter c. 20mm.



Figure North Skye 8.9: Belemnites. Coin c. 20mm across.



Figure North Skye 8.10: Bivalve. Coin diameter c. 20mm.



Figure North Skye 8.11: Carbonate-cemented layer (concretion or 'cementstone'). Pole c. 1m long.



Figure North Skye 8.12: Carbonate-cemented layers (concretions or 'cementstones'). Pole c. 1m long.



Figure North Skye 8.13: Bedding-parallel carbonate concretion ('cementstone'). Hammer c. 30cm long.



Figure North Skye 8.14: Near-equidimensional carbonate concretion (or 'cementstone'). Pole c. 1m long.



Figure North Skye 8.15: Concretion with internal mineral (carbonate) growth ('geode'). Coin c. 20mm across.



Figure North Skye 8.16: Dolerite sill within shale/claystone. Thermal alteration is minimal. Pole c. 1m long.

Return to the public road. It may have been noticed that above the high-water line towards the south of the coastal traverse there are the rusted remains of a wagon. This is one of the remaining pieces of evidence for small-scale diatomite extraction from a loch within the Quiraing Landslip, NW of [Digg](#), adjacent to [Loch Vallerain](#). The deposit was discovered in 1886 and extracted from 1908 until 1913, first by the British Diatomite Company (until 1911) and thereafter by the Skye Mineral Syndicate Ltd until it was abandoned. Material was transported via an aerial ropeway to the coast east of [Digg](#), where a pier (now destroyed by the sea), had been constructed to enable shipping.

A brief detour to the site at [Loch Vallerain](#) can be undertaken if time and enthusiasm are available. Access is from north of [Digg](#), heading west towards the loch, located NE of the obvious mound of [Dùn Vallerain](#), the site of a fort, with only traces of walls still visible.



Figure North Skye 8.17: Rusted remains of a wagon used during Digg diatomite extraction.



Figure North Skye 8.18: Workers involved in the diatomite extraction at Digg.

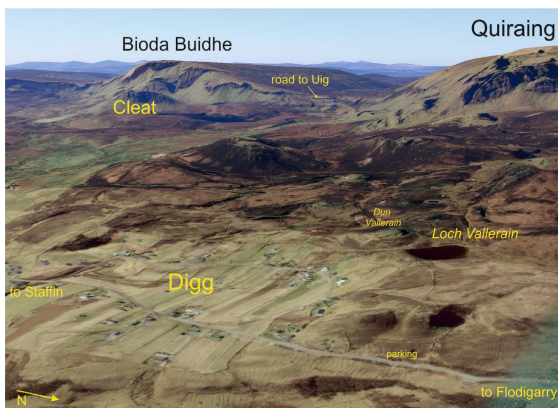


Figure North Skye 8.19: Oblique Google Earth© image of the Digg - Loch Vallerain area, site of (now abandoned) diatomite workings.

Return to the public road and proceed to the road-cut opposite [Lochan nan Dùnan](#) at [\[NG 4673 7063\]](#).

In the roadcut opposite [Lochan nan Dùnan](#), within a landslipped mass, is a tilted sequence of Paleocene lavas and sedimentary units, made obvious by the bright red/orange weathered tops (laterites) that have developed on the contemporaneous surfaces as the sequence accumulated.

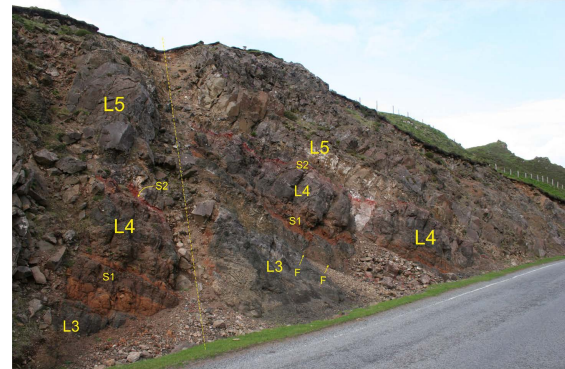


Figure North Skye 8.20: Paleocene volcanic and sedimentary section in roadcut opposite Lochan nan Dùnan. The sequence is repeated due to a fault that can be attributed to the Holocene landslip events. F, minor faults within the sequence. View looking towards NNE.

The sequence is dominated by basaltic lavas, typically with syn-volcanic weathered tops, in some instances with the development of a true laterite (a reddened clay-rich soil). Amygdales are ubiquitous, as are microphenocrysts of plagioclase.

Sedimentary unit, S1, is a polymictic volcanoclastic breccia-conglomerate, variable in thickness and partially infilling the upper surface of lava, L3. Sedimentary unit, S2, comprises an upper reddish-brown brittle silty claystone with clasts of laterite and altered basalt and (visible) near-euhedral vitreous crystals of clinopyroxene. The lower part of S2 is typically sandstone, locally conglomerate, that has infiltrated the brecciated upper surface of the subjacent lava, L4. Sorting is poor and predominantly matrix-supported.

The remarkably fresh clinopyroxene crystals within the upper part of S2, with reference to their lateritic host, are accompanied by microscopic remnants of glass shards and crystals of plagioclase and alkali feldspar, together with various hydrothermal minerals, mainly calcite and zeolites. The presence of these fresh minerals within S2, especially the clinopyroxene crystals, and the glass shards, suggest a pyroclastic origin for this material. However, the presence of other material (clasts of laterite and basalt) suggest that S2 is ultimately of sedimentary in origin, but contains components (crystals of clinopyroxene, plagioclase and alkali feldspar; glass shards) that indicate pyroclastic activity during the construction of the lava field.

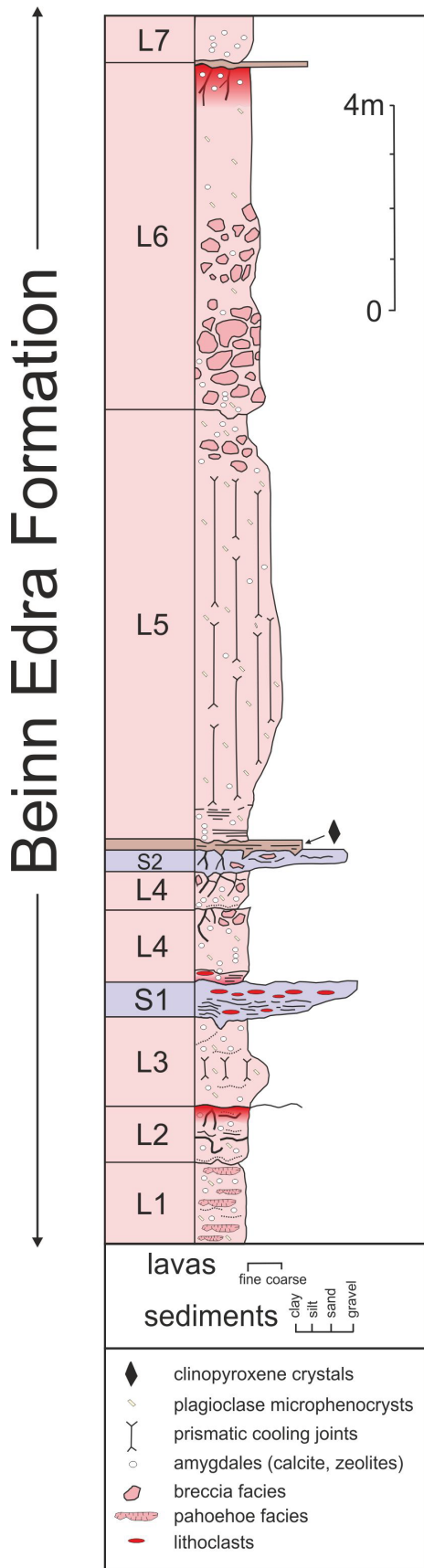


Figure North Skye 8.21: Summary log of the Paleocene volcanic and sedimentary section in roadcut opposite Lochan nan Dùnan.

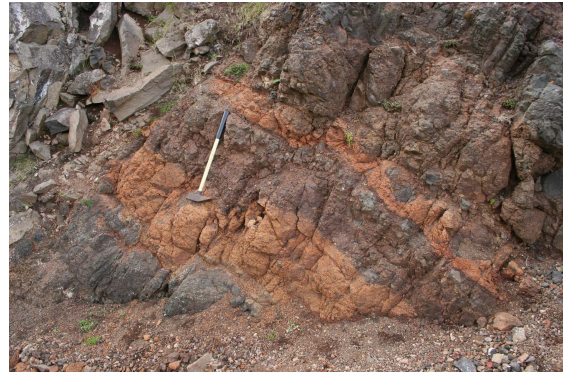


Figure North Skye 8.22: Detail of the sedimentary unit, S1, in roadcut opposite Lochan nan Dùnan. Hammer c. 60cm long.



Figure North Skye 8.23: Detail of the sedimentary unit, S2, in roadcut opposite Lochan nan Dùnan. Lens cap c. 80mm across.

Return to the parking area.

End of excursion.