

NORTH ELGOL COAST

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OS Grid Reference: NG516172

Introduction

Coastal sections north of Elgol on the Strathaird Peninsula (Figure 5.20) provide a rare opportunity to study a relatively complete section through the western Scottish Oxfordian strata. Though the beach, cliffs and hillsides north of Elgol provide excellent exposures, baking during the intrusion of the nearby Cuillins Tertiary Igneous Complex makes study of the succession difficult. The Oxfordian rocks exposed here all belong to the Staffin Shale Formation and are locally divided into four members: the Tobar Ceann Siltstone Member (in part), the Scaladal Sandstone Member, the Camasunary Sandstone Member and the Camasunary Siltstone Member (Figure 5.21). The headland of Rubha na h-Airigh Bàine and the foreshore just north of this headland provide the type sections for the latter three members.

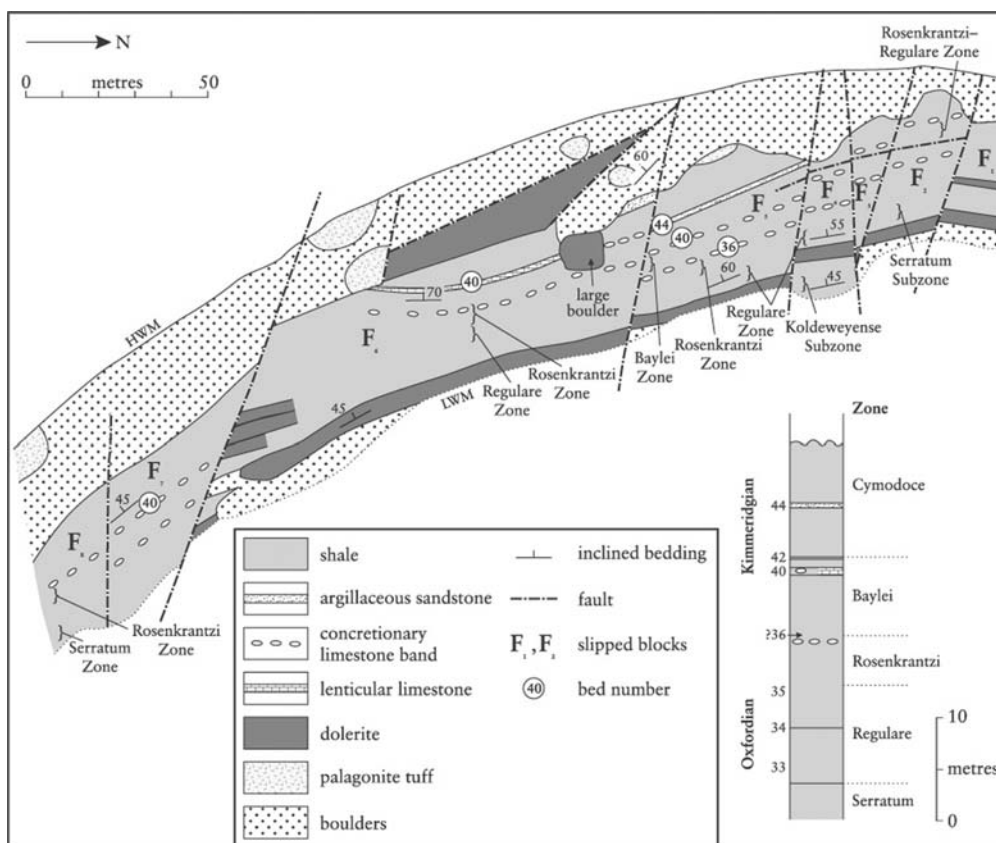


Figure 5.20: Locality map of the North Elgol Coast GCR site. Outcrop of the Oxfordian beds from BGS Sheet 71W (Broadford) (1976).

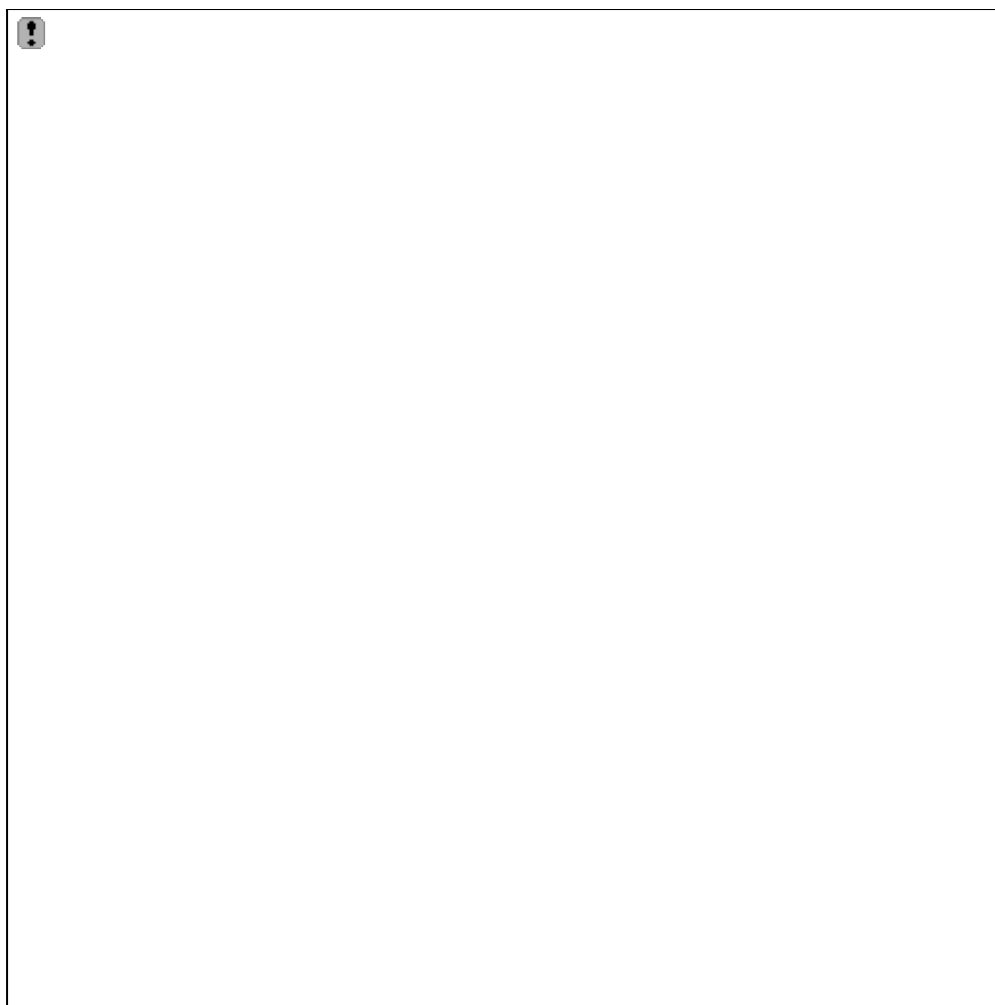


Figure 5.21: Stratigraphical log of the Elgol section (after Sykes, 1975, fig. 6).

The site has figured in accounts of the Scottish Jurassic deposits since this part of Skye was mapped by the Geological Survey in the early 1900s (Wedd, 1910). Though Arkell (1933) made only brief reference to this locality, the work of subsequent authors has shown it to be of considerable importance in elucidating the Oxfordian stratigraphy of the Hebrides Basin. Both Hudson and Morton (1969) and Turner (1966, 1970) made valuable contributions to understanding the Oxfordian geology of this area. However, it was Sykes' revision of the stratigraphy (Sykes, 1975) and the later studies of Sykes and Surlyk (1976) and Sykes and Callomon (1979) that have provided a firm basis for modern research.

Description

The sequence at Elgol is exposed in a synclinal structure, the core of which lies at NG 517 176. Of the four major sections through the Oxfordian in Scotland, this, though incomplete, is the thickest. The stage is represented by 145.5 m of siltstones and sandstones. The sequence at Elgol shows important thickness and facies changes when contrasted with the type sequence of the Staffin Shale 55 km to the north at Staffin Bay (Turner, 1966; Sykes, 1975). The sequence on the coast from 2.7 km to 3.6 km north of Elgol may be summarized as follows, based on Sykes (1975).

		Thickness (m)
<i>Staffin Shale Formation</i>		
<i>Camasunary Siltstone Member</i>		
4	Blue siltstones with indeterminate bivalves and <i>Amoeboceras</i> aff. <i>marstonense</i> Spath, <i>Ringsteadia marstonense</i> Salfeld and <i>R. cf. frequens</i> Salfeld	seen to 7.5
<i>Camasunary Sandstone Member</i>		
3	Fine-grained, unfossiliferous, bioturbated sandstones with blue silty intercalations becoming more abundant towards the top. Ammonites are very scarce, with <i>Perisphinctes (Liosphinctes) apolipon</i> (Buckman) near the base and ? <i>Amoeboceras</i> sp. about the middle	91.4
<i>Scaladal Sandstone Member</i>		
2	Series of bioturbated and ripple drift bedded, coarse-grained sandstones, baked hard by the nearby intrusion. Ammonites and bivalves are quite common: <i>Cardioceras (Scoticardioceras) excavatum</i> (J. Sowerby), <i>C. (Subvertebriceras) densiplicatum</i> Boden, <i>Perisphinctes</i> spp. and <i>Euspidoceras</i> sp., with <i>Camptonectes</i> sp., <i>Pleuromya</i> sp. and <i>Oxytoma</i> sp.	32.6
<i>Tobar Ceann Siltstone Member</i>		
1b	Sandy silts with <i>Cucullaea</i> sp. and <i>Pinna</i> sp. and ammonites	4.0
1a	Silty clays and muddy sandstone with a poor fauna. Turner (1966) recorded <i>Cardioceras (Scarburgiceras) scarburgense</i> (Young and Bird) and <i>C. (S.) praecordatum</i> Douvillé. Sykes (1975) recorded <i>C. (S.) excavatoides</i> Maire	9.0
(continuation down of Tobar Ceann Siltstone into the Lamberti zone of the Callovian)		

The type section of the Tobar Ceann Siltstone is in a gully just below the lava plateau at Tobar Ceann (NG 565 196). Much of the section consists of badly weathered silty clay; however, the highest 4 m of sandy silt have yielded an abundant bivalve and ammonite fauna (Sykes, 1975).

The type section of the Scaladal Sandstone is in low cliffs at Rubha na h-Airigh Bàine (NG 517 172). Bedding structures are well displayed in the cliff, consisting of regular alternations of 0.2–0.4 m bands of coarse-grained sandstone displaying large-scale ripples, 0.5 m from crest to crest, separated by laminated, bioturbated, ill-sorted sandstone containing macroconch *Perisphinctes* sp.. The clasts range up to 4 mm in diameter, making the coarsest beds technically granule conglomerates. Numerous sedimentary clasts are present, and the rock is best classed a subgreywacke.

The type section of the Camasunary Sandstone is in low cliffs and the rock platform 100 m to the north (NG 517 173). It comprises a succession of thick-bedded, fine-grained, laminated, bioturbated quartz sandstones with erosive bases, separated by shaley, sandy partings.

The type section of the Camasunary Siltstone is in the rock platform at NG 517 178. It comprises laminated silty sandstones and siltstones, passing up into heavily baked silty shale with well-preserved *Ringsteadia*.

The Scaladal Sandstone is also exposed in the cliff at the southern end of the Carn Mor landslip (Hudson and Morton, 1969). The junction of Scaladal Sandstone resting on Tobar Ceann

Siltstone is seen just above the path. The basal sandstone is a poorly sorted calcareous sandstone containing quartz grains and clasts of mudstone exceeding 2 mm diameter. Abundant ammonites infilled with mudstone rest at all angles in the sediment.

Interpretation

The basic stratigraphy of the Elgol section is, in part, similar to that at Staffin, some 55 km to the north. There is the same passage from fine-grained sediment of Mid Callovian to Early Oxfordian age into Mid Oxfordian arenaceous sediments, the Scaladal Sandstone being the equivalent of the Glashvin and Digg silts at Staffin (Figure 5.2). However, the Upper Oxfordian succession is very different, for whereas at Staffin fine, silty, micaceous clays (Flodigarry Shale) were deposited throughout the Late Oxfordian, at Elgol there was a thick incursion of fine sand, the Camasunary Sandstone, followed only in the latest Oxfordian by the silts of the Camasunary Siltstone.

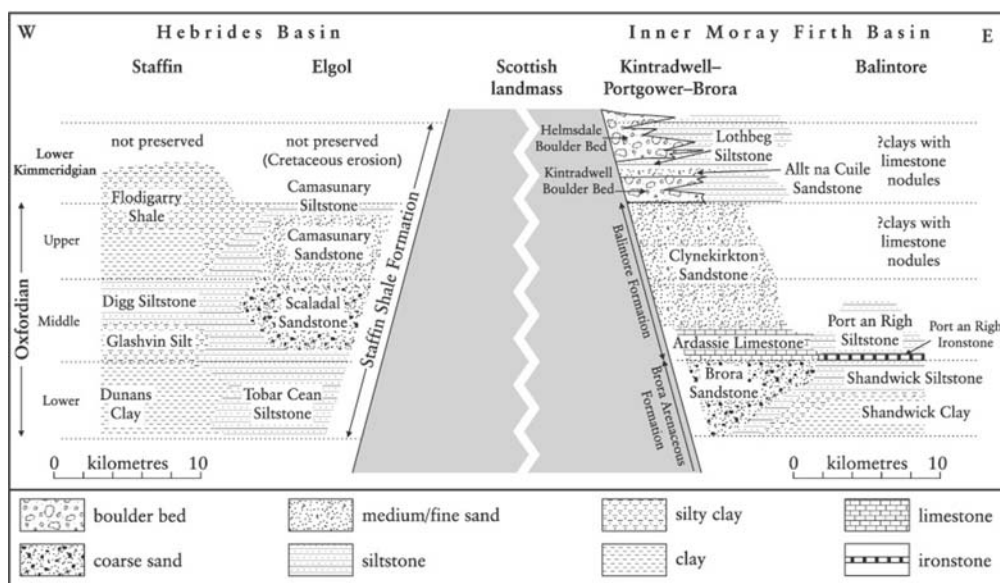


Figure 5.2: Schematic cross-section to show the relations of the near-shore and distal members in the Hebrides and Inner Moray Firth Basins. Beds such as the Brora Sandstone and the Ardassie Limestone originally extended eastwards over the Scottish landmass but have been removed by Kimmeridgian erosion. The Helmsdale Boulder Beds continue up into the Portlandian Stage.

Sykes (1975) discussed the contrast between the Elgol and Staffin successions in terms of sedimentation in shallow 'onshore' and deeper-water, argillaceous, offshore conditions. This was clearly the case when comparing the Brora and Balintore sections, but the comparison within the Hebrides Basin is less satisfactory. The beds that are predominantly composed of coarse clastic sediment are localized in the Elgol area. Lower Oxfordian is present 30 km to the south on the Isle of Eigg in a silty, argillaceous facies very similar to that of the Dunans Clay to the north at Staffin (Wright, 1964; Sykes, 1975). The Scaladal Sandstone, with its lithic clasts, poor sorting, large-scale ripple bedding and ammonites preserved at all angles in the bioturbated facies, gives the impression of a sediment that has been rapidly dumped by turbidity currents into deeper water at its present location without the winnowing that occurs in a shelf environment.

Turner (1966) proposed that the Elgol area had been situated close to a delta draining the Scottish landmass during the Oxfordian, and that this had produced the coarse sediment. However, the Elgol section lacks features such as laminated, bioturbated silts and channel sandstones typical of sedimentation close to delta mouths. It is more likely that erosion, consequent upon an uplift of the Scottish landmass in the Mid Oxfordian, resulted in the positioning of the Elgol area proximal to a submarine fan dumping large quantities of shelf sediments into the deeper waters of the Hebrides Basin. This feature persisted through Late Oxfordian times.

Zonally, the Tobar Ceann Siltstone has yielded ammonites belonging to both subzones of the Mariae Zone. The overlying Cordatum Zone is poorly represented. Sykes (1975) recorded one ammonite typical of the Bukowskii Subzone. The Cordatum Subzone may be absent due to erosion beneath sandy silts near the top of the Tobar Ceann Siltstone (Sykes, 1975). This concept of intraformational erosion is supported by the presence of eroded mudstone clasts in the basal Scaladal Sandstone at Carn Mor. The Vertebrale Subzone is well represented in the Scaladal Sandstone, with a varied and distinctive fauna. Antecedens Subzone *Perisphinctes* are known from the higher Scaladal Sandstone and the lower Camasunary Sandstone, but the drawing of precise zonal boundaries, particularly in the Camasunary Sandstone, is very difficult. However, the *Amoeboceras* and *Ringsteadia* of the Camasunary Siltstone allow precise attribution to the Rosenkrantzi Zone.

Conclusions

Despite the fact that the Elgol sequence is one of the most difficult of the major Oxfordian successions to study because of the baking of the sediments during the intrusion of the Cuillins Tertiary Igneous Complex, the section has considerable palaeontological and sedimentological interest. The site contains the type sections of the Scaladal Sandstone, Camasunary Sandstone and Camasunary Siltstone members of the Staffin Shale Formation. The sequence contains an important assemblage of ammonites including two zonal and five subzonal faunas with characteristics of both the Boreal and Sub-Boreal zonal schemes. The site is of importance in elucidating not only the stratigraphy of the Boreal Oxfordian but also the regional palaeogeography, as the lithologies found here comprise atypical clastic-dominated facies in a Hebrides Basin where sedimentation was predominantly of deeper-water argillaceous facies.

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