Lleiniog RIGS Site

NRW RIGS no. 237 [SH 34866 67750]

GeoMôn Global Geopark original webpage

RIGS Statement of Interest:

Lleiniog RIGS Site is a series of large boulders lying in the intertidal zone and on the low coastal apron at Lleiniog, south-east Anglesey. The site is of regional geological importance because two of the boulders are the largest undisputed glacial erratics on the island. The boulders are of Carboniferous limestone. The largest lies conspicuously on the beach at SH 623791 and measures 7.3m x 3m x 3m. Bedding in the block, which is only just overtopped at high tide, is almost vertical. The second largest boulder occurs on the low coastal apron, immediately north of the unmetalled track which passes through the public car park gate at SH 621792. It measures 5.4m x 3.6m x 3m and again demonstrates near-vertical bedding. This boulder was figured in Greenly (1919; plate XLVII, page 753) but is now completely concealed by vegetation. The boulders are very angular and irregular. Their composition and lack of abrasion indicates a relatively local rock source and limited distance of glacial transportation. Lleiniog itself lies on the Ordovician outcrop. The nearest source of Carboniferous Limestone is c. 0.5km to the north. Glacial sediments in coastal sections both north and south of the Lleiniog erratics comprise tills and glaciofluvial sands and gravels deposited predominantly from the Irish Sea ice sheet. Greenly favoured that the large stranded limestone boulders had been washed from the Irish Sea till. A north-east to south-west movement of ice can be inferred from the evidence, and a transportation distance of at least 0.5km must have been involved.

Network context of the site: About 2.4 million years ago there was a general cooling of the Earth's climate, heralding the onset of the Quaternary "Ice Age", a period of geological time extending to the present day. In reality, the period has seen a number of cold 'glacial' periods interspersed with warmer 'interglacial' periods such as the one in which we now live. Since about 450,000 years ago there have been at least four intensely cold periods during which large parts of upland Britain were covered by ice sheets for long periods. Although Anglesey was probably overrun by ice on these occasions, only evidence from the last major glacial phase – the Late Devensian – is known. Possible evidence from the warm interglacial period before the Late Devensian may locally have escaped the destructive erosional and depositional effects of the last glaciation. During the Late Devensian, around 20,000 years ago, Anglesey was completely submerged by ice. Two ice sheets from different sources were involved. The Snowdonian mountains were the source of ice streams that moved broadly northwards towards Anglesey, while a massive Irish Sea ice sheet, fed by glaciers from Scotland, Ireland and Cumbria, moved onto the island from the north. The Irish Sea ice stream was dominant, and travelled north-east to south-west across the island, broadly in keeping with its NE–SW-trending, structurally controlled rock ridges. The Welsh and Irish Sea ice streams met in the region of the present-day Menai Strait and produced a confluent south-westward flow. Deposits from the Irish Sea ice tend to contain a wide range of rock types from its diverse source areas and from the varied geology of the seafloor traversed. A red colouration is common, being derived partly from Permian-Triassic rocks offshore. The Irish Sea sediments commonly contain unconsolidated seafloor debris, including sand and shell fragments, dredged from the seafloor by the ice. Tertiary lignite, coal fragments and flint are also a characteristic component of the Irish Sea deposits. Alternatively, deposits from the Welsh ice sheet reflect the geology of its source areas, with a high proportion of Cambrian slates and mudstones, varied Ordovician igneous materials and a blue-grey colouration. Although the broad pattern of the island's glaciation has been understood for nearly 100 years, the exact timing of the arrival and retreat of the different ice masses is still poorly understood, as is the relative extent of both ice masses during the Late Devensian. Anglesey contains an exceptional range of Quaternary evidence, in the form of coastal sediment exposures, glacial landforms and erratic boulders, which can be used to reconstruct the glacial history of the island, and elucidate regional variations in ice movement and sedimentary processes.

Three separate networks of RIGS have been selected to demonstrate the glacial history of the island. These are: 1) sedimentary sequences; 2) erratic boulders and; 3) glacial/glaciofluvial landforms. Selected sites may belong to more than one of these networks. Network context of the site Lleiniog is one a series of Anglesey RIGS belonging to Network

2, ‘Erratic boulders’. Erratics are glacially transported stones and boulders. They may form a component of glacial deposits such as till, or can occur as stranded boulders on the land surface. Their distance of transport varies enormously from a few metres to many hundreds of miles. Erratics composed of distinctive rock types (different to the underlying bedrock geology) can be traced back to their point of origin and can serve as important indicators of glacial flow direction. Anglesey is famous for a series of erratics first described systematically by Edward Greenly (1919) in his seminal work, The Geology of Anglesey. Some of the stranded boulders described by Greenly appear to have very distant origins, perhaps in Scotland or the Lake District. Others are of distinctive local rock types that clearly indicate ice-flow directions across the island. Some have not been moved far at all, but are still testament to the immense transporting and erosional power of the Late Pleistocene glaciers. In many cases, the erratics have been used in one form or another by man. These megaliths have considerable archaeological value and some are protected as Scheduled Ancient Monuments (SAM). Others are the subject of myth and folklore and the exact geological and archaeological context of many is still poorly understood.

References:

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