Point Lynas RIGS Site

NRW RIGS no. 394 [SH 48059 93293]

GeoMôn Global Geopark original webpage

RIGS Statement of Interest:

Point Lynas RIGS Site is an accessible example of a thick mafic tuff layer within mudstones, now metamorphosed to chloritic schists

Point Lynas RIGS Site is an accessible and unusually clear example of a thick mafic tuff layer within mudstones, which have now been metamorphosed to chloritic and micaceous schists of the Monian Supergoup. The outcrop was originally exposed by construction activities associated with Point Lynas jetty, and is now kept clean by salt spray and wave action. This site demonstrates that Precambrian mafic igneous activity included major ash eruptions, in addition to the localised submarine lavas and intrusions documented elsewhere on Anglesey.

Geological setting/context:

The Precambrian basement rocks of Anglesey and south-west Ll■n can be divided into several discrete groups, all of which were juxtaposed along a series of steep, brittle and/or ductile faults and shear zones (e.g. Dinorwic and Aber-Dinlle faults; Berw, Central Anglesey and Ll■n shear zones) collectively referred to as the Menai Strait Fault System (MSFS). First, the Monian Supergroup consists of a thick sequence of polydeformed metasediments and meta-igneous rocks, comprising the South Stack, New Harbour and Gwna groups, the latter representing the type example of a large-scale submarine debris flow or mélange said by some researchers to be of Lower Cambrian age. Ongoing research, however, may suggest a much older date for the Gwna Group with possible Cambrian ages being put forward for the South Stack metasediments. Second, the Coedana Complex of central Anglesey comprises high-grade metasediments, amphibolites and gneisses, and low-grade, thermally metamorphosed hornfelses adjacent to a granite (Coedana Granite), which has recently yielded a late Precambrian zircon age of 614 ± 4Ma. Third, a belt of schists and metabasites displaying blueschist facies grade of metamorphism lies within the MSFS. The metabasites have yielded ages of 580–590Ma. Fourth, the Sarn Complex in Ll■n comprises metagabbros and granite rocks which occur to the south-east of the Ll■n Shear Zone (LSZ), a continuation of the MSFS, which separates these igneous rocks from low-grade Monian mélange to the north-west. A late Precambrian zircon magmatic age of 615 ± 2Ma has been obtained from a metagabbro of the LSZ. Fifth, on the mainland of north-west Wales, the Arfon Group comprises a thick sequence of tuffs and volcaniclastic rocks, dated at 614 ± 2Ma, which are conformably overlain by late Lower Cambrian siltstones. Correlatives of the Arfon Group may occur as isolated outliers on Anglesey and, if proven, would provide an important potential lithostratigraphical link across the MSFS. The stratigraphical correlation between the various units has proved highly controversial. The recent recognition of mylonitic rocks, for example in the LSZ, emphasises the presence of tectonic contacts and indicates that each component may represent a so-called ‘suspect terrane’ which was transported laterally into position along the major faults and shear zones. Ongoing unpublished research suggests, that Anglesey’s Precambrian rocks accumulated in accretionary prisms, providing a tectonic sequence rather than a stratigraphic sequence which was formerly accepted. This Precambrian basement later formed the north-west margin of the Lower Palaeozoic Basin, the initiation of which was contemporaneous with Arfon basement terranes and was completed at least by early Ordovician times since an unconformable Arenig overstep sequence has been identified at several localities such as Wig Bach, Parwyd and Mountain Cottage Quarry. The Arenig sequence of Anglesey and Ll■n is considerably less deformed and metamorphosed than the underlying basement, although this distinction is not everywhere obvious.

Network context of this site: To select RIGS to demonstrate the Precambrian evolution of Anglesey and Ll■n, four separate networks were devised. These are: 1. Precambrian stratigraphy and structures. This network includes two sub-sets: a) Precambrian sedimentary structures; and b) tectonic structures, such as folds and faults, which may have occurred during a tectonic event in Precambrian times or later, for example, during the Caledonian Orogeny; 2.

Precambrian palaeontology which includes any life-form and trace fossil, such as stromatolites, sponge spicules, worm burrows and bioturbated metasediments. Some current research suggests that some of these fossils may be Cambrian or even Ordovician in age,although other geologists dispute this. As these life-forms were previously held to be Precambrian in age, they have been included in this category; and 3. Precambrian reference sections. These aim to represent all important Precambrian rock types found in Anglesey and Ll■n. They include the major mapped units of Greenly (1920). The aim is to provide the best and most accessible exposure of the rock type. These can be considered as RIGS 'type sections'. Where there is a relevant mineralogical, sedimentary, structural or other change across an outcrop, several representative sites have been chosen. 4. Precambrian igneous sections.

This network includes four main subsets: a) mafic rocks that were erupted during deposition of Precambrian sediments, as volcanic ashes or as lava flows, b) mafic and ultramafic rocks that were intruded whilst these sediments were wet, c) the products of alteration of these mafic and ultramafic igneous rocks as the surrounding wet sediments were buried, intensely deformed, and dewatered by metamorphism, and d) felsic to intermediate rocks that were erupted as volcanic ashes or formed major to minor intrusions, following regional deformation and metamorphism. Precambrian rocks may also have suffered later phases of deformation, along major shear or thrust zones. Point Lynas jetty belongs to Network 4 (RIGS Precambrian igneous sections; see above) and has been chosen to illustrate subset a), expressed by a foliated chloritic ash layer within micaceous schists of the Monian SuperGroup. The volcanic ash origin has been confirmed by thin-section analysis.

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