Traeth Lligwy

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RIGS Statement of Interest:

Traeth Lligwy RIGS is the type section of a red bed sequence comprising interbedded, burrowed fine-grained muddy sandstones and siltstones. This Traeth Lligwy Formation forms the uppermost division of the folded and cleaved Anglesey Old Red Sandstone succession which, sited over 100 km north-west of the nearest comparable outcrop in the Welsh Borderland, provides an important constraint on late Silurian to early Devonian palaeogeographical reconstruction, and on the timing and nature of late Caledonian orogenic events. The Traeth Lligwy site forms part of the sequence described and interpreted by J. R. L. Allen (1965) in his seminal paper on Old Red Sandstone sedimentology. The site, on the north side of Lligwy Bay, provides the only exposures in the Traeth Lligwy Formation. Here a 27 m-thick sequence occupies the core of an eastward plunging syncline. The formation is distinctive within the Anglesey succession, and within the spectrum of Old Red Sandstone facies as a whole, in being dominated by beds of intensely bioturbated, red, fine-grained, muddy sandstone with associated trace fossils. Such beds, which Allen (1965) describes as having a 'churned' and 'mottled' appearance, range from a few centimeters to over 2 m in thickness. They alternate with thin beds of blocky red siltstone, comparable to those which form the upper levels of underlying Porth y Mor Formation fining upwards cycles (see RIGS JRD 2), but in which, in contrast, calcareous nodules are rare. The thicker calcrete profiles of the underlying divisions (see RIGS JRD 1 and JRD 2) are absent from the Traeth Lligwy Formation. Intraformational conglomerates and sandstones with tractional sedimentary structures are also rare, although a 2.4 m-thick sandstone which displays both planar- and cross-lamination is present in the upper part of the exposed sequence. The burrowed appearance of the dominant sandstone beds within the Traeth Lligwy Formation persuaded Allen (1965) that this division of the Anglesey Old Red Sandstone succession was the product of deposition in a semi-permanent lake. Here bioturbating organisms were effective at mixing the sand, silt and mud grade sediment supplied to the lake by streams. Periodic drying out of this standing body of water allowed the limited growth of calcrete glaebules, but was never long enough for the mature calcrete profiles seen in underlying divisions to form.

Geological setting/context: Allen (1965) viewed the Anglesey Old Red Sandstone succession as lying at the margin of a broad depositional tract connected to the main Old Red Sandstone basin to the south, supplied with sediment sourced some distance to the north-west by south-easterly flowing rivers. This remains the favoured palaeogeographical interpretation (Allen, 1974; Allen and Crowley, 1983; Bluck et al., 1992). As with the underlying divisions, the age of the Traeth Lligwy Formation remains unproved. Allen (1965) attributed the deformation displayed by the Anglesey Old Red Sandstone succession to the widely recognised mid Devonian (late Caledonian-Acadian) tectonic event implying a late Silurian to early Devonian age (see RIGS JRD 1). Despite is lacustrine origin, the Traeth Lligwy Formation has yet to yield fossils and the site offers opportunities for palynological study.

Network context of the site: The Traeth Lligwy site is one of a network of four RIGS selected to represent the Anglesey Old Red Sandstone succession.

References:

Allen, J.R.L. (1965) The sedimentation and palaeogeography of the Old Red Sandstone of Anglesey, North Wales. Proceedings of the Yorkshire Geological Society, 35, 139–185.

Allen, J.R.L. (1974) The Devonian rocks of Wales and the Welsh Borderland. In The Upper Palaeozoic and post-Palaeozoic rocks of Wales. (ed T. R. Owen), Cardiff: University of Wales Press, pp. 47–84.

Allen, J.R.L. and Crowley, S.F. (1983)Lower Old Red Sandstone fluvial dispersal systems in the British Isles. Transactions of the Royal Society of Edinburgh, Earth Sciences, 74, 61–68.

Bluck, B.J., Cope, J.C.W. and Scrutton, C.T. (1992) Devonian. In Atlas of Palaeogeography and Lithofacies. (eds J. C. W. Cope, J. K. Ingham and P.F. Rawson). Memoir of the Geological Society, London, 13, pp. 57–66.

Site geometry: Site boundary