Traeth Bach RIGS Site

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RIGS Statement of Interest

Traeth Bach RIGS Site is the Traeth Bach Formation,comprising fluvial and lacustrine siltstones with 'exotic' conglomerates and calcretes. These strata form part of a folded and cleaved Anglesey Old Red Sandstone succession unique within North Wales.

Sited over 100 km north-west of the nearest Old Red Sandstone outcrop in the Welsh Borderland, the Anglesey succession provides an important constraint on late Silurian to early Devonian palaeogeographical reconstruction, and on the timing and nature of late Caledonian orogenic events. Moreover, J. R. L. Allen's seminal sedimentological study of this succession, published in 1965, established many of the key features of fluvial depositional models and calcrete formation. The site exposes the lower 100 m of the Traeth Bach Formation although the base is not seen.

The sequence comprises thick units of red siltstone with abundant irregular carbonate nodules which grade upwards into beds of limestone or dolomite calcrete. In thin section, the limestones display a complex range of textures and fabrics (Allen, 1965). Brecciation is common, with darker masses of inclusion-rich, microcrystalline calcite cross-cut by intersecting veins of clear, coarsely crystalline calcite. Tubular root-related structures (rhizoliths) are also present. Beds of pebble conglomerate up to 1.5 m thick and composed of clasts which can be matched to local Precambrian and Ordovician rocks are present at three horizons; these are the 'exotic' conglomerates of Allen (1965), and contrast with rare intraformational conglomerate beds composed of red siltstone rip-up clasts. Allen's (1965) synthesis of the sedimentary processes and depositional environment of the Anglesey Old Red Sandstone succession was an important early study of fluvial sedimentology.

The succession accumulated in a depositional basin flanked to the south-west by an upland area of Precambrian and Lower Palaeozoic rocks. These older rocks were the source of alluvial fan gravels (the Bodafon Formation; see RIGS JRD 4), which accumulated along the basin margin. Away from this margin, the calcareous muddy siltstones of the Traeth Bach Formation were interpreted by Allen as the deposits of ephemeral, non-saline playa lakes. The 'exotic' conglomerate beds record periodic fluvial input of sediment from the adjacent basin margin. The calcareous nodules and limestone and dolomite beds display many of the features of modern calcretes and dolocretes. They record the diagenetic growth of carbonate within soil profiles during periods of prolonged subaerial exposure in a semi-arid, seasonally wet climate (Allen, 1974a). Allen's (1965) description of these Anglesey examples was the first and one of the most detailed accounts of Old Red Sandstone calcrete in Wales.

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, 1974b; Allen and Crowley, 1983; Bluck et al., 1992). The age of the succession remains unproved. A mid-Devonian age has been suggested (Hurst et al., 1978), but the presence of the folding and cleavage makes this unlikely (Allen and Williams, 1979; Hurst et al., 1979). Allen (1965) attributed the deformation to the widely recognised mid Devonian (late Caledonian-Acadian) tectonic event implying an earlier late Silurian to early Devonian age for the Anglesey Old Red Sandstone succession. However, the Traeth Bach Formation has yet to yield fossils to indicate its precise age and offers opportunities for further palaeontological, particularly palynological research.

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

References:

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Site geometry: Site boundary