

Hydrogeology of Wales: Ordovician and Silurian aquifers

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This page is part of a category of pages that provides an updated review of the occurrence of groundwater throughout Wales.

Author(s): N S Robins and J Davies, British Geological Survey

Contributor(s): D A Jones, Natural Resources Wales and G Farr, British Geological Survey

Ordovician and Silurian strata



Abergwesyn Pass between Aberystwyth and Llanwrtyd Wells, showing typical Silurian upland scenery. P802422.

Ordovician rocks crop out extensively in north and south-west Wales and in parts of mid Wales and the Welsh Borderlands (**Plate P802422**). Silurian strata crop out in mid and north Wales, east of the Tywi Anticline and Welsh Borderland Fault system and in parts of south Wales (**Figure P841814**). The Ordovician dominantly comprises marine mudstones, siltstones and interbedded volcanic rocks with some breccia and fan deposits. The Silurian strata dominantly comprise a series of marine turbiditic mudstone and sandstone sequences with subordinate limestones.

The Ordovician succession formed within a subsiding basin between faulted margins defined by the Menai Strait and Welsh Borderland Fault systems. Deposition of black marine mudstones was periodically interrupted by lava and pyroclastic debris from volcanic centres in north and south-west Wales.

In north Wales both the Tremadoc Series and basal Arenig Series crop out in Snowdonia, the Lley Peninsula, Anglesey, around the Harlech Dome and in the core of the Derwen Anticline. The oldest strata are the grey mudstones and siltstones of the Tremadoc Series; up to 480 m thick with occasional sandstones in the upper part of the sequence. These are followed by a 1000 m-thick volcanic succession, the Rhobell Volcanic Group, which includes basic lavas, breccias, coarse-grained mass-flow units, and alluvial deposits. A marine transgression followed giving rise to the basal Arenig fan deposits: the Allt Llwyd Formation in Snowdonia and the Parwyd Grit Formation in the Lley Peninsula.

In Central Wales and the Welsh Borderlands there is an almost unbroken sequence of Ordovician sediments. These are also present in Powys in the Shelve Inlier. The Raglan Mudstone Formation comprises mainly mudstones and siltstones with subordinate cross-bedded sandstone horizons.

In Pembrokeshire and Carmarthen the oldest Ordovician strata are Arenig-age silty shales and subordinate sandstones. The principal strata that follow include the Treffgarne Volcanic Formation

and the younger Fishguard Volcanic Group, which are varied sequences that are dominated by volcanic events with mudstones intercalated within the volcanic sequences. The Ordovician continues with graptolitic mudstone and subordinate sandstone sequences in the Haverfordwest to Llandovery area. A notable inlier of Llanvirn age volcanic strata occur in the Builth and Llanwrtyd areas. The overlying Silurian sequence continues with graptolitic mudstones and subordinate calcareous sandstone sequences in the Haverfordwest to Llandovery area and into the Welsh Borderland.

In north Wales the Silurian is represented by a thick sequence of mudstones in the Vale of Conwy. To the north the Clwydian Range and the Llangollen syncline contain similar strata. The Denbigh Grit Group is present in part of the area.

Much of Central Wales is now underlain by Silurian mudstones and turbiditic sandstones deposited in the so-called Welsh Basin. The arenaceous deposits are prevalent in the Aberystwyth area and are typified by the Devil's Bridge Formation which contains subordinate mudstones and which is nearly 500 m thick. The overlying Aberystwyth Grits Group occurs along the coast between New Quay and just north of Aberystwyth. The younger Cwmystwyth Grits Group forms the core of the Central Wales Syncline. At the close of the Wenlock, deeper water conditions brought the return of black mudstones and shales typified in the Builth-Llandrindod area by the Builth Mudstones. This depositional environment continued throughout the Ludlow producing mudstones and sandstones with subordinate siltstones and limestones.

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