

Hydrogeology of Wales: Quaternary 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.

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Geological setting

A blanket of glacial and postglacial material was deposited during the Late Devensian time over much of the lower-lying parts of Wales. Glaciers flowed radially down from the mountains towards Cardigan Bay in the west and the Welsh Borderland in the east. The Irish Sea Ice flowed southwards into the Vale of Clwyd, south-west across Anglesey and the Lleyn Peninsula into Cardigan Bay, thence south-east and south into Dyfed and into the Afon Teifi valley *above* Cardigan and Lampeter. The deposits are complex wherever the Irish Sea and Welsh ice sheets met, but elsewhere lodgement till was deposited during the advance of the ice and a range of melt-out and flow tills, morainic deposits and outwash sands and gravels were deposited during the retreat. Glaciolacustrine deposits were formed both during the advance and the retreat of the glaciers. Smaller cwm glaciers formed during the final Loch Lomond Stadial, when drumlins, eskers, kames and kettleholes were formed.

In north Wales the Welsh till is blue-grey in colour except in the Vale of Clwyd where it has a reddish hue. It is divided between a lower till, middle glaciofluvial sand and an upper till, the product of the advance and retreat of a single ice sheet. The sequence is generally 20 to 30 m thick, exceptionally up to 95 m thick in parts of the Vale of Clwyd. Only the basal lodgement till is present wherever the drift sequence is thin. The upper till is sandier than the basal till and is a flow till. The Irish Sea till in Anglesey and the Lleyn Peninsula is red, uncompacted and sandy, but there may be a lower compacted blue till derived from the Welsh Ice sheet. In south Wales the valleys in the coalfield are lined with till from the Welsh Ice sheet.

Glaciofluvial sands occur as channel deposits and proglacial outwash fans interbedded within the till in some areas. Glaciolacustrine deposits formed in ice dammed lakes are generally fine grained or have a fine-grained matrix, whereas river terrace deposits comprise sands and gravels deposited in the colder more temperate stages of glaciation. Head deposits also occur as slump deposits on valley sides, and are the most widespread deposit which includes periglacial and postglacial active layer deposits and displaced till.

Alluvium has been widely deposited in the valley bottoms during the Holocene. These deposits are fresh water, estuarine and marine alluvial silts, clays and sands. Coastal dune-lands occur locally and there are also widespread areas of blanket peat inland, mostly in areas of high ground.

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