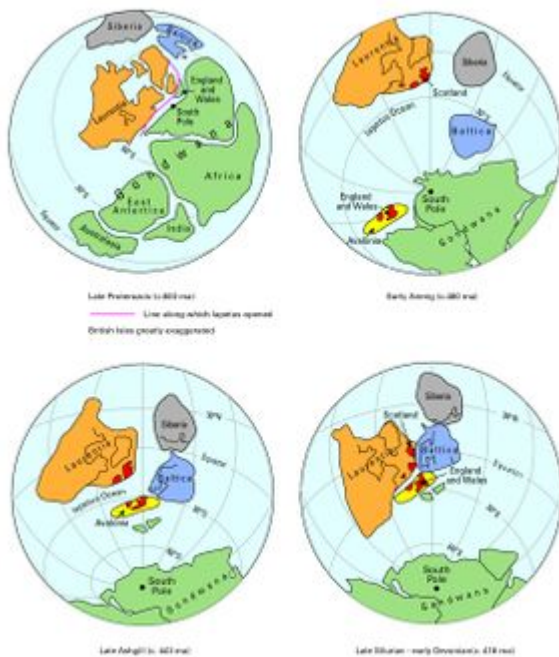


# Cambrian, introduction, Wales

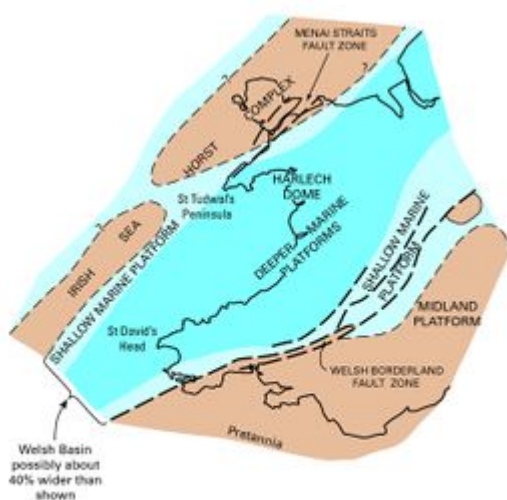
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**From: Howells, M F. 2007. [British regional geology: Wales](#). Keyworth, Nottingham: British Geological Survey.**



Distribution of continents in Late Proterozoic and early Palaeozoic time. Note: England and Wales are greatly exaggerated in size (adapted from Mitchell, 2004). P916144.



Palaeogeography of the Welsh Basin in mid-St David's (Mid Cambrian) (adapted from Cope et al., 1992). P916149.

In earliest Lower Palaeozoic times, Wales, together with Belgium, England, southern Ireland and the

Avalon area of eastern Newfoundland, formed part of a north-west-facing continent on the south-east side of the Iapetus Ocean at a latitude between 40° and 60° south ([P916144](#)). The intense volcanic, tectonic and metamorphic activity that occurred at the edge of this continent in late Precambrian times had dissipated by the time it was encroached upon by a major marine transgression with deposition of a carbonate-poor sequence in early Palaeozoic times. The elements of this continental plate (Avalonia) and its proximity to the Gondwana continent are still uncertain; it was separated from Baltica by the Tornquist Sea. On the north-west side of the Iapetus Ocean the Scottish Lower Palaeozoic carbonate-rich sequence accumulated at latitudes between 25° and 40° south on the edge of the North American continent of Laurentia. In Wales, the structural grain of the Precambrian basement influenced the development of a basin in which shallow and deep water sediments accumulated throughout early Palaeozoic times. The basin was defined by the Menai Straits Fault Zone at the edge of the Irish Sea Landmass in the north-west, and the Welsh Borderland Fracture Zone, including the Pontesford, Church Stretton and Twyi lineaments, at the edge of the Midland Platform in the south-east. Both fault zones continued to influence basin development and sedimentation throughout early Palaeozoic times ([P916149](#)).

The Cambrian System was defined in Wales, its historical type area, in the early years of the 19th century. However, in parts of the succession, particularly the lower parts, there is a dearth of faunas and the stratigraphy is difficult to establish. Consequently, the base of the Cambrian is now formally defined in south-east Newfoundland. The oldest rocks assigned to the Cambrian system in north Wales overlie an unconformity, but it is possible that some of the rocks below the unconformity may also be of Cambrian age; there is no direct contact between undisputed Cambrian rocks and the Monian Supergroup on Anglesey. There are no agreed international series subdivisions of the Cambrian System. The sequence has been divided into Lower, Middle and Upper parts (Table 2) and these have been casually regarded as series, although on the global scale they have been used inconsistently. Consequently, the British regional series names Comley, St David's and Merioneth, respectively the Lower, Middle and Upper Cambrian as applied in Britain, have been used informally. Sea level rose progressively from early Cambrian times, with minor fluctuations, into late Cambrian times when three pulses are recognised, possibly caused by a fluctuating ice sheet in the southern hemisphere. Subsequently, there was a pronounced fall in sea level. The radioactive calibration of the time scale has been difficult because of the lack of suitable lithologies and the resetting of isotope systems in metamorphic events, but Welsh rocks have contributed important data nonetheless. On the geological timescale currently in use (2004) the Cambrian system spans the interval 542 to 488 Ma.

Cambrian strata crop out in the Harlech Dome, Arfon and Llŷn, in north Wales, and in the vicinity of St David's in Pembrokeshire and Llangynog, south-west of Carmarthen, in south Wales. Local lithological correlation is good, although wider correlation is hindered by poor biostratigraphical control in the lowermost beds. The rocks contain some of the earliest remains of marine fossils. The communities are representative of the European Avalonian Province and are totally distinct from those of the North American Laurentian (Pacific) Province observed in equivalent strata in Scotland. The shallowest marine environments generally contain lingulate brachiopods whereas trilobites inhabited the more offshore settings. Trilobites only became firmly established in late Comley times. The richest faunas are found in the dark, blue-grey mudstone of the St David's Series, which host a variety of sponges, hyoliths, echinoderms and bradoriid ostracods as well as several trilobite species. Most of these animals were benthic and relatively local in distribution, but some species of the large paradoxidid and tiny blind agnostid trilobites are widely distributed, being known from Scandinavia, Siberia, Spain and Newfoundland; they may have been bathypelagic, swimming widely in deep waters. These are the most useful macrofossils for dating the rocks. In the Merioneth Series, black mudstone contains the specialised olenid trilobites that evolved to occupy the most poorly oxygenated environments and characterise the 'Olenid Biofacies'.

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