ISSN 1750-855X (Print)
ISSN 1750-8568 (Online)

Ordovician sediments and palaeogeography

Pat Brenchley[1]

BRENCHLEY, P. (1989). Ordovician sediments and palaeogeography. *Proceedings of the Shropshire Geological Society*, **8**, 1–2. The account of a lecture describing the Ordovician sediments and volcanics of Shropshire, and their palaeogeography.

[1]*affiliation: Liverpool University*

BACKGROUND

This paper concerns three particular areas of Shropshire that are linked by virtue of being Ordovician sediments containing fossils.

AROUND THE SHELVE INLIER

The first area to be addressed is that part of Shropshire east of the Church Stretton fault and around the Shelve inlier, just west of the Church Stretton fault. This comprises the Ordovician shelf area, a shallow marine area and a deeper marine area of Caradoc age containing assemblages associated with differing marine conditions. Each assemblage is associated with a particular fossil but, because of evolution, the fossils associated with a shallow water environment at the bottom of a sequence are different at the top of the sequence and it is easier therefore to refer to environmental belts as benthic assemblages, with benthic assemblage 1 occurring near shore and assemblages 2 to 5 occurring further out to sea.

There are generalities that can be determined about each benthic assemblage. For instance, shallow water environments show an abundance of fossils, but the number of species is generally small. This is because the environment near shore is very stressful, the substrate shifts and water temperatures are variable. Thus there are only a few tolerant species but those that can survive can do so in large numbers as they have no competitors. Further out from the shore fossils remain abundant, but the number of species increases until the area off the shelf when remains of fossils are less likely to survive as there are few, if any, bottom dwellers.

By the occurrence of different benthic assemblages through the Ordovician sequence in Shropshire it can be seen that in the earliest times there was a shallow water environment which deepened over time so that at the end of the Caradoc there was a deep water environment.

AROUND HORDERLEY

The second area of Shropshire addressed was a road cutting on the A49 near to Horderley, excavated in 1978. At the base of the sequence is a layer of Horderley Sandstone, then a layer of shales, then a massive layer of Horderley Sandstone followed by more shale.

Fossil remains indicated that this was a shallow marine environment and not in keeping with turbidite deposits, as the low angle cross bedding to be seen on one sandstone face is not consistent in direction and shows sand-draped circular hummocks in between circular scours. This is referred to as hummocky stratification.

The best explanation for this type of structure would be storm deposition; strong cyclones of hurricane force stirring up strong water currents and the water currents carrying sands which are quickly deposited as the storm subsides. The Thames storm surge of 1954 is a modern day equivalent. The fossil fauna of the area can tell us much more about the environment than the sand and shale sequences on their own could do.

WEST OF THE CHURCH STRETTON FAULT

Next to be considered are the Caradoc sequences just west of the Church Stretton Fault. Unfortunately these are poorly exposed.

The sequence starts with a Grit followed by shales with two volcanic horizons within the

shales. The sequence is much more of an off-shore sequence that that seen east of the Church Stretton fault. The volcanics are often debris flows; they have flowed down slopes and one of the volcanic centres can be traced to the Breidden Hills. There is a long ridge of the Breiddens made up mostly of volcanic conglomerates containing andesitic cobbles and some coarse agglomerates. The beds dip towards the south-east and are mainly shales containing graptolites and in one or two places are the odd trilobite and a few brachiopods but this was a deepish marine environment at the outer limits of a bottom living fauna. At first sight the perfectly rounded cobbles within the volcanic layers would seem to be a beach deposit but there is no bedding and the cobbles are of all orientations, sometimes lying surrounded by sand. They represent mass flow conglomerates; they have formed in one environment – the rounding would suggest a beach – but they have avalanched down a slope.

Further along the hill the conglomerates thin. At the quarry at Middletown Hill there are some conglomerates, but there are also some thick beds of angular tuffs. These must have been deposited in small fault-bounded troughs as they are totally confined between faults. This type of environment may have been an andesitic volcano with a nice cone shape; cobbles formed around the coast line but the steep slopes of the volcano continued down below sea level so that the cobbles were liable to slippage. Eruptions from the volcano were mainly andesitic lavas but with some tuffs.

Finally there are the volcanics at the quarry on Moel y Golfa Hill. Round the sides of this quarry one can see the massive intrusive andesites which represents the magma pushing up and feeding the volcano, but in the centre part of the quarry there are caught up volcanic conglomerates and also some pillowed andesite lava. So here one can see part of the rocks which have slipped down the steep slopes of the volcano have been intruded again by andesitic lavas within a marine environment.

ACKNOWLEDGEMENTS

Based on notes by Joan Jones prepared during a lecture given by Dr Pat Brenchley to the Shropshire Geological Society on 17th February 1988.

ISSN 1750-855x