

The Magnesian Limestone cliffs at Blackhall Rocks, county Durham

Thursday 9 May 2013

with Michael Mawson

11 members joined Michael at the top of the Magnesian Limestone cliff above Blackhall Rocks, north of Hartlepool, where he gave us a full illustrated geological background on the development of Durham Province (the equivalent of the Yorkshire province) of the Zechstein Sea when it was just north of the equator and its western coastline around 280 million year ago in the Late Permian era.

The Zechstein Sea was very saline and almost landlocked, stretching from today's Pennines to the Urals and down towards the Alps, with the open seas to the north in the region of present day Norway.



Polished evaporite Anhydrite sample

Due to its proximity to the equator and persistent evaporation, precipitation of limey mud was constantly occurring, followed by massive deposits of the Hartlepool anhydrite/ gypsum and halite evaporites predicated to the east of the Blackhall Rocks.

The Blackhall cliffs represent the western coast of the Zechstein Sea, which coincide with the present Blackhall foreshore and the Blackhall Rocks, would have been at the front of the Zechstein shoreline reefs.

Due to the salinity bryozoans and cyanobacteria and other microbes were the main life forms. These developed algal mats and produced large thicknesses of thin planar laminated deposits in the intertidal and shallow sea.



Due to this saline environment only a few molluscs developed including small brachiopods and nautiloids.

Nautiloid



Oolites



Stromatolitic algal mats

Beds of oolites and larger bean-shaped pisoliths developed in high energy wave conditions and stromatolites developed in the intertidal region of the shoreline.

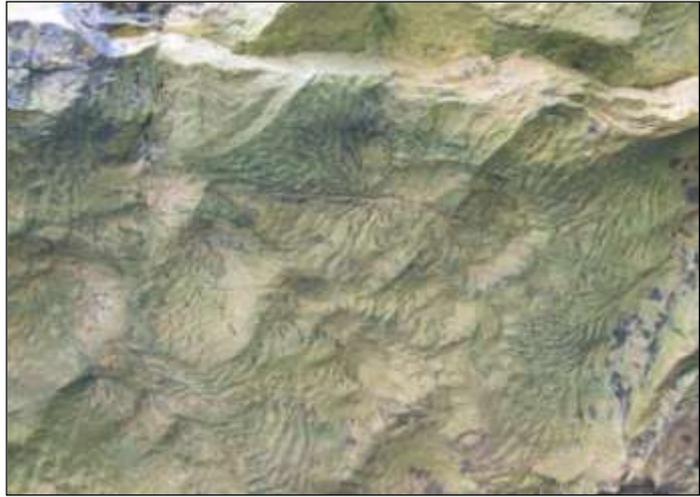


Gin cave

The large and very impressive Gin sea cave has been eroded out of the Boulder Conglomerate and clearly shows the remains of what was originally interpreted as broken up reef cliff scree. It is now interpreted as reef rampart deposits formed in a high energy surf zone environment during major violent tropical storms. These boulders will probably not have been transported far and seldom moved from their jumbled positions. It is also thought that there were various sea level changes during that period of time.

Some of the Crinkly Bed type structures are exposed in the roof of the Gin Cave.

These ripple structures indicate they are of a microbial origin and are interpreted as having been developed in a subtidal high energy environment but have then been subject to long periods of subaerial exposure.



Crinkly Beds ripple structures in the Gin Cave roof

The Blackhall Fault, which contained fractures filled with galena and barite, is just to the north of the Gin Cave. The remains of a small trial level still remain.

Itinerary

Michael took us down to the Blackhall Rocks foreshore and going south along the pebble beach we visited six locations. He gave a clear and full interpretive description of exposures which covered the various aspects of the western Zechstein coast line at each of these locations.

We stopped for lunch beside the Gin Cave and then we progressed along the beach looking at various exposures before scrambling up the Green Stairs cliff where recent cliff falls had destroyed much of the stairway.

After clambering up the steep landslip stairway and thanking Mike for an excellent trip we repaired to the RSPB visitor centre near Seal Sands south of Hartlepool for a welcome drink and bite to eat before setting off on our journeys home.