
The Dungeon, Merseyside

[SJ 252 832]

Introduction

This site shows a section through the Tarporley Siltstone Formation, at the base of the Mercia Mudstone Group, in faulted contact with the older Wilmslow Sandstone Formation. The Tarporley Siltstone Formation comprises red, fine-grained sandstones and siltstones, with parallel and rippled bedding, and pseudomorphs after halite, indicating deposition in a marine intertidal environment, an unusual sedimentary setting for the British Mid Triassic red beds, but providing evidence of a marine incursion contemporaneous with the marine Muschelkalk in Germany. This site has been described by Thompson (1970a, 1986).

Description

The Dungeon is a natural stream section that exposes the Tarporley Siltstone Formation on the eastern side of the Dee Estuary near Thurstaston. The Mercia Mudstone Group crops out here within a N–S-oriented graben bounded to the west by the Thurstaston fault. The underlying Helsby Sandstone Formation is seen on the western (footwall) side of the fault in the Thurstaston roadcutting GCR site (see site report, above).

At the south-western end of The Dungeon section, the Tarporley Siltstone Formation is seen faulted against the Wilmslow Sandstone Formation. The contact between the Tarporley Siltstone Formation and the underlying Frodsham Soft Sandstone Member of the Helsby Sandstone Formation is not exposed here, but can be inferred to run east-west across the low ground to the south-east of The Dungeon.

In The Dungeon, approximately 24.5 m of the Tarporley Siltstone Formation strata (Figure 3.30) are exposed between the Thurstaston Fault and the bridge at the north-east end of the section. The formation comprises sandstones, mudstones, and heterolithic facies, with an increase in units of very fine-grained sandstones towards the top. Many of the features described by Ireland *et al.* (1978) at the Red Brow GCR site (see below) can be seen at The Dungeon, but the dominant facies at the latter site is red shales with thinly interbedded fine and very fine rippled sandstones. The ripple marks are predominantly asymmetrical current ripples, and indicate flow directions to the north-west. The upper part of the section includes thicker, fine-grained, micaceous, red sandstones with abundant mudstone rip-up clasts. Sedimentary structures and features include desiccation cracks, injection structures, intraformational mud clasts, armoured mud balls, mud drapes on foreset surfaces, trace fossils, pseudomorphs after halite, and calcite-filled geodes.

At the top of the section is another fault, above which lie poorly exposed interbedded siltstones and mudstones with pseudomorphs after halite and symmetrical ripples, presumably also part of the Tarporley Siltstone Formation.

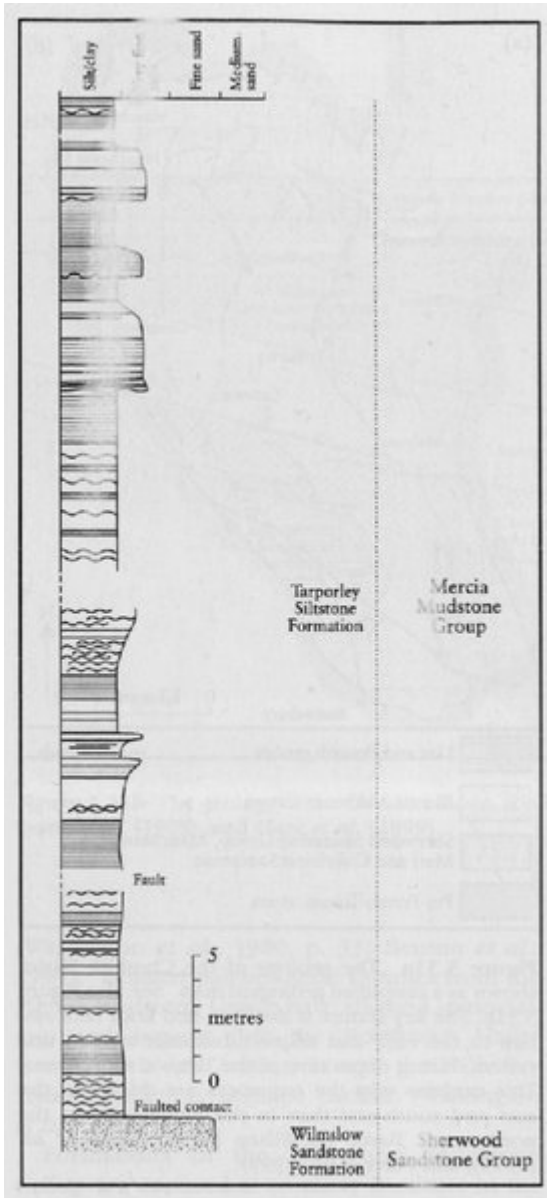
Interpretation

The Tarporley Siltstone Formation at The Dungeon was deposited in a lake-marginal or intertidal environment (Thompson, 1986). Subaerial emergence is indicated by the desiccation cracks and pseudomorphs after halite, while the ripple marks and trace fossils indicate sub-aqueous deposition. The continuous sequence of 4 m of red mudstones at the base of the succession indicates deposition on a high to low transitional mud flat. The succeeding 4 m of red mudstones with rare siltstones were presumably deposited on a low-energy intertidal flat or estuary area. The intercalation of fine-grained sandstones in the top 3 m of the section suggests continuing deposition in an intertidal flat, but with occasional channels or sand bars.

Conclusions

The Tarporley Siltstone Formation is well exposed in The Dungeon section. The mudstones, siltstones, and sandstones of this unit record evidence for deposition on the margins of a shallow sea, contemporary with the major Muschelkalk transgression that flooded Germany and the North Sea region. This site provides a useful onshore representation of a formation that extends offshore into the East Irish Sea Basin, and hence is important for the interpretation of Mid Triassic palaeoenvironments and palaeogeography in this region.

References



(Figure 3.30) Sedimentary log of the Wilmslow Sandstone and Tarporley Siltstone formations in the stream section at The Dungeon. (P. Turner, unpublished information.)