

The Permian red beds of North-East England

Introduction

The Permian succession of north-east England lies within the Zechstein Sea Basin, the deposits at the western edge of which are exposed from Durham south to Nottinghamshire. The succession in Durham begins with 0–9 m of basal breccia, followed by the Yellow Sands, which are overlain by the Marl Slate at the base of the marine Zechstein sequence.

The thin basal breccia is a piedmont deposit, associated with uplift and erosion of underlying Carboniferous sediments. The Yellow Sands are predominantly aeolian in origin, and are either coeval with, or younger than, the basal breccias. There is no independent evidence for the age of these units, but they are generally considered to be Mid Permian, since they underlie the Marl Slate (Smith *et al.*, 1974). The Marl Slate was traditionally dated as Ufimian, or Wordian, on the basis that it overlies the Rotliegendes units which include the major Illawarra magnetic reversal; in the Jin Yugan *et al.* (1997) stage succession, this reversal is considered to occur in the highest Wordian (Middle Permian Series; see (Figure 1.3)). However, Smith (1995) suggested that the whole of the Zechstein may be younger, Wuchiapingian or Changhsingian. If this is the case, the basal breccia and the Yellow Sands in Durham, Yorkshire, and Nottinghamshire, could be late-Mid Permian in age.

One GCR site only, Crime Rigg, is selected to illustrate the Permian red-bed facies of northeast England. The remainder of the Permian succession, the marine Zechstein, is represented by marine Permian GCR sites (Smith, 1995).

[Crime Rigg Quarry, County Durham](#)

References

| | | International | Germanic | Russian | North American |
|--------|-------------|---------------|---------------------|------------|----------------|
| Late | Lopingian | Changhsingian | Unter Buntsandstein | Tatarian | Ochoan |
| | | Wuchiapingian | Zechstein | | |
| Middle | Guadalupian | Capitanian | Weissliegendes | Kazanian | Capitanian |
| | | Wordian | | | Wordian |
| | | Roadian | | | Roadian |
| Early | Cisuralian | Kungurian | Rotliegendes | Kungurian | Leonardian |
| | | Artinskian | | Artinskian | |
| | | Sakmarian | | Sakmarian | Wolfcampian |
| | | Asselian | | Asselian | |

(Figure 1.3) Permian stratigraphy, showing the international scale (Jin Yugan *et al.*, 1997), and main equivalent divisions from successions in Germany and central Europe, Russia, and North America. The Illawarra magnetic reversal event (IR) is documented in the top Wordian Stage, and high in the Rotliegendes, so the 'Zechstein' lithostratigraphical unit falls in the Capitanian Stage or higher. (Based on Jin Yugan *et al.*, 1997 and Wardlaw, 2000.)