Little Castle Head, Pembrokeshire

[SM 855 065]

Potential ORS GCR site

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Introduction

The Little Castle Head site (Figure 5.52), (Figure 5.53) is described in the companion Silurian stratigraphy GCR volume (Aldridge *et al.,* 2000) on account of the late P■ídolí age of the strata. Only a brief account is presented here. Little Castle Head lies on the north shore of Milford Haven, south Pembrokeshire. Formerly assigned to the Red Marls of Pembrokeshire (Cantrill *et al.,* 1916), the strata belong now to the Sandy Haven Formation of the Milford Haven Group (Allen and Williams, 1978). These include two volcanic horizons, the Townsend Tuff Bed and Pickard Bay Tuff Bed, of which the former is the most regionally extensive, being known throughout Wales and the Welsh Borderland (Allen and Williams, 1981a; Parker *et al*., 1983). The section lies in the Winsle Block, one of several fault-bounded basins in south Pembrokeshire. The faults that define the block are the Benton Fault to the north and the Ritec Fault to the south, which acted as synsedimentary basin-margin faults and which were re-activated as thrusts in the Variscan Orogeny (Sanzen-Baker, 1972; Dunne, 1983; Powell, 1987, 1989; Marshall, 2000b). Variscan compression resulted in the tight folding present at the site.

Description

The Sandy Haven Formation (Allen and Williams, 1978) comprises about 850–900 m of predominantly red mudstones/siltstones, with minor quartz conglomerates and sandstones and a distinctive suite of airfall tuffs. The Little Castle Head site exposes beds in the middle part of the Sandy Haven Formation. This consists of bright red mudstones with abundant calcretes, minor purple and grey-green, lithic sandstones and a few granule- to pebble-grade conglomerates with vein quartz and lava clasts. It also contains the tuffs, the principal ones being the Townsend and Pickard Bay Tuff beds (Allen and Williams, 1978; 1981a). Of these tuffs (the magenta beds of Cantrill *et al.,* 1916), the Townsend Tuff Bed is the thicker, comprising three falls (A, B and C) in 2–4 m of beds (Figure 5.54).

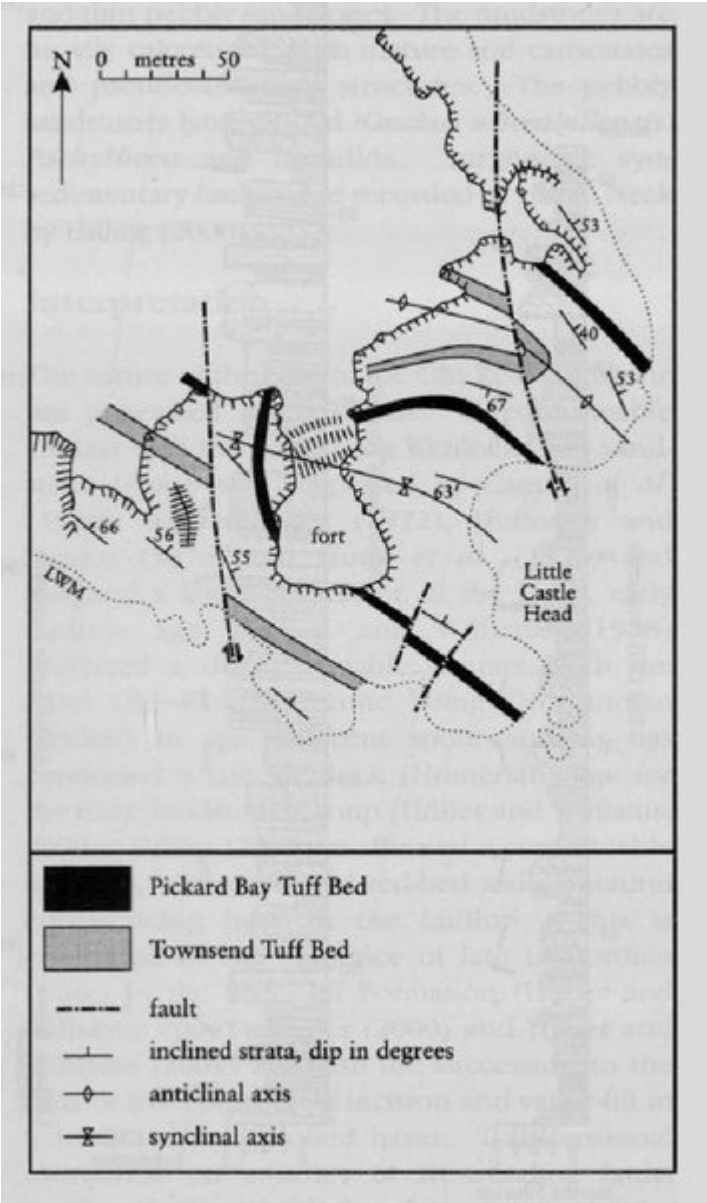
Interpretation

The red calcrete-rich mudstones that dominate the succession are interpreted as the deposits of an extensive coastal mudflat, subjected to periodic marine influence and crossed by small, wet-season streams that were confined to channels, but also subject to flash sheet-flooding. These streams were probably largely sourced from the north, but some of the exotic clasts in the conglomerates may have been derived from the Pretannia landmass to the south (Cope and Bassett, 1987; Bluck *et al.,* 1992). Polygonal arrays of cracks in the mudstones are desiccation cracks, not synaeresis cracks, as stated by Lane (2000d). The well-developed calcretes at this level point to prolonged periods of subaerial exposure of the mudflats and the formation of thick carbonate soil profiles. The Townsend Tuff Bed is a regionally extensive marker bed of great value in correlation of the late P■ídolí red beds throughout the Anglo-Welsh Basin. In the absence of faunas at this level, Allen and Williams (1981a) suggested that it could be used as the local Silurian-Devonian boundary. Palynomorph and thelodont assemblages suggest that this lies at a higher level (e.g. Richardson *et al.,* 2000), but sampling so far has been of suitable facies at a level when early Devonian species were already established. Radiometric dating of the tuffs may provide some degree of age precision. Allen and Williams (1981a) speculated that the tuffs were the products of Plinian eruptions. The thinnest of the Townsend tuffs (Fall A) was deposited by strong east-west winds from a centre 100–200 km away, but its location is unknown (Bevins in Stephenson *et al.,* 1999).

Conclusions

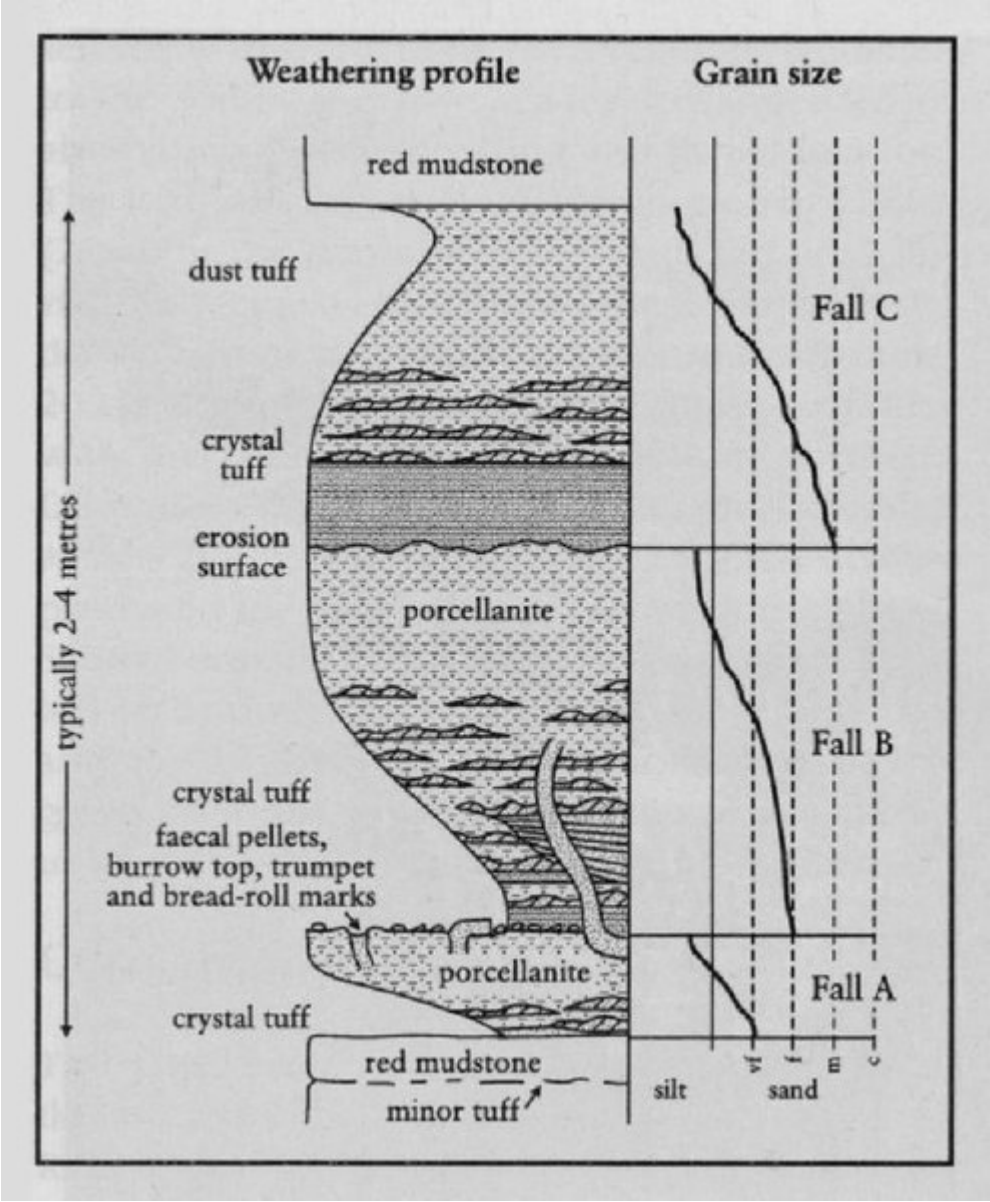
Little Castle Head provides a reference section for the Sandy Haven Formation of late P■ídolí age. Red mudstones rich in soil carbonate (calcrete) horizons point to a coastal alluvial mudflat subjected to prolonged periods of emergence. The site also provides a reference section for the Townsend Tuff Bed, an important volcanic ashfall marker bed in the region, here in a succession tightly folded by Variscan compressive forces.

References



(Figure 5.52) Geological map of Little Castle Head. Based on Allen (1980), Hancock et al. (1982) and Parker et al. (1983).

(Figure 5.53) Oblique aerial view looking north-west to Little Castle Head. The strata are tightly folded and include the Townsend Tuff Bed and Pickard Bay Tuff Bed, which weather to slots and recesses. (Photo: S. Howells.)



(Figure 5.54) Schematic profile of the Townsend Tuff Bed illustrating its main sedimentological features. After Allen and Williams (1981a).