

Pennine Middle Coal Measures Formation

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Pennine Middle Coal Measures Formation ([PMCM](#)), Carboniferous, Northern England Province

Pennine Middle Coal Measures Formation is part of the [Pennine Coal Measures Group](#)

Name

The formation has historically been referred to as the Middle Coal Measures, as defined by Stubblefield and Trotter (1957^[1]). The name was applied across Britain, despite different boundary definitions existing between England and Scotland (Browne et al., 1999^[2]). To distinguish the succession present within the Pennine Basin from that present within the Midland Valley of Scotland and the South Wales Basin, the formation has been renamed the Pennine Middle Coal Measures Formation.

Lithology

Interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit. In southern Britain the formation can be broadly divided into two unnamed members (Aitkenhead et al., 2002^[3]). From the base of the Vanderbeckei Marine Band to the base of the Maltby Marine Band (Waters et al., 2009, figs. 13, 14^[4]) is similar to the upper member of the Lower Coal Measures. Between the Maltby Marine Band and the top of the Cambriense Marine Band marine bands are common at the bases of cyclothem and coals are thin. In Yorkshire, sandstones are generally thicker and coarser than is typical of the Coal Measures.

Genetic interpretation

The deposits accumulated in a delta-top environment with large distributary channels, similar to that

described for the Pennine Lower Coal Measures Formation (see Section.6.10.1). Some of the cycles commence with laterally widespread marine bands that probably result from sea level rises. The lower part of the formation includes sandstones with a provenance from the west, representing a continuation from the upper part of the Pennine Lower Coal Measures (Hallsworth and Chisholm, 2000^[5]; Chisholm and Hallsworth, 2005^[6]). The upper part of the formation displays a return to derivation from the north as well as the start of a new influx, this time from the east and south-east (Hallsworth and Chisholm, 2000^[5]; Chisholm and Hallsworth, 2005^[6]).

Stratotype

The type area is the Potteries (North Staffordshire) Coalfield, Stoke-on-Trent (SJ 50 90), where there are numerous borehole and shaft sections, but few exposures (Waters et al., 2009, fig. 13^[4]).

Reference sections include: the basal Vanderbecke Marine Band at Miry Wood, Apedale (SJ 8118 4940), which is to be designated a RIGS site (Rees and Wilson, 1998^[7]); the upper part of the formation, from below the Rowhurst Coal to the top of the Cambriense Marine Band, from 325.5 to 200.3 m depth, in the No. 4 underground borehole (BGS Registration Number SJ84NW/30) (SJ 8392 4850) at Holditch Colliery, Stoke-on-Trent (Rees and Wilson, 1998^[7]); the top part of the formation, from about 162 m depth at the top of the Cambriense Marine Band to the bottom of the borehole at 183.3 m depth in the No. 1 underground borehole (BGS Registration Number SJ85SW/19) (SJ 8396 5029) at Parkhouse Colliery, Stoke-on-Trent (Rees and Wilson, 1998^[7]); and the base and lower part of the formation, in the Hesketh Back Cut, Chatterley Whitfield Colliery from 318.5 m to the top of the constructed stratigraphical section (V5 British Coal, G7 BGS log) (SJ 884 533) (Rees and Wilson, 1998^[7]). The base and lower part also has a reference section at Duckmanton, north Derbyshire (SK 4237 7040), which is the basal Stratotype section for the Duckmantian Stage, and includes 50 m thickness of Pennine Middle Coal Measures above 75 m of Pennine Lower Coal Measures (Owens et al., 1985^[8]).

Lower and upper boundaries

The base of the formation, as defined by Stubblefield and Trotter (1957^[1]), is taken at the base of the dark grey, fissile mudstone of the Vanderbecke Marine Band (VDMB), with an eponymous fauna and/or other marine fossils.

The top of the formation, as defined by Stubblefield and Trotter (1957^[1]), is taken at the top of the dark grey, fissile mudstone of the Cambriense Marine Band (CAMB), with an eponymous fauna and/or other marine fossils. This definition is extended to the Scottish Solway area (Figure 6, Column 7; Figure 10, Column 3), which formerly used the top of the Aegiranum (Skelton) Marine Band (AGMB) to define the top of the formation.

Thickness

Up to 600 m thick across the North Staffordshire Coalfield; about 650 m thick in Lancashire; 200 m thick in north-west England, and 200-270 m thick around Canonbie.

Distribution and regional correlation

Central and northern England, North Wales. The formation broadly equates with the Scottish Middle Coal Measures and South Wales Middle Coal Measures formations, although in the Midland Valley of Scotland the definition of the top differs from that of the Pennine Basin. This reflects the absence of the Cambriense Marine Band within the Midland Valley of Scotland.

Age and biostratigraphical characterisation

Duckmantian to Bolsovian. The base of the formation is taken at the base of the Vanderbeckei Marine Band (VDMB), which marks the base of the Duckmantian Stage. The top is taken at the base of the Cambriense Marine Band (CAMB), which occurs within the Bolsovian Stage.

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