

Carboniferous: blocks, basins and sedimentary cyclicity, Northern England

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From: Stone, P, Millward, D, Young, B, Merritt, J W, Clarke, S M, McCormac, M and Lawrence, D J D. 2010. [British regional geology: Northern England](#). Fifth edition. Keyworth, Nottingham: British Geological Survey.

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Introduction

Rocks of Carboniferous age underlie about three-quarters of the Northern England region, either at outcrop or concealed by later beds. They are lithologically varied and accumulated in a range of depositional environments: marine, paralic, deltaic and terrestrial. Early in Carboniferous times, rapidly subsiding, fault-controlled, extensional basins developed between structurally elevated, emergent blocks. The variation in the thickness of lower Carboniferous strata throughout northern England reflects the close association between sedimentation and the widespread contemporaneous faulting. Syndepositional folding, related to dextral movement on some of the major faults, developed from late in Visean times. By the end of the Visean, thermal relaxation was also driving crustal subsidence, resulting in the gradual submergence of the distinctive block-and-basin regional topography, and the depositional onlap of the earlier structural highs.

Although subsidence was influenced by the broad pattern of structures established early in the Carboniferous, it interacted with eustatic changes in sea level, so that cyclical sedimentation patterns became a general feature of the Carboniferous successions. Throughout the period, the principal rock types of limestone, mudstone, sandstone, seatearth and coal succeed each other in a regular pattern of cyclothems, repeated at different scales and with varying degrees of complexity. Individual rock types within each cyclothem reflect changing environmental and depositional conditions. A particularly well-developed and distinctive cyclic succession built up during the late Visean to early Namurian interval and is commonly referred to as the 'Yoredale facies'.

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