

Out of the Mire: New Perspectives on Facies Models for Coal and Coal-bearing Strata

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Most models for coal-bearing strata developed before 1985 depicted coal as accumulating as peat in low-lying areas immediately adjacent to active clastic depositional systems. Floodplains, back-barrier environments, and delta tops were often suggested as sites for coal (peat) accumulation. However, although such environments may be places where organic-rich muds accumulate, they are usually not locations of significant peat accumulation. Those peats that accumulate in such settings have a high ash (inorganic) content and, if preserved, would form carbonaceous shales, not coals. In the last decade or so models of coal and coal-bearing strata have been radically changed by incorporation of sequence stratigraphic concepts and by studies of modern peat-forming environments close to active clastic sedimentary environments.

Many coals immediately overlie a sequence boundary and are not genetically related to underlying clastic sedimentary facies. Such coals may be the initial facies that accumulate over an incised landscape during a rise in base level associated with transgression. Thickness and distribution of a coal bed is determined by the interplay between rates of creation of accommodation and peat accumulation rates. Coal-beds have distinct characteristics dependant on tectonic setting and the degree of glacioeustatic influence.

Under certain climatic conditions raised mires may accumulate low ash peat in close proximity to active clastic depositional environments. In such cases peat accumulation may be a significant factor in shaping the clastic environments and determining their evolution through time. Like the growth of reefs, the upward growth of raised mires may create substantial vertical aggradation of surrounding facies.