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The Significance of Coal Seam Splits for High Resolution Sequence Stratigraphy

Coal seam splits formed by the inundation of the mire with marine derived material during base level rise provide evidence for flooding surfaces that are correlatable from shallow-marine into non-marine environments. Expressions of these flooding surfaces are recorded by changes in the composition of the unsplit coal many kilometres up depositional dip of the transgressive limit. Similarly, falls in base level which generate sequence boundaries may also be traced into the coal and recorded by changes within it.

The Sunnyside coal seam of the Cretaceous Blackhawk Formation in Eastern Utah contains two laterally extensive splits which open out basinward into packages of shallow-marine sediments. Increases in the inorganic mineral and pyrite content of the coal combined with reduced vitrinite reflectance, provide clear signatures of the flooding surfaces related to these splits at least 15km back into the unsplit coal. The coal constrained by these flooding surfaces is therefore the coastal plain equivalent of the marine shoreface parasequence bounded by the same two surfaces further into the basin. Furthermore, changes in coal composition and vitrinite reflectance within this package of coal enable us to identify a complete record of very high-resolution accommodation changes throughout the formation of this parasequence.

Identifying high-resolution accommodation trends within packages of coal correlated to changes in marine base level is central to understanding sequence stratigraphic expressions within non-marine systems. The additional resolution provided by coal data also enables sequence stratigraphic interpretations of the equivalent shallow-marine strata to be refined.

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