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# Influence of Coal Quality on the Carbon Sequestration Potential of Coalbed Methane Reservoirs in the Black Warrior Basin

Coal quality is a fundamental control on gas sorption capacity, and hence, the carbon sequestration potential of coalbed methane reservoirs. Our research focuses on the importance of coal quality in determining the carbon sequestration potential of the Black Warrior basin of Alabama, where coal-fired power plants operate amidst a thriving coalbed methane industry. Flooding of coal with carbon dioxide may not only decrease greenhouse gas emissions, but may also enhance coalbed methane recovery.

Of the coal quality parameters analyzed, rank and mineral matter content are the most important controls on carbon sequestration capacity. Variation of maceral content appears to be of lesser significance. The regional rank pattern reflects significant variation of paleogeothermal gradient that is not related directly to regional subsidence, folding, and faulting. Rank varies predictably on a regional basis and is thus an easy parameter to incorporate into quantitative determinations of sequestration capacity.

Extreme local variation of ash and sulfur content reflects development of ombrogenous to topogenous mires in marginal-marine to alluvial depositional settings. Detrital mineral matter is concentrated adjacent to contemporaneous fluvial axes and in channel-fill coal bodies and is least abundant in what are interpreted as supratidal peat domes. Concentrations of early diagenetic pyrite higher than 2% are characteristic of coal beds with marine roof. Density logs of coal beds thicker than 0.3 m can be used to estimate mineral matter content and thus help minimize uncertainty related to depositional heterogeneity when assessing the carbon sequestration potential of coal.