Abstract

The Raton Basin of Colorado and New Mexico is a Laramide foreland basin that has been important to coal geology since its first identification as a coal resource in 1821, and as a major Coal Bed Methane resource in the modern era. Raton Basin contains Cretaceous to Paleogene strata representative of the major transgression and subsequent regression of the Western Interior Sea-way. The interaction between the distal and proximal lithosomes of strata within the Raton Basin is not fully understood. The coaly, fine-grained rocks of the lower and upper coal zones of the Upper Cretaceous to Paleogene Raton Formation are indicative of deposition in wet, distal lowlands, whereas the coarser grains of the barren series of the Raton Formation indicate that this unit was deposited in a highland setting proximal to the source. While the basin has been extensively explored and produced for petroleum and coal in the past (specifically the Cretaceous Vermejo Formation and Raton Formation), vertical and lateral interaction, geometries, and potential communication between the coal deposits and surrounding fluvial deposits is not well understood. This project has served as an investigation into the depositional model of the coal deposits and their surrounding fluvial deposits, specifically by: analyzing outcrops using architecture analysis, performing core descriptions and interpretations, conducting coal palynology, organic petrology, and chemical analysis. It has been proposed that the Upper Cretaceous to Paleogene strata of the Raton Basin were deposited within a Distributive Fluvial System (DFS), and that the coal-rich zone is the down-dip expression of this system. Initial results (vertical and lateral relation of facies in core and outcrop, organic petrology, and palynology) reveal that the extensive and laterally continuous coals formed in a woody low-lying fluvio-lacustrine depositional environment, and humid subtropical climate.

Discussion, Conclusions, and Modern Analog

Organic petrology results from coal samples in this study reveal a vitrinite-dominated (woody) coal composition (Fig. 2E). Sparse palynology results (counts not possible due to lack of spores) included a dominance of fern spores, which suggests a wet paleoenvironment. Analysis also reveals a relatively high abundance of non-descript lacustrine algae. Palynofloral assemblage suggests that standing water was present during the life of the mire (Demchuk, Personal Comm.) (Fig. 2D).

Core and Outcrop analysis reveals that coals are most commonly vertically and laterally associated with carbonaceous mudstone. The combination of the coals and the carbonaceous mudstone deposits are interpreted to be representative of a lacustrine lithosome, and the depositional system for the Upper and Lower Coal Zones of the Raton Formation is interpreted to be a fluvio-lacustrine system.

It is determined that a possible modern analog for this ancient peat-forming depositional environment is the Grijalva flood plain in the Tabasco, Mexico (Fig. 3A).

References

