Chemostratigraphy and Sedimentology of Lower-Middle Pennsylvanian Strata in the Forest City Basin, Southern Iowa

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ABSTRACT

Atokan (Lower–Middle Pennsylvanian) strata of the lower Cherokee Group in the Forest City Basin, southern Iowa, represent a relatively low-energy fluvial system confined to incised paleovalleys in a low accommodation setting. Creation of accommodation was linked to sea level rise during Early–Middle Pennsylvanian time, and consequently, the lower Cherokee Group has been interpreted to locally contain both terrestrial and marginal marine deposits. The funneling effect of incised valleys, however, likely permitted a tidal influence to propagate far upstream and resulted in sedimentary structures and stratigraphic patterns that are poorly understood and possibly misinterpreted. Tidal influence has been recognized in coeval shelf and fluvial-deltaic strata far to the south of the study area on the northern margin of the Arkoma Basin. We hypothesize that Atokan strata of the Forest City Basin represent the updip extent of these Arkoma systems. The objective of this research is to characterize the sedimentology of the Forest City Basin Atokan depositional system in order to reevaluate the Early–Middle Pennsylvanian regional depositional models and sediment dispersal patterns. Methods for this study include detailed facies analysis and establishment of stratigraphic bounding surfaces for regional correlation. Initial correlations will primarily be based on a pre-existing palynostratigraphic framework. We propose to also utilize emerging chemostratigraphic techniques by collecting suites of elemental data using pXRF core scanning equipment. These techniques will enhance interpretation of facies associations, potentially provide a way to distinguish between terrestrial and marine deposits, and may reveal additional marker beds for regional scale correlations.

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