

Desmoinesian Granite Wash Facies Architecture, Western Oklahoma and Texas Panhandle

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Pennsylvanian to lower Permian gas-bearing Granite Wash of the Anadarko Basin has long been known to represent feldspathic sandstone and conglomerate deposition in a fan-delta system along the faulted northern margin of the Amarillo-Wichita Uplift. This study focuses on the Desmoinesian Granite Wash facies architecture with the ultimate goal of relating architectural elements to reservoir quality distribution. Cores from Roberts and Hemphill Counties, TX, and Roger Mills, Beckham and Washita Counties, OK provide examples of lithofacies and facies components of a fan-delta system. Distal deepwater aprons are recognized from high-density and low-density turbidity current, debris flow and hemipelagic deposits. Syndepositional soft-sediment deformation and fluidization structures are common and suggest deposition on moderate slopes of deepwater apron instead of basin-floor fan. Preliminary examination of more proximal located core indicates a variety of facies elements that include offshore and nearshore marine, gravelly and sandy fluvial and paleosol. Because facies architectural element hierarchical organization and correlation (lithofacies to sequence stratigraphic elements) are largely influenced by changes in base level, a model is being evaluated for establishing an independent track of relative sea level variation. Spectral gamma ray logs should record chemical weathering byproduct flux to the basin in the K/Th ratio. In addition, maximum U contribution is expected with minimum detrital flux (high rates of relative sea level rise). This model is also being evaluated using magnetic susceptibility and thin section data. Such an approach, if validated, would greatly improve facies architecture identification and correlation.