

# **Depositional Interpretation and Sequence Stratigraphic Control on Reservoir Quality and Distribution in the Meramec Stack Play: Anadarko Basin, Oklahoma**

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## **ABSTRACT**

The Mississippian Meramec Stack Play in the Anadarko Basin of Oklahoma is dominantly a clastic system, with primary facies composed of argillaceous to calcareous siltstones deposited within or below storm wave base. Sediments were deposited as northeast-southwest elongate clinoforms with inclinations of less than 1 degree, prograding to the southeast. Low inclinations resulted in individual clinoforms forming in relatively similar water depths and energy conditions along depositional dip. These geometries and processes create strike-parallel facies belts through the play.

The primary driver of reservoir quality in the Meramec is the volume of calcite cement. Facies-specific cementation creates a strong depositional control on reservoir distribution as reservoir units are primarily deposited in low-energy settings below storm wave base with higher volumes of clay, while non-reservoir is primarily higher energy facies deposited near or within storm wave base or in deeper settings by turbidite flows with high initial depositional porosity that is preferentially cemented.

A strong eustatic control is observed in the Meramec creating a series of stacked reservoir and non-reservoir facies at multiple scales. The influence of sea level change, and subsequence facies successions is the primary driver of stacked pay potential through the play.