

# **Paleotopographic Control on the Variability of Woodford Shale Strata Across the Southern Cherokee Platform Area of Central Oklahoma: A Mechanism for Increased Preservation-Potential of Organic Content**

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## **Abstract**

The Woodford Shale on the southern Cherokee Platform of central Oklahoma was deposited mainly within two linear trends (Trend 1 and Trend 2) that correspond to eroded and missing sections in the underlying Hunton Group. These trends have been interpreted as incised valleys that were carved out of the underlying Hunton Group by erosional processes that occurred prior to the deposition of the Woodford Shale. The Woodford Shale preferentially filled the incised valleys as they represent the maximum accommodation that was available in the study area at the time of deposition. Identification, correlation and mapping of 12 well-log facies (RGRPs) from 137 wells reveals that Trend 2 began to backfill during regional transgression prior to the onset of backfilling of Trend 1. As a result, the well-log facies are not necessarily correlative between the two trends in either time or space. Total organic carbon content (TOC) models, estimated from  $\Delta \text{Log } R$  log calculations, suggest that the linear trends contain separate organic rich RGRPs. This observation implies that the hydrocarbons present in the terminal extents of each trend were sourced by separate organic-rich strata. Therefore, paleotopographic limitations on deposition are thought to be a potential mechanism for the development of localized bottom-water anoxia and, by extension, the preservation of organic matter.