

# **ON THE GENESIS OF SHALES AND CLAY DIAGENESIS CONTROL ON RESERVOIR QUALITY PARAMETERS OF LATE DEVONIAN TO LATE PENNSYLVANIAN UNCONVENTIONAL RESERVOIRS OF THE ANADARKO BASIN, OKLAHOMA**

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## **ABSTRACT**

The foreland Anadarko Basin in southeastern Oklahoma is one of the deepest and most prolific hydrocarbon producing basins in North America. In its deepest portion of approximately 40,000 feet, the basin consists of a thick Cambrian carbonate sequence overlain by 25,000 feet thick stack of alternating sandstone and shale layers of principally Upper Paleozoic age. Historically, the Anadarko Basin shales have been known as major hydrocarbon sources, while lately their importance continuously arises from the perspective of unconventional reservoir exploitation. Yet, the shaley units remained relatively under-researched with respect to their clay mineralogy and diagenetic control over the reservoir rock properties.

Focusing on the Late Devonian to Late Pennsylvanian shales of the Anadarko Basin and combining state-of-the-art analytical techniques such as transmission electron microscopy (TEM), whole-rock major and trace element geochemistry and X-ray diffraction (XRD) on clay fraction, this study aims to unravel the genesis and diagenetic evolution of shales as well as their impact on the distribution of reservoir characteristics in the subsurface. This research is hypothesis-driven and it starts with the premise that shale reservoir characteristics like microporosity, permeability and compartment of organic matter are intrinsically linked to the type, the mode of origin and diagenetic evolution of shaley clay component. By conducting this investigation I hope to open some new venues in understanding of fundamental characteristics of the Anadarko Basin shales (i.e. their origin and diagenetic history) which are known to effectively control the reservoir quality distribution in a variety of unconventional reservoirs.