

Syn depositional Tectonism and its Effects on Mississippian (Kinderhookian to Osagean) Lithostratigraphic Architecture: Part 2 – Subsurface Occurrences in the Midcontinent USA

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As in exposures of Kinderhookian to Osagean carbonates in Missouri and adjoining Arkansas and Oklahoma, deposition of these rocks in the subsurface of Kansas and northern Oklahoma also records aggradational and progradational sedimentation that was overprinted by syn depositional tectonism related to regional Ouachita tectonism. Such deposition and tectonic overprint are reflected in the character, occurrence, and type of petroleum reservoir rocks in the subsurface, hence, they are significant attributes of any exploration model. There are, for example, relatively narrow but regionally extensive, linear, E-W oriented belts wherein the Kinderhookian-Osagean section is thin, and includes many marine and subaerial unconformities and folded strata, that reflect the repeated passage of foreland bulges (arches) during deposition. Potential subunconformity-truncation and structural traps abound in such situations, although periodic eustatic lowstands also contributed to reservoir porosity formation in some units. On a more regional scale, the absence of Mississippian rocks over much of central Oklahoma to central Texas likewise is related to broad Ouachita-related uplift. In contrast, significant thickening of these units in central Kansas reflects anomalous subsidence, and potential facies-trap reservoirs are likely in such areas. Reefs in the section are both allochthonous (related to syn depositional tectonism) and autochthonous. They locally are porous and oil-stained in outcrops, hence, they may be viable reservoir objectives in the subsurface.