

Sedimentology and Diagenesis of Mississippian (Kinderhookian and Osagean: Tournaisian and Visean) Buildups in Southwest Missouri, Northwest Arkansas, and Northeast Oklahoma

Beau T. Morris¹, S. J. Mazzullo¹, and Brian W. Wilhite²

¹*Department of Geology, Wichita State University, Wichita, KS 67260*

²*Woolsey Operating Co., Wichita, KS 67202*

Carbonate buildups are present in the Kinderhookian Compton and basal Osagean Pierson formations in SW Missouri and adjoining Arkansas and Oklahoma. Their depositional origin, biota, and diagenesis are key to evaluating their potential as subsurface petroleum reservoirs. They formed on aggradational to progradational distally-steepened ramps. Those in the Pierson are mainly layered bafflestones, they contain abundant fenestrate bryozoans and crinoids, and are capped by crinoid grainstones. They are interpreted to have been deposited in a relatively shallow, high-energy environment, and locally they are oil-saturated. The older Compton buildups instead are hybrid mud-dominated lithoherms/fenestrate bryozoan-crinoid muddy bafflestones that are associated with nodular-bedded, shaly mudstones. They are interpreted to have been deposited in low-energy, deeper-water environments than the Pierson buildups. One of the Compton buildups is a stromatactis-type “reef” with abundant marine cement-filled vugs. The lithoherm/bafflestone buildups were uplifted and subaerially exposed in mid-Compton time within an EW-trending belt in the study area. Meteoric-dissolution vugs formed and were occluded by detrital dolomite and coarse calcite cement, and then the buildups were dislodged and redeposited to the north within thick sections of upper Compton that downlap an intraformational exposure surface. Such allochthonous buildups might be mappable in the subsurface by thickness trends.