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Edward L. Washburn and Evan K. Franseen, University of Kansas, Lawrence, KS

**Paleotopography and Sea-Level Controls on Facies and Thickness Variability of Transgressive Limestones: Upper Pennsylvanian Merriam Limestone, Northeast Kansas**

Transgressive limestones of Midcontinent Pennsylvanian cyclothemic strata, which are commonly thin units, may display significant thickness variations due to variable paleotopography. The Merriam Limestone in NE Kansas was deposited during marine transgression over irregular topography of the Bonner Springs Shale that formed from subaerial exposure and erosion. Additional erosion during transgression created several large-scale channels (100's of meters wide, 3-5 meters deep). Smaller channel-like features (10's of meters wide, 1-2 meters deep) are developed locally. Filling and draping of paleotopography during sea-level rise created vertical and lateral facies variations within Merriam strata, and an increased thickness in lows (up to 5 m thick) compared to topographically high areas (<1 m to 1.5 m thick).

Initial deposits in channels consist of argillaceous skeletal wackestones/packstones with re-worked Bonner Springs clasts. These deposits grade upward to cleaner wackestones/packstones with interbedded skeletal packstones/grainstones indicating fluctuating energy conditions and cessation of siliciclastic deposition during continued transgression. Strata filling channels are characterized by a variety of geometries at the margins, including thinning and convergence, lap-out, and overlap. Equivalent strata on surrounding highs consist of shallow water coated-grain wackestones, packstones, and grainstones. Uppermost Merriam strata maintain consistent thickness and facies (skeletal packstone, phylloid-algal wackestone) throughout the study area, indicating relief had been largely filled.

As shown in this study, thicker transgressive deposits in paleo-lows may contain potential reservoir strata that show complex facies associations and geometries. Other transgressive deposits in Midcontinent cyclothem may exhibit similar favorable reservoir characteristics as a result of deposition over variable paleotopography.