

Sequence Stratigraphy of the Lower Morrow in the Arroyo and Gentzler Fields of Southwestern Kansas

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Wireline logs and cores from two fields in southwestern Kansas were used to construct a sequence-stratigraphic framework for the lower Morrow successions in the Hugoton Embayment. Twenty-one lithofacies, representing upper estuarine to offshore depositional environments, were defined. Core data and wireline-log responses were integrated to construct an electrofacies model. Distinctive wireline-log responses define five electrofacies, related to depositional environment. Crossplots, RH0maa-Umaa and Nphi-Dphi versus photoelectric index, were used to determine lithology and distinguish facies.

An upper estuarine electrofacies is confined to valleys incised in the pre-Pennsylvanian unconformity. Laterally, the incised valley fill is bounded by an electrofacies interpreted as interfluvial deposits. Lower estuarine and upper shoreface facies and lower shoreface to offshore facies comprise the remaining lower Morrow facies. At Arroyo field, a simple incised valley-fill deposit constitutes the transgressive systems tract separated by a maximum flooding surface from the overlying offshore to lower shoreface facies of the highstand system tract. The overlying sequence of the middle Morrow limestone is separated by a transgressive surface of erosion. The facies interpretations developed at Arroyo field were applied to the lower Morrow at Gentzler field. The lower Morrow at Gentzler field represents more open-marine environments arranged into three sequences composed of lower estuarine and upper shoreface and offshore to lower shoreface facies.

The proposed sequence stratigraphic framework better represents the complex stratigraphy of the lower Morrow in the Hugoton Embayment.