INTEGRATED DIAGENESIS AND HIGH-RESOLUTION SEQUENCE STRATIGRAPHY OF THE MISSISSIPPIAN LIME, NORTH-CENTRAL OKLAHOMA

Taylor Ewald
Boone Pickens School of Geology, Oklahoma State University, Stillwater, Oklahoma
taylor.ewald@gmail.com

Abstract

This proposed thesis will utilize early diagenesis as a tool to refine high-resolution sequence stratigraphic interpretations and make predictions as to the distribution of early diagenetic fabrics within reservoir facies of the Mississippian Lime. Diagenesis exerts a strong control on the quality and heterogeneity of carbonate reservoirs. Thus, identifying the distribution of different diagenetic fabrics and understanding the underlying processes creating the distributions is of fundamental importance. When these diagenetic processes are integrated with facies in a sequence stratigraphic framework they provide a predictive tool for the distribution of diagenetic alterations that tend to constrain reservoir quality and heterogeneity. A sequence stratigraphic framework is currently being developed for the Mississippian Lime based on cores drilled in north-central Oklahoma (Payne County). The proposed work seeks to utilize early diagenetic analysis, which will include basic petrography, cathodoluminescence petrography, scanning electron microscopy, x-ray diffraction, and stable isotope geochemistry to further define the distribution of such features within the stratigraphic framework. The results from this study are expected to support and constrain the facies based sequence stratigraphic interpretations of parasequences, system tracts and sequences. Additionally, it is expected that this study will indicate that the early diagenetic heterogenetic fabrics within the Mississippian Lime can be predicted at a range of scales.