# INTEGRATED STRUCTURAL AND STRATIGRAPHIC ANALYSIS OF THE GUADALUPIAN SEVEN RIVERS FORMATION, MCKITTRICK CANYON, NEW MEXICO

Benjamin Smith
*Geological Sciences, The University of Texas at Austin, Austin, Texas*
bsmithguitarman@gmail.com

Stratal geometries and quantified stratigraphic variables such as progradation/ aggradation (P/A) ratios have long been regarded as important tools for seismic stratigraphy and reservoir characterization. However, recent studies have shown that interpretation of these parameters for steep walled carbonate platforms can be problematic because there is little consensus about the relative importance of depositional versus early structural contributions to the final geometry and orientation of strata. The famous “fall in” beds of the Artesia Group in the Guadalupe Mountains have been interpreted either as depositional dips with little modification or alternately as the product of syndepositional faulting and down to the basin tilting. If these dips are primary in origin, then original water depth profiles can be reconstructed and a sequence stratigraphic interpretation can be utilized to explain facies distribution as well as the dynamic evolution of shelf strata. If instead geometries are the result of syndepositional or early structural deformation, then quantified stratigraphic variables can provide a framework for analyzing the occurrence, timing, and distribution of syndepositional faults and fractures, which in turn are first order controls on diagenesis and fluid flow throughout geologic time.

Outcrops of the Guadalupian Seven Rivers Formation in McKittrick Canyon, New Mexico display the complete shelf-to-basin profiles of four high-frequency sequences. This study will integrate a recently acquired LIDAR digital elevation model with detailed facies mapping to better understand relationships among large-scale shelf geometries, depositional facies, antecedent topography, and the nucleation and inheritance of syndepositional structures within the Seven Rivers platform.

AAPG Search and Discovery Article #90249  2015 Grants-in-Aid Projects