

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

John B Thurmond¹, Peter Drzewiecki² (1) University of Texas at Dallas, Richardson, TX (2) Eastern Connecticut State University, Willimantic, CT

Evidence for a Hydrodynamic Origin of Guadalupian-aged Carbonate Mud-Mounds

Antecedent topography is one of the most important controls on subsequent deposition of sediments in many carbonate and siliciclastic systems. However, in carbonate depositional systems, it is often assumed that stratigraphic thickening of section over antecedent highs mandates a biological origin. Three-dimensional facies mapping of Permian mud-mounds in the Guadalupian San Andres Fm. in Last Chance Canyon, New Mexico provides insight into the role of antecedent topography in carbonate systems.

Previous work has recognized a series of down slope trending mud-mounds that were interpreted to be sponge bioherms. The mud-mounds directly overlie an unconformity developed on fissile lime mudstone. Erosion on the unconformity resulted in a series of down slope-oriented gullies up to 3m deep. The mud-mounds accentuate the gullied antecedent topography, resulting in relief of up to 20m. This morphology, in addition to sparse siliceous sponge fossils, has been the primary basis for evidence of biologically mediated or enhanced growth resulting in a bioherm.

Further investigation of these mud-mounds has indicated that there is little evidence of an identifiable mound-constructing organism that could have yielded a true bioherm. This leaves three possible hypotheses: 1) The mud-mounds are purely erosional in origin, 2) There is an unrecognized and extremely cryptic organism that constructed the mounds, or 3) The mounds are hydrodynamic in origin, resulting from differential deposition of mud due to long-lasting down slope currents.