

# **Sedimentology of the Rush Springs Sandstone (Permian/ Guadalupian), Western Oklahoma: Evidence of an Erg-Erg Margin Depositional System**

Zachary A. Poland<sup>1</sup>, Alexander R. Simms<sup>2</sup>, and James O. Puckette<sup>1</sup>

<sup>1</sup>*Boone Pickens School of Geology, Oklahoma State University, Stillwater, OK;*

<sup>2</sup>*Department of Earth Sciences, University of California, Santa Barbara, CA;*

The Rush Springs Sandstone (Permian/Guadalupian) of western Oklahoma has traditionally been interpreted as a shallow marine/fluvial-deltaic unit. Based on 23 measured sections and a 177 m core, we present a new model for the Rush Springs Sandstone. We suggest that the Rush Springs Sandstone represents an ancient erg-erg margin depositional system.

From facies relationships, the Rush Springs Sandstone can be divided into three paleoenvironmental belts in west-central Oklahoma. These belts are erg center, erg margin and extradune environments. Outcrop observations suggest that the central portion of the Rush Springs Erg was characterized by compound eolian bedforms several tens of meters high with wet/damp interdunal areas. Paleocurrent data from the Rush Springs Sandstone is in agreement with paleocurrent data from Late Paleozoic eolian sandstones in the Colorado Plateau, and indicates that regional atmospheric circulation controlled eolian deposition in western Pangea. Paleocurrent data from the Rush Springs Sandstone suggests that it is a possible sediment source for contemporaneous lowstand eolian sand sheet deposits on the Permian Basin shelf as originally suggested by Kocurek and Kirkland (1998). Our new facies model for the Rush Springs Sandstone is important because it could aid in mitigating arsenic contamination within the important Rush Springs/Marlow aquifer, understanding the paleogeography and paleoclimate of the southern midcontinent, as well as aiding hydrocarbon exploration.