AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

Richard P. Langford[1], Depret Pierre Andre[1] (1) Unviersity of Texas at El Paso, El Paso, TX

Differences in the Early Diagenesis of Sand Dune Sea along a Transect from the Marine Margin to the Playa Margin, Cedar Mesa Sandstone, Southern Utah

The Permian Cedar Mesa Sandstone in Southern Utah exposes depositional analogs of the North Sea Rotliegende Sandstones. Eolian sandstones intertongue with fluvial sandstones, inland sabkha muds and evaporites, and marine sediments. A transect extending downwind from the near the marine margin to the inland sabkha margin of the dune sea illustrates the importance of paleoenvironment on early diagenesis.

Thick high-porosity sandstones are found throughout the dune sea, but change from calcite-dominated to calcite- and hematite-dominated cements from the marine to the playa margin of the dune sea. Early hematite cementation is associated with influxes of playa and fluvial silts into interdunes near the playa margins. The marine margin of the dune sea is characterized by thick eolian sandstones separated by thinner dolomite-cemented sandstones associated with wet interdunes and pond deposits. Farther inland, bioturbation increases with distance from the coastal sand source. Rooted horizons are associated with low-porosity zones and pond deposits are associated with calcite-cemented intervals. A change from evaporation of marine-derived waters to formation of fresh-water ponds is indicated by the bioturbation and isotope data from dolomites and limestones. At the inland sabkha margin, topographic highs are heavily bioturbated and are associated with hematite and calcite cementation. Topographic lows are associated with calcite cementation and high-porosity sandstones.

Bioturbation and ponds are associated with sequence boundaries defined by super bounding surfaces and porosity increases downward from bounding surfaces, which have the most influence on diagenesis of erg interior and playa margin settings.