POROSITY DISTRIBUTION IN THE STUART CITY TREND, LOWER CRETACEOUS, SOUTH TEXAS[1]

D.G. Bebout,[1] R.A. Schatzinger,[1] R.G. Loucks[1]

ABSTRACT

The Lower Cretaceous Stuart City Trend is a complex of biogenic reefs, banks, tidal bars, channel fills, and islands that accumulated on a broad carbonate shelf encircling the Gulf of Mexico. A variety of carbonate facies were deposited in environments with a wide range of energy levels along this shelf-margin complex. Only 4 of these facies, however, have greater than 5 percent porosity and 5 millidarcys permeability — the algae-encrusted miliolid-coral-caprinid packstone, mollusc grainstone, rudist grainstone, and coral-stromatoporoid boundstone. Rudist grainstone is potentially the most consistant in terms of porosity and permeability, thickness, and lateral extent.

Intraparticle, interparticle, and fracture porosity are present in the thick limestone section along the Stuart City shelf margin. Intraparticle porosity is common and in places reaches 20 percent although permeability in facies with intraparticle porosity is low. On the other hand, in facies with interparticle porosity of greater than 5 percent good permeability of up to 10 millidarys exists. Permeability in any facies may be enhanced by the presence of thin fractures which were noted to be common in several cores.

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[2]Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas

MIDDLE GLEN ROSE (CRETACEOUS) FACIES MOSAIC, BLANCO AND HAYS COUNTIES, TEXAS

Arthur W. Cleaves[1]

ABSTRACT

An 80-foot interval from the middle part of the Glen Rose Limestone has been sampled at 35 surface localities in Central Texas for the purpose of reconstructing vertical and lateral changes of depositional environment on the northwestern part of the San Marcos platform. A marker unit, the *Corbula* interval, crops out in the center of the stratigraphic interval and serves as a datum for interpreting carbonate facies changes above and below the marker.

The middle Glen Rose was deposited as a mosaic of shoal-water lithotopes in a broad, shallow lagoon behind the Gulf Coast reef trend. Over much of the platform, the sea was sufficiently shallow to allow for the formation of local tidal-flat offlap sequences. Hence, intertidal and supratidal units make up a significant proportion of the individual local facies successions.

In Blanco and Hays Counties, there are two distinct patterns of vertical facies change. Closer to the Llano uplift (Blanco County), three to five offlap cycles are present within the 80-foot interval. In all sections, the highest of the cycles contains the *Corbula* interval. These cycles involve a gradational trend from shallow subtidal through supratidal facies. Each cycle is commonly bracketed by sharply defined bedding planes. The cycles represent local marine offlap sequences and result from the progradation of carbonate mudflats into the shelf sea. Further to the east and more distant from the Llano uplift (Hays County), the facies mosaic lacks the superposed succession of local regressional cycles. Subtidal mudstones and fossiliferous marls comprise the bulk of the section both above and below the *Corbula* interval.

The difference in the vertical facies pattern for the two areas may result from their position in relation to the ancient shoreline. Because the Llano uplift was emergent during the accumulation of middle Glen Rose lithotopes, the outcrops closer to the uplift could be expected to contain abundant evidence of tidal-flat sedimentation. Mud mounds and small islands adjacent to land may have served as nuclei for the development of local offlap sequences. Florida Bay is an excellent Holocene analogue for these deposits. Further to the southeast, the shelf sea was slightly deeper and lacked the nuclei necessary to initiate offlap sequences. One complete cycle, the *Corbula* interval cycle, crops out in both areas and may record a brief period of emergence for part of the San Marcos platform. Above the *Corbula* interval, no complete cycles are present for approximately 150 ft, with subtidal marl and mudstone being the dominant lithologies for both areas.

[1]Department of Geology and Geological Engineering, University of Mississippi