VARIATION OF "GROWTH FAULT" STRUCTURAL STYLES IN THE TEXAS GULF COAST BASIN

Thomas E. Ewing[1]

ABSTRACT

Within the overall theme of Gulf Coast growth faulting there is significant regional variability. Detailed mapping and regional seismic interpretation of selected areas in growth fault trends of onshore Texas point up this variability, which can be related to patterns of oil and gas fields and overpressure occurrence.

Several basic styles of growth faulting are observed in the Tertiary sequence of the Texas Gulf Coast. The most distinctive are glide-fault systems, which display a basal detachment below highly faulted and rotated, usually sand-rich and hydrocarbon-bearing strata. Most glide systems show rapidly migrating highs following the basal detachment, an "escalator" model (Vicksburg, Sarita, Corsair). However, others involve domino-style extension similar to Great Basin models (Yegua, Lobo). Other areas show rotated blocks on listric faults which may sole into a deep slide plane at great depth (Frio), often downdip of ridges of mobile shale (Zapata Wilcox). Still other growth faults are only slightly listric, have slight block rotations, and may root at great depth (Dewitt Wilcox). More local growth faulting also occurs along the margins of salt- or shale-withdrawal basis, or as compactional faulting related to shale ridges.

Factors that control structural styles must include: the nature of the pre-progradation substrate; presence of salt- or shale-related bathymetric features on the old continental slope; the rate and spatial variation of sediment loading; and the relative excess of sedimentation over subsidence. Presence of thick mud sequences in the substrate favors shale-ridge development and glide-fault systems. Slope features localize the trend of faulting and may concentrate it over the slip-face of the slope feature. The spatial variance of sedimentation may determine the geometry of faulting, and also initiate salt or shale movement. The relative excess of sedimentation over subsidence determines the magnitude and timing of the fault systems.

[1]Frontera Exploraton Services, 900 NE Loop 410, San Antonio, TX 78209

ENVIRONMENTAL SEDIMENTOLOGY OF THE PONTCHARTRAIN-MAUREPAS ESTUARINE COMPLEX

George C. Flowers[1], Andrew W. Durfee[1], and Wayne C. Isphording[2]

ABSTRACT

The Pontchartrain Basin is the site of one of the largest estuarine complexes in the southeastern United States. It is well known that the same geographic factors that make southeastern Louisiana an important metropolitan and industrial region have also led to disruption of the estuarine enviornment. Pollution, development, flood abatement, and dredging have all impacted the estuary. Besides affecting the biota and water quality, the impact of these environmental pressures is reflected in the bottom sediments of the lakes.

As part of an ongoing study of northern Gulf of Mexico estuaries, over 120 bottom sediment samples were collected from the Pontchartrain-Maurepas estuarine complex in late 1987. Comparison of sediment maps generated in the present study with studies based on samples collected in 1931, 1972, 1973, and 1978 indicates that the distribution of sediment types has not changed greatly over the past 56 years. A notable exception is the south shore in the vicinity of outfall canals and the Inner Harbor Navigation Canal where sandy sediment is accumulating. Other "textural islands" of sediment with elevated sand content, discovered by the 1931 sampling of Lake Pontchartrain, persist to the present day.

Lake Maurepas sediments have a significantly lower level of carbonate than Lake Pontchartrain sediments. In Lake Pontchartrain the carbonate content increases from east to west with the highest values occurring along the south shore. The generally elevated carbonate content of the sediments probably reflects the impact of shell dredging on the estuarine complex. The anomalously high carbonate content of a few samples along the south shore, however, is probably due to the concentration of shell by wave action rather than shell dredging which is prohibited in the near shore areas of the lake.

Of the two lakes, Lake Pontchartrain has been impacted most by heavy metals carried in effluent, particularly along the south shore due to the numerous outfall canals. Comparison of metal levels in the lake with values determined for Mississippi Sound indicates that Pb and Cr are elevated in lake Pontchartrain. As frequently observed in estuarine sediments, the heavy metal content of affected sediments increases with increasing clay content. Therefore, sediment samples taken at the mouths of outfall canals can produce erroneous estimates of the impact of effluent due to the elevated sand content. The sandy sediments in the vicinity of outfall canals are the result of winnowing during periods of high discharge storm drainage.

[1]Department of Geology, Tulane University, New Orleans, LA 70118
[2]Department of Geology and Geography, University of South Alabama, Mobile, AL 36688