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Wilcox trend, which suggests that fluids are escaping from the geopressed zone via growth faults and perturbing the temperature field in the overlying meteoric regime.

Although a few areas of the Vicksburg-Frio growth fault zones have elevated temperature gradients below the top of geopressure, it is still unknown why such a prominent thermal anomaly occurs along the Wilcox trend but not along the Vicksburg and Frio trends.

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Stratigraphy of Glen Rose Formation, Western Gulf Coastal Plain

Strata of the Glen Rose Formation and equivalent units crop out in a continuous band across the Edwards Plateau, the area of outcrop skirting the Llano uplift, the Lampasas cut plain, north-central Texas, southeastern Oklahoma, and southwestern Arkansas. These rocks dip into the subsurface of the Gulf coastal plain. Although the Glen Rose interval has been studied on outcrop and in the subsurface in these areas through numerous investigations of local scale and several regional review papers, a synthesis integrating subsurface with outcrop across the broad region and a more detailed lithostratigraphic framework are needed.

On outcrop on the Edwards Plateau, the Glen Rose is divided into upper and lower members by the Corbula bed, a thin but widespread accumulation of the minute clam *Carycorbula matinae*. In this region, the Corbula bed lies beneath anhydrite and gypsum beds (dissolution zones on outcrop), which may be traced through laterally equivalent limestones in the subsurface around the Llano uplift to thin anhydrite stringers above the Ferry Lake Anhydrite in northeastern Texas. These stringers may be traced to the lower part of the Thorp Springs Member of the Glen Rose in the subsurface and outcrop area of north-central Texas. In the Paluxy River Valley, the Corbula bed occurs beneath the Thorp Springs. This specific correlation allows clear demarcation between beds of the upper and lower Glen Rose members in the region. Correlation of this type within the Glen Rose interval allows a detailed understanding of the depositional history of this sequence and provides a more explicitly defined lithostratigraphic framework into which future studies may be integrated.

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Off-Shelf Portion of Harris Delta: Reexamination of Downdip Woodbine-Eagle Ford

This study related the Eagle Ford equivalent Harris delta north of the Stuart City shelf edge with the downdip Woodbine-Eagle Ford section south of that shelf edge. Together, they comprised one large deltaic complex that divided into two major lobes at an avulsion site near Anderson County, Texas. One lobe prograded southwestward toward Kurten field in Brazos County, the other (now partly eroded) prograded southeastward beside the low-lying Sabine (uplift) landmass into Polk County. The Polk County lobe crossed the Stuart City shelf edge in the Seven Oaks-Hortense field area, and continued to prograde southward into deeper and higher energy water. Such an environment caused this "off-shelf Harris delta" to oversteepen, resulting in frequent slumps and gravity flows that deposited debris-flow and turbidite sands along with predominantly fine-grained prodelta sediments. More familiar deltaic facies (outer fringe) are present in the uppermost section.

Numerous structural and stratigraphic maps and cross sections illustrate the progradation of the downdip Harris delta and its features. The progradation was arrested for a time by deeper water at the older and more precipitous Sligo shelf edge. This progradational hiatus is recorded by a relatively strong reflection that separates two seismic sequences. The younger onlapping sequence appears to represent continued Harris delta sedimentation. Among the interesting features mapped seismically and/or geologically are: mounded reflections that represent the largest slumping events, thickness anomalies associated with the carbonate substrate, and erosional(?) channels at the section top. These off-shelf Harris delta deposits appear to interfinger laterally with a genetically different eastern (Tuscaloosa?) sequence in Tyler and Jasper Counties.

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Oil and Gas Entrapment, Louisiana Shelf, Offshore Gulf Coast Region

Oil and gas accumulations in the Louisiana offshore are caused by vertical hydrocarbon migration. Source beds for both thermal gas and oil lie considerably deeper than reservoirs. The required vertical pathways are steeply dipping faults and salt structures (ridges and diapirs). Faults and salt structures indicate the continuing presence of rift structures that began along a normal passive continental margin during the Pennsylvanian. Tectonic trends are northeast, northwest, north, and west-east; they follow well-established regional stress systems. Listric and growth faults commonly are too shallow for vertical hydrocarbon migration and require connection with vertical faults. Vertical oil and gas migration is predictable in its directions. The underlying geological, geophysical, and geochemical processes are understood and are not different from such processes in other productive basins. Secondary salt layers at shallower levels cause interruptions of vertical oil and gas migration; at the same time these interruptions seem to indicate a large future exploration potential on the Louisiana shelf.

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Historical Back-Barrier Shoreline Changes, Padre Island National Seashore, Texas

Historical progradation rates of the Laguna Madre shoreline at Padre Island National Seashore have varied considerably, largely in response to rainfall fluctuations and perhaps grazing pressure.

Analysis of aerial photographs indicates that near the northern margin of the National Seashore the shoreline prograded at an average rate of 26 ft/year between 1941 and 1950. The average rate of progradation increased to 42 ft/year between 1950 and 1964. Average rates then slowed in the late 1960s, and since 1969 the shoreline has prograded at an average rate of only 1 ft/year. Some areas of the shoreline are presently eroding.

Early maps and accounts suggest that a century ago North Padre Island was largely vegetated. Overgrazing and a series of droughts in the late 19th and early 20th centuries denuded the island, and prevailing winds blew sand westward across the island into Laguna Madre.

With higher than average rainfall in the past 2 decades and less grazing, the island has significantly revegetated. Winds now carry less sand to Laguna Madre; reduced sand supply is a major cause of present-day shoreline retreat.

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Subsidence in Geopressed Geothermal Resource Test Sites: Monitoring Assessment Combining Geodetic Leveling and Tidal Control Stations in Southwestern Louisiana

The Louisiana Geological Survey has an ongoing environmental monitoring program, sponsored by the U.S. Department of Energy, at geopressed geothermal prospect well sites in southwestern Louisiana. This paper presents the results from monitoring subsidence at some of these reservoir sites. Over 1,000 km of first-order surveys and data from several NOAA and U.S. Army Corps of Engineers tidal control stations were examined to determine regional trends. Tidal records were used to examine the history of sea level with respect to the land surface. Relative rates of land subsidence can be determined by comparing rates of water level rise over time with rates of rise from a stable craton. Regional subsidence ranges from 3 to 5 mm/year.

First-order bench-mark networks established at Parcperdue, Sweet Lake, and Gladys McCall prospects were used to determine local trends of subsidence. Repeated leveling surveys before, during, and after fluid withdrawal from Parcperdue and Gladys McCall indicate that an increase in subsidence was observed during the drilling of the wells. Data suggest subsidence was possibly due to surface loading by heavy drilling equipment. Historical leveling in the Sweet Lake region indicates differential compaction between sediments as a possible cause for subsidence. However, in all cases, virtually no increase in subsidence was observed during and after times of fluid withdrawal.