

In the Anacacho Mountains of Kinney County, the Anacacho is primarily composed of tan-orange recrystallized, molluscan, sorted biosparite. In addition, there are two interbedded chalky micrites which are distinguished from massive calcareous crusts on the biosparites. At the top of the northeast end of the Anacacho Mountains, some patches of molluscan, bryozoan, biosparrites occur. In the Whites Mine area of Uvalde County, the biosparite also occurs; however, three mines penetrate an asphaltic, molluscan, unsorted biosparrite.

The diagenetic sequence of the Anacacho Formation began with early diagenetic events such as micritization, authigenic growth of glauconite in foraminiferal tests, and authigenic growth of framboidal pyrite nodules. Postdepositional diagenesis included the development of microspar, syntaxial overgrowths of spar, recrystallization of allochems, and calcite spar fill. Further burial caused severe compaction, evidenced by fracturing and pressure solution features. The sediments of the Anacacho Formation were then uplifted and subjected to ground-water circulation in the freshwater phreatic zone. This resulted in dissolution of spar and microspar followed by precipitation of "dog tooth" sparry cement. This secondary porosity development primarily occurred in the Whites Mine area biosparrites; however, paleokarstic development which may have occurred during this stage of diagenesis is found throughout the Anacacho in this area. Following the transgression of Upper Cretaceous and lower Tertiary marine shales, the unconformable surface of the Anacacho was sealed and ultimately trapped migrating hydrocarbons. As the hydrocarbons penetrated secondary freshwater porosity, "dog tooth" spar crystals were dislodged and incorporated into the hydrocarbon matrix by mechanical and/or chemical mechanisms. The hydrocarbons were devolatilized to asphalt following exposure of the Anacacho and, possibly, by thermal activity from local mafic intrusions.

The biosparrites in the Whites Mine area represent biostromal bank buildups on bathymetric highs that produced abundant skeletal debris. This debris migrated to the southwest, primarily as prograding sand waves, and resulted in deposition of biosparite in the Anacacho Mountains. The skeletal debris built up sufficient bathymetric relief into the photic zone that biostromal growth became active. Therefore, through time, the bank migrated to the southwest over skeletal debris.

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Hydrocarbon Potential of Dead Sea Rift Valley

The Dead Sea Rift is one of the world's unique geologic and topographic features, whose petroleum potential has not yet been evaluated. The sector of the Dead Sea is an asymmetric graben 20 km (12 mi) from rim to rim and over 120 km (75 mi) long. The total throw from the west rim, where the Upper Cretaceous crops out to the deeper portion of the grabens, is more than 8 km (26,200 ft). Throw on the eastern side is considerably greater as the valley wall is largely Precambrian. The level of the Dead Sea is -400 m (-1,300 ft)—the lowest place on earth.

Asphalt blocks floating from the Dead Sea, along with asphalt and heavy oil seeps in the valley, have been known since biblical times. These are suggestive of leaks from deeper accumulations.

Although some exploration drilling has been done, no test has yet reached objectives in the deeper sunken block where the Miocene is figured to be at a depth of at least 7 km (23,000 ft).

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Evolution and Seismic Expression of Mesozoic and Cenozoic Shelf Margins, Gulf of Mexico and Vicinity

Mapping and classification of modern and ancient shelf margins provide a basis for a concise post-rifting history of the Gulf of Mexico basin. Many hydrocarbon occurrences in the basin can be related to styles of shelf margins and their associated slope with implications for frontier exploration in deep-water facies. Seven basic types of shelf margins have been recognized.

1. Reef-dominated carbonate margins surrounded the deep basin during the Early and middle Cretaceous. This category can be subdivided into: (a) low-relief, short-lived (ca. 10 m.y.) margins in Louisiana and Texas (Stuart City and Sligo), and (b) high-relief (1 to 3 km; 3,280 to 9,843 ft), long-lived (ca. 40 m.y.) margins elsewhere (Florida, Campeche, and Blake escarpment, Golden Lane, El Abra), which are typically associated with fore-reef talus.

2. Sigmoidal progradational carbonate margins developed landward of drowned mid-Cretaceous margins of the Florida and Yucatan platforms during the Cenozoic. Large-scale gravity slides with rollover structures have occurred along the Yucatan slope contemporaneously with deposition of sigmoidal carbonate margins.

3. Carbonate ramps with little or no seismic expression characterized the Late Jurassic, when a deep marine basin was first established, an the Late Cretaceous, following drowning of mid-Cretaceous carbonate platforms.

4. Stable progradational clastic margins with well-developed, undeformed, large-scale clinoform stratification are relatively rare in the Gulf basin. Modern examples are limited to offshore Alabama and Veracruz.

5. Unstable progradational clastic margins result from gravity sliding of the continental slope, commonly associated with salt and shale diapirism, which obscures large-scale clinoform stratification. Growth faults with major expansion and rollover characterize the shelf margin; folds and/or thrust faults characterize the lower slope. This type of shelf margin has dominated the northwestern Gulf during the Cenozoic, and now extends from offshore Mississippi to offshore Veracruz. Numerous episodes of deltaic progradation to the shelf margin have been identified in Texas and Louisiana; these clastic influxes have prograded the shelf edge as much as 350 km (215 mi).

6. Tectonically active progradational clastic margins are present in Tabasco and eastern Veracruz. There the shelf margin has prograded up to 200 km (125 mi) since the early Miocene in an area of active compression and sinistral wrench faulting. Interaction of basement tectonics with diapirs and probably gravity sliding has created great structural complexity in thick Neogene deltaic sequences.

7. Tectonically active sediment-bypassing margins characterize the early Tertiary. The continental margins of Veracruz and Cuba underwent major compressional deformation and did not develop broad constructional shelves; instead, most sediment was probably bypassed to the deep basin. At the same time, a deep-water foreland basin, probably with a similar type of margin, extended into Chiapas and central Guatemala.

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Facies and Diagenetic Controls on Reservoir Rock Properties of Hosston Sandstones, Washington Parish, Louisiana