

GEOLOGIC HISTORY OF THE GULF BASIN

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The basin contains more than six million cubic miles of predominately Mesozoic and Cenozoic sediments. It is underlain by a normal oceanic crust (and a normal upper mantle) which is buried in its axial depression by 45,000 feet of sediments, most of which were deposited in deep waters. It is a fragment of the "old" Pacific Ocean and not a part of the "new" Atlantic.

Late Paleozoic orogenies influenced the basin shape: the "buried" Llanoria (Ouachita) structural belt along the northern margin, the Chiapas-Guatemalan structural belt along the southern margin, and a "connecting" structural belt (now "buried") along the western margin. This latter margin was more strongly established by Nevadan (Jurassic) and Laramide (early Tertiary) orogenies. A complex system of transform faulting, created as the Gulf Basin (and Mexico) drifted westward, leaving the Caribbean "Pacific Tongue" behind, marks the southeastern margin. Great thicknesses of Jurassic salt occur in major depressions within the basin. Much of this salt was apparently deposited "abruptly" in deep waters. During salt deposition, the African continent probably marked the eastern margin of the Gulf Basin. The Nevadan orogeny restricted normal Gulf circulation from the Pacific, creating conditions favorable for salt sedimentation.

Post-salt sediments came from two major provenances: Mesozoic from the Appalachians and Cenozoic from the Rocky Mountains.

History of the Gulf Basin supports modern concepts of continental drift. The rising Mid-Atlantic ridge and westward drift dominated the sedimentary and structural history during Late Paleozoic and Mesozoic times, while the East Pacific rise controlled the Cenozoic history. The data indicates that the effect of the rising Mid-Atlantic ridge ended the Paleozoic era, and that intermittent drift of the continents away from the ridge carrying them "deeper" into the Pacific sea level, controlled the beginning and ending of the different periods and epochs of the Mesozoic. Furthermore, the influence of the East Pacific rise on Western North America ended the Mesozoic era and controlled the periods and epochs of the Cenozoic era.

The Gulf "Salt basin" appears genetically related to a series of "Salt basins" which formed from north to south as continents began to drift apart along the Mid-Atlantic "swell". Progressive decrease in age from Late Paleozoic at the north to Lower Cretaceous at the south suggests the supercontinent (or continents) began rifting apart first at the northern end. The sedimentary and structural records indicate drift was spasmodic rather than continuous.