two Texas deposits (one in Webb County, the other in Live Oak County), it is the dominant ore-stage sulfide. This ore-stage marcasite occurs as intergrowths within and overgrowths on uranium-bearing phases and in close association with ferroselite near the redox boundary. Ore-stage marcasite occurs commonly as overgrowths on pre-ore sulfides that are dominantly pyrite both in ore and in a more extensive halo around the altered tongue. In two of the Texas deposits, ore-stage marcasite is present as much as 200 m (Webb County) and 400 m (Live Oak County) downdip from the roll front. Because of the close association of marcasite and uranium mineralization, understanding the conditions that lead to marcasite precipitation enables clearer determination of the geochemical environment of ore deposition. Kinetic factors are shown to favor marcasite over pyrite and we suggest that undersaturation with "monosulfide"-type phases such as mackinaurite and greigite are a prerequisite for marcasite formation.

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Subaerial Diagenesis of Axial Corallite of *Acropora Cervicornis*

In the subaerial environment the axial corallite of *Acropora cervicornis* is micritized. The micritization starts in the biologically secreted aragonite; later, the pore-infilling cement (recrystallized or not) is micritized. If the micritized fibers are leached out, the nonmicritized fibers are left without support and the corallite becomes crumbly (chalky). As more fibers are micritized, the corallite may be leached out entirely. If the pores of the corallite are infilled with minerals resistant to leaching, a reticular three-dimensional frame will be left in the space occupied by the corallite. If the new voids are infilled by drusy calcite a cast of the corallite will be created. The aragonitic fossil corals located in the splash zone may be replaced by calcite crystals, with much of the texture of the original cement, septa, septothecae, and costae reappearing and being preserved as ghosts in the calcitic crystals. The spherulitic texture of septa, septothecae, and costae produced by a submarine recrystallization process is not preserved.

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Relation of Sedimentary History and Tectonics to Natural Gas Accumulations, Western Gulf of Mexico

The western Gulf of Mexico province, which lies offshore from the states of Louisiana and Texas, is estimated to contain large resources of natural gas in Miocene, Pliocene, and Pleistocene rocks.

Interpretation of chemical and isotopic analyses of natural gases from 47 fields suggests that the province is important as a gas-producing region for three reasons. (1) Several shallow Pleistocene accumulations are of apparent biogenic origin; this gas is characterized by enrichment of the light isotope C^{12} in methane (δC^{13} lighter than -55 parts per thousand) and by large amounts of methane ($C_1/C_{1\text{-}5} > 0.99$). (2) Many of the Miocene accumulations were generated during the early stages of thermal cracking of liquid hydrocarbons. This type of gas is wetter than biogenic gas ($C_1/C_{1\text{-}5} > 0.92$) and isotopically heavier (δC^{13} heavier than -43 parts per thousand). (3) Numerous accumulations occur in thermally immature (with respect to oil generation) rocks in which hydrocarbons, particularly gases, have migrated vertically from deeper, more mature rocks. These gases are relatively dry ($C_1/C_{1\text{-}5}$ generally > 0.90), and have a wide range of carbon isotope values.

The gas occurrences can be related to the sedimentary history and tectonics of the area. The location, areal extent, and thickness of sediments in late Tertiary and Quaternary depocenters controlled the distribution of reservoir and source rocks and the depth of the maturity level for each rock series. Movement of a thick Mesozoic salt section, in conjunction with concurrent subsidence of the Gulf basin and the influx of sediments, resulted in folding and faulting of Cenozoic rocks and the formation of structural traps. Regional growth faults, plus radial faults associated with salt diapirism, provided pathways for the migration of hydrocarbons.

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Geoseismic Modeling—An Interactive Computer Approach to Stratigraphic and Structural Interpretation

The solution of complex structural and stratigraphic problems often requires a merging of geologic, geophysical, and computer science principles. Geoseismic modeling is one such multidisciplined approach that allows the geoscientist to test geologic concepts to see if they can be confirmed seismically. Often, many iterations are required to formulate a geologic model that adequately matches the measured seismic response. To do this effectively, the geoscientist must have easy access to accurate theoretical principles and be able to interact with the computer in a real time environment. This leads to the following important considerations in making the computer an effective tool for geoseismic interpretation: (1) the geoscientist must be able to interact with the computer using his own language and terminology; (2) good human engineering principles, including graphic input and output devices, are necessary for describing the geologic model to the computer; (3) the system must be interactive to allow the geoscientist to test various geologic configurations quickly and to adapt these to the measured seismic response, because long turnaround time associated with batch processing interrupts the thought process and usually leads to an incomplete analysis; and (4) the system must be flexible enough to describe accurately both the seismic characteristics and the geologic configuration.

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Wave-Form Factor Analysis—Quantitative Approach to Seismic Stratigraphy