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DOLLAR BAY FORMATION OF EARLY CRETACEOUS (FREDERICKSBURG) AGE IN SOUTH FLORIDA

The slowly subsiding, low-dip, South Florida basin centered on Florida Bay was an area of carbonate and evaporite deposition. Several structural features mapped in the basin during the study include the Charlotte high (Charlotte County), the Martin high on the northeast, the Largo high in the southeast, and the Pine Key arch in the south. The Broward trough and the center of the basin are the only persistent negative features. Neither the Lee-Collier swell, a very low and ephemeral feature extending offshore from the southwest part of the peninsula, nor the Forty Mile Bend high in the lower part of the peninsula, are persistent.

The common types of limestone, dolomite, and anhydrite textures occur in a series of cycles within the so-far nonproductive Dollar Bay Formation. A cycle typically culminates in porous calcarenite between anhydrite end members. Environments from shallow shelf to euxinic are present. Light carbonates usually occur over highs and dark carbonates in the structurally low areas.

The Dollar Bay Formation is 450 ft thick and consists of 4 units. All contacts above, below, and within the formation are conformable. The formation contains many zones of porosity; numerous oil shows have been reported.

Unit D at the base of the Dollar Bay consists of a single cycle about 55 ft thick. The favorable facies usually is a dark-brown, finely crystalline dolomite with intercrystalline porosity. Five poor shows of oil have been recorded in this unit.

The overlying unit C is a single sedimentary cycle averaging 325 ft thick, consisting characteristically of chalky dolomite and limestone. Interspersed are beds of fine-grained calcarenite with effective porosity. Fifteen oil shows have been reported from this unit, one of which consisted of a recovery of 15 ft of oil on a drill-stem test. In Hendry County, unit C thins and becomes a dark, petroliferous micrite, undoubtedly the source for the oil shows within this unit.

Units B and A consist of multiple thin cycles. They have few favorable characteristics and shows of oil are scarce. The Dollar Bay Formation, particularly unit C, has the best potential for oil production of any nonproductive section in the South Florida basin. Although structure will control local oil accumulation, stratigraphy will determine the favorable areas in which to search. Unfortunately, the Dollar Bay favorable areas do not coincide with the Sunniland Limestone favorable trend.

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INFERRED DIAGENETIC HISTORY OF WEAKLY SILICIFIED DEEP-SEA CHALK

At various times during the Oligocene, profuse blooms of the planktonic calcareous algae, *Braarudosphaera rosa*, contributed large numbers of braarudosphaerid pentaliths to deep ocean sediments of the South Atlantic Ocean basin. During such intervals the carbonate compensation level for *B. rosa* was considerably depressed; nevertheless, many of the pentaliths were disaggregated into wedge-shaped segments as a result of solution. Following deposition, skeletal calcite liberated by dissolution was reprecipitated as low magnesium calcite overgrowths on discoasters, coccoliths, pentalith segments, and minute particles of skeletal debris. As shown by scanning electron micrographs, extensive development of the secondary overgrowths led to the formation of low magnesium chalk laminae within the otherwise unconsolidated Oligocene ooze sequence. Paleo-oceanographic conditions rather than absolute sediment age or depth of burial were responsible for the submarine lithification of the chalk laminae.

At one locality (Rio Grande Rise, SDSP Site 22, Sample 22/4/1), calcite cementation was followed by the deposition of silica derived from the dissolution of siliceous microfossils and volcanic glass. The silica was reprecipitated as spherules (3-5 microns in diameter) of alpha-cristobalite which partly filled the interstices of the rock and are responsible for the weakly silicified condition of part of the chalk. Clinoptilolite, a second authigenic silicate in the chalk, is readily distinguished in scanning electron micrographs from the detrital quartz and mica also present in insoluble residues of the chalk.

Abundant cristobalite spherules are also present in weakly silicified chalk lenses sampled within the Eocene "Horizon A" radiolarian chert sequence at DSDP Site 29B. These results indicate that cristobalite spherules represent the initial stage of silicification of carbonate rock in the deep-sea environment.

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DIGITAL WELL LOGS PLUS DIGITAL COMPUTER EQUALS NEW PRACTICAL EXPLORATION TOOL

Petrophysical analysis utilizing digital-log information has recently become a recognized tool in the search for oil and gas. Until now, this method has not been widely used in exploration programs, due to the unavailability of a mass of accurate, inexpensive digital-well-log data and adequate computer software to completely analyze the data.

These data and analysis capabilities are now available to the oil industry and can be readily used in modern petroleum exploration programs.

Results from computer analysis of digital logs from many wells can develop leads for exploration trends, locate possible bypassed hydrocarbon-bearing areas, and better indicate productive zones within a well.

AAPG DISTINGUISHED LECTURE TOUR ABSTRACTS

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UPPER PALEOZOIC FLUVIAL-DELTAIC, SHELF, AND SLOPE DEPOSITIONAL SYSTEMS IN A CRATONIC BASIN, WEST-CENTRAL TEXAS

Upper Pennsylvanian and Lower Permian rocks on the eastern flank of the West Texas basin were deposited within fluvial-deltaic, shelf-edge bank, and slope depositional systems. The Cisco fluvial-deltaic system consists of numerous 100- to 200-ft-thick packages of dip-fed facies flanked by strike-fed interdeltaic embayment facies. Fluvial deposits include tabular and belted sandstone bodies characterized by braided and coarse-grained, meander-belt sequences. Fine-grained multistory meander-belt facies exhibiting general fining upward point-bar sequences commonly occur high in the system, pointing to decreasing sediment supply from the Ouachita Mountains and Fort Worth Piedmont. Fluvial channels normally cut subjacent deltaic facies and may lie on rocks of previous depositional episodes.

Cisco deltaic facies are progradational, coarsening upward prodelta, delta-front, channel-mouth bar, and distributary channel units, and aggradational crevasse splays and delta-plain facies (coal, mudstones, or organic-rich clays); local destructional sandstone bars may fringe the delta. Interdeltaic embayment facies flank delta lobes and include mudstones, sheet sandstones, limestones, and impure detrital coals. Sheet sandstones may reflect strike-fed strandplain accretion or locally reworked delta-front sandstones.

The Sylvester shelf-edge bank system occupies a position along the shelf to basin break in paleoslope. The system is composed predominantly of carbonate units that intertongue updip with fluvial-deltaic facies and downdip with slope facies. Individual units range from 100 to 400 ft thick; carbonate facies