unbleached rocks is in the relative abundance of clay minerals (and the TMS is very sensitive to clays), areas of potential hydrocarbon-induced diagenetic alteration may be mapped using broad-bank sensors.

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Lockhart Crossing Field: New Wilcox Trend in Southeastern Louisiana

A 1982 Wilcox oil discovery in southeastern Louisiana constituted one of the more significant onshore United States discoveries for the year and illuminated a new oil trend. Prior to this discovery, Lockhart Crossing field was known for its gas and condensate production from Cretaceous lower Tuscaloosa sandstones at depths of 17,000-18,000 ft (5,200-5,500 m). Oil production from sandstones of the lower Eocene of the uppermost Wilcox Group was recently established at 10,000 ft (3,000 m) with successful completion (630 BOPD), of the Callon 1 Reed Erickson. To date, 30 producers and 5 dry holes have been drilled in the field, with production peaking at 10,000 BOPD and recoverable reserves of 15-20 million bbl of oil after secondary recovery.

The main field reservoir is a 40-80 ft (12-24 m) marine sandstone with two distinct facies present. The most dominant of these two facies is a coarsening-upward sequence of very fine to fine-grained glauconitic sand deposited as a nearshore bar. The second is a tidal channel facies with a fining-upward sequence of medium to very fine grained sand. The spatial relationship of these two facies defines a progradational sequence of tidal channels overstepping and eroding into existing nearshore bars. The primary trapping mechanism, however, is structural in the form of a rollover anticline.

In April 1983, Callon and Amoco extended the trend southeast with the discovery of Livingston field. Chances are good that this new trend will yield additional discoveries with continued exploration.

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Growth Movement of Citronelle Dome and Its Genetic Relationship to Other Salt Structures in Southern Mississippi Salt Basin: an Approach in Computer Applications

Citronelle field, one of Alabama's largest oil fields, was created by one of the many salt structures that occur throughout the southern Mississippi salt basin.

The history of domal movement was determined using computer techniques of conventional mapping and trend-surface analysis based on structural tops and thicknesses of 22 lithostratigraphic field units. Unique statistical parameters for each trend surface were then compared using cluster analysis. The definition of three major episodes of domal movement resulted.

The first episode occurred in the Cretaceous during Tuscaloosa deposition. The second occurred in the Paleocene during Midway deposition, and the third occurred in middle Eocene during Claiborne deposition. A similar history of structural development was determined for two other salt structures along the southern margin of the southern Mississippi salt basin.

This genetic relationship appears to reflect subsidence characteristics within the southern Mississippi salt basin. As such, this relationship may be valuable in better understanding the occurrence of oil and gas reserves in the basin and in future exploration efforts in this mature area.

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Petroleum Reservoirs in Silurian Dolomite of Western Illinois

The basal Silurian Alexandrian carbonates, sandwiched between the Ordovician-Silurian and Silurian-Devonian unconformities, have produced more than 3 million bbl of oil from the Buckhorn East and Brooklyn fields on the western margin of Illinois. These fields are shallow (450-670 ft), remote from the most-productive portion of the Illinois basin, and potential exists for additional production from this unconformity play. Three lithofacies were recognized in Alexandrian carbonates in detailed core and wireline studies that included thin-section, x-ray, and SEM analyses. These carbonates are regressive sequences composed of shallow-shelf, restricted-subtidal, and intertidal facies. The shallow-shelf facies is primarily biosparite composed of crinoid and brachiopod debris; this facies is dolomitic in places. The restricted-subtidal facies consists of both bioturbated and undisturbed gray micrites containing stylolites, green chloritic clay, and glauconite; sparry clacite fills vertical cracks. The intertidal facies is tan, mottled, vuggy dolomite composed of algal mats, anhydrite-filled birdseye structures, burrows, and scattered marine fossils.

Petroleum reservoirs apparently developed as a result of dolomitization in intertidal and shallow-shelf carbonates. Vuggy porosity, a possible result of karst leaching, is found in pay zones within the dolomitic intertidal facies. Evidence of emergence and subaerial weathering include the presence of vadose silt, anhydrite, and nontectonic breccia.

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Glacial Cycles, Hydrocarbon Generation and Salt Tectonics on Louisiana Slope

In the northern Gulf of Mexico, maximum growth on regional down-to-the-south faults, maximum salt tectonics, and the timing of maximum oil generation are synchronous. Sedimentary pulses triggered by glacial cycles are recognized to correlate well with the maxima. Synchrony of glacial, structural, and sedimentary events suggest a cause and effect relationship.

During major glacial events, up to an 8-fold increase in melt water had an order of magnitude increase in the amount of sediment brought to the northern Gulf of Mexico. Eight discrete upper Pleistocene sediment packages have been identified in seismic profiles. Likewise, approximately 8 major growth fault trends are recognized on the Louisiana slope. The causal effect of increased lithostatic pressure owing to rapid deposition on underlying plastic salt promotes flowage that activates regional faults and accelerates salt tectonics. Higher biological productivity during glacial maximas and contemporaneous regressive sands explain higher concentrations of hydrocarbons during maximum structural and stratigraphic activity.

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Is Turbidite Facies Association Scheme Valid for Interpreting Ancient Submarine-Fan Environments?

Although turbidite facies reflect only their processes of deposition, turbidite facies associations are routinely used to identify ancient submarine-fan systems and their subenvironments (e.g., upper fan, channel, etc). This credulous leap from interpreting process of deposition to interpreting environment of deposition may not be valid for the following reasons: (1) Mutti and Ricci Lucchi's facies association scheme was developed exclusively from the study of ancient turbidite sequences; however, the true relationship between turbidite facies associations and related environments has not been adequately documented in modern settings; (2) channel-levee complexes of many modern submarine fans such as those of the Amazon and Mississippi are large enough to contain most ancient fan systems in their entirety; and (3) comparable channel-levee complexes have not been recognized in outcrop. Consequently, the validity of turbidite facies associations for interpreting ancient submarine-fan systems and their subenvironments must be considered tenuous until confirmed by detailed core studies of a variety of modern fans.

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Anisotropic Permeability, Eolian Lyons Sandstone

Directional permeabilities from nine attitude-oriented core samples of well-laminated eolian Lyons Sandstone from Larimer County, Colorado, were measured with a gas permeameter. Intrinsic permeabilities across the laminae, parallel to lamination and dip, and parallel to lamination