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HYDROCARBONS CORED FROM KNOLLS IN SOUTHWESTERN GULF OF MEXICO

Some of the piston cores from knolls in the southwestern part of the Gulf of Mexico contain either layers of solid hydrocarbons or scattered inclusions of this material.

Geochemical analyses indicate that the hydrocarbons contain about 50% asphaltenes. Samples from within a 58-m thick tar layer, from the tar layers, and from the inclusions were compared.

Paleontologic investigations on coccoliths and Foraminifera show that mixing of fossil assemblages is common suggesting upward movement of sediment with the hydrocarbons.

These findings demonstrate that hydrocarbons can originate in deep-sea sediments and that their upward movement results in "oil seeps," which may account for some of the hydrocarbons found on modern beaches.

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REVIEW OF RECENT STUDIES ON MARINE PLEISTOCENE OF ATLANTIC COASTAL PLAIN—NEW JERSEY TO GEORGIA

A review of recent work on the marine Pleistocene of the Atlantic coastal plain shows that more than 50 formation and physiographic names have been used. An attempt is made to correlate some of these. There is good physiographic and paleontologic evidence of a Sangamon high sea level at about 28 and possibly 42 ft. No higher Pleistocene shorelines have been demonstrated conclusively in Maryland, Delaware, or New Jersey; the higher Pleistocene deposits probably are of alluvial origin. There is physiographic evidence of a 100-ft shoreline in Virginia (Windsor=Elberon Formation), and there is physiographic and paleontologic evidence of such a shoreline in South Carolina and Georgia. This shoreline has been referred to the Wicomico Formation and is tentatively regarded as of Yarmouth age. The terraces above the 100-ft contour are probably nonmarine, and may be of Tertiary age.

The old idea that the Atlantic coastal plain has been very stable during Pleistocene time and that the shorelines reflect eustatic changes in sea level is questioned. Warping and Holocene submergence have been indicated for New Jersey, and the work of various geologists suggests that along the southeastern coast, the eustatic fluctuations of the sea may have been superimposed on a tectonically rising coast. There is evidence of a mid-Wisconsin high stand of the sea, but whether the presence of the Silver Bluff and Princess Anne shorelines above sea level has been caused by a mid-Wisconsin sea level higher than the present, or whether tectonic movement has taken place, is not determined. There is no evidence of a Holocene stand of the sea higher than that of today.

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COILING DIRECTIONS IN PLANKTONIC FORAMINIFERA FROM COASTAL GROUP OF JAMAICA

Dominant coiling directions were noted in the *G. menardii, G. acostaensis-G. dutertrei* and *G. crassaformis-G. truncatulinoides* groups in the middle Miocene to Pleistocene Coastal Group of Jamaica. Several reversals of coiling direction in the *G. menardii* lineage occur at the top of the Miocene (Buff Bay Formation) before dextral coiling dominates Pliocene assemblages. A period of dextral coiling in the *G. crassaformis* group is seen in the Pliocene (lower part of the Bowden Formation), coinciding with increasingly abundant *G. miocenica* and *G. fistulosus*. *Globoquadrina altispira* disappears from the sequence just before reversal to sinistral coiling in *G. crassaformis*. Sinistrally coiled *G. menardii* reappears in the impoverished planktonic faunas at the top of the Bowden Formation. The direction of coiling in the *G. tosaensis-G. truncatulinoides* group is variable near the base of the Manchioneal Formation, but becomes dextral with the near-disappearance of *G. tosaensis*. At least some of the coiling changes appear to have regional correlative value in the Caribbean and Gulf of Mexico.

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PERMEABILITY ANISOTROPY IN MICROSUCROSIC DOLOMITES

It is generally agreed that there is no preferred relation between porosity and permeability unless additional parameters, such as grain size, and shape, or pore-size distribution, are used as a basis of initial selection. Most mechanically deposited sediments obviously retain directional properties such as preferred orientation of elongated grains, imbrication, *etc.*, unless substantially modified by diagenesis. This anisotropy is also reflected in their respective permeability properties. Somewhat less obvious is the occurrence of permeability anisotropy in fine-grained carbonate deposits referred to an intertidal and supratidal origin. This is surprisingly true of the uniform microsucrosic dolomites.

Silurian dolomites from the Montana subsurface demonstrate a vertically consistent dielectric and permeability anisotropy. This is based on the simultaneous solution of three equations of the form $y - h = a \sin (kx-b)$, where three permeability plugs of 120° apart are analyzed for each foot of core. Use of the sine function, calculated in the expansion identity form

$$\sin (kx-b) = \sin kx \cos b - \cos kx \sin b,$$

assumes the existence of one maximum value and one minimum value lying within 180° horizontal rotation, because permeability is a two-directional feature. The resulting calculations yield an ellipse whose major and minor axes provide a ratio equivalent to the permeability contrast based on azimuthal orientation.

Assuming that the concepts of shoreward distribution of common matrix carbonate particles in a tidal-flat complex, and local source dolomitization are valid, both primary deposition and secondary dolomitization habits would provide a condition of final permeability anisotropy. Based on remnant magnetic orientation of the described core samples, the anisotropy is shown to be concordant with presumed directions of regressive facies progression and normal to regional structural axes and small scale fracturing.

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