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Hydrocarbon Occurrences in Triassic-Jurassic Lacustrine Deposits, Newark Rift Basin, Atlantic Passive Margin

Thick organic-rich lacustrine sediments of the onshore rift basins of eastern North America constitute a new and potentially important source of hydrocarbons that heretofore have neither been reported nor described in the literature.

In the Newark basin of New Jersey, for example, lacustrine deposits comprise a major part of the Triassic-Jurassic stratigraphic section and yield up to 8% organic carbon. Like the Late Cretaceous, nonmarine, producing strata of the Cabinda and Gabon basins of the West African passive margin, these sediments formed along plate margins in wrench-faulted rift basins with deep-water lakes and anoxic bottom conditions. Laterally they interfinger with fan deltas along the border fault and fluvial-deltaic sequences along the tilted margin of the basin. Organic-rich laminated siltstones and carbonates, the result of depressed ecologic efficiency in highly productive lakes, contain (like the Eocene Green River Shale) amorphous algal kerogen, pollen and spores, plant cuticles, and whole fish. Veinlets and blebs of gilsonitelike deposits locally fill joints and fault surfaces. On the basis of organic maturation and depth of burial, these lacustrine rocks and their contained organics fall within the "hydrocarbon window." Having formed in pull-apart basins on the passive margin, these rocks display a variety of structural and stratigraphic traps, and should be given serious consideration in future exploration programs.

MENELEY, R. A.

Exploration Potential of Scotian Shelf

No abstract available.

MERRILL, GEORGE F., and RICHARD H. BENNETT, NOAA, Miami, FL

Bathymetric Map of Geotechnical Corridor on U.S. Atlantic Continental Margin Southeast of Cape May

A detailed bathymetric map was compiled of a geotechnical corridor study area on the continental margin approximately 138 km southeast of Cape May, New Jersey. Corrected narrow-beam echo soundings were collected on a 1 × 2.5-km trackline grid using loran C and satellite navigation systems. The bathymetric map is presented on six sheets of approximately 71.5 × 91.0 cm, having a total map size of 143 × 273 cm. The map covers approximately 6,246 sq km and has a scale of 1:40,000 with a 10-m contour interval.

The map depicts three provinces:

1. The continental shelf has a slope of less than 1° and extends to the shelf break at the 120-m contour east of Wilmington Canyon but, on the west side of Spencer Canyon and extending eastward, the shelf break occurs at the 180-m contour.

2. The slope-rise break generally occurs at the 2,100-m contour west of Spencer Canyon, whereas the major change in gradient east of Spencer Canyon occurs at the 2,200-m contour. The continental slope has an average gradient of from 6 to 8°. The rise has an average gradient of less than 0.5 to 1°.

3. Numerous valleys dissect the slope; only Spencer Canyon extends onto the shelf, whereas many valleys originate at about 300 to 500 m water depths and merge on the upper rise forming relatively few canyons that extend seaward. Axial gradients of slope valleys are variable, steep to low, less than 6°, whereas valley axial gradients on the rise are very low, commonly less than 1°.

Slope morphology is strikingly different from upper rise morphology—a function of a much higher frequency of valleys with steep walls as compared to the upper rise.

MILLER, ROBERT E., ROBERT E. MATTICK, HARRY E. LERCH, U.S. Geol. Survey, Reston, VA, et al

Petroleum Geochemistry and Geology of Cenozoic and Mesozoic Sedimentary Rocks from Georges Bank Basin

On the basis of petroleum geochemical studies of the COST G-1 and G-2 well samples in the George Bank Basin, the Tertiary and Cretaceous sections between depths of 0 and 6,000 ft (1,829 m) are not believed to be prospective for oil or gas because of the thermally immature character of the lignitic and woody type of kerogens and extractable organic matter. The total organic carbon and extractable hydrocarbons of the Jurassic sedimentary rocks below 6,000 ft (1,829 m) indicate that these are poor to fair source rocks.

Compositions of the C_1 to C_7 light and gasoline-range hydrocarbons, temperatures of maximum pyrolysis (TS_2)°C, carbon preference indices (CPI), and thermal alteration indices (TAI) suggest that the shallowest thermally mature rocks are between 16,000 and 18,000 ft (4,877 and 5,486 m) in the G-2 well. High vitrinite reflectance (R_o) percentages may reflect oxidation and recycled organic matter. Estimates of the depth of thermal maturity based on measurements of the present geothermal gradient at the G-1 (1.2°F/100 ft) and G-2 (1.5°F/100 ft) wells are inconsistent with the depth of thermal maturity indicated by temperature-sensitive geochemical characteristics.

The results of this study suggest that further consideration should be given to: (1) a reassessment of thermal-maturation processes in sediments associated with rift basins on passive margins; (2) the possibility that thermal maturation of the organic matter in the basin may have been influenced by a variable heat-flow history; (3) the location of the heat source, which may have been farther east of the present continental shelf than is presently thought.

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Signatures of Surficial Sand and Small-Scale Mass Wasting of Sediments at Shelf Break and Upper Slope Seaward of Baltimore Canyon Trough

Sedimentary processes were investigated for the continental margin between Wilmington and Lindenkohl Canyons. Sediment sampling was carried out in a series of closely spaced shelf-break-normal transects from the outer shelf to the upper rise.

Q-mode factor analysis of the sieved sands identified three significant end-member (E-M) size distributions. E-M I dominates the slope below 400 m south of and 200 m north of Spencer Canyon. The shelf, shelf break, and upper slope to the foregoing respective depths are dominated by E-M II and III sands. These boundaries are breached on the slope in at least two places. The breaches appear to be pulses of shelf sand which extend down the slope to at least 500 m, producing load casts at the contact between the sands and the underlying muds.

The most dramatic soft-sediment deformation structures were recovered in a box core taken 400 m north of Wilmington Canyon. A thick sandy surface layer extended downward as