The question of possible source(s) for oils in Gulf Coast Tertiary reservoirs is related to the question of early versus late migration. What was the time relation between generation, migration, reservoir deposition, and trapping? Combinations of inferences, interpretations, and facts suggest several possible scenarios consistent with the geology and the geochemistry, indicating that the oils were probably derived from more than one source. The integration of geochemistry with geology is leading us to a better understanding of the entire system, and is showing us the value of looking this gift horse in the mouth.

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High-Resolution Seismic Methods in Coal Exploration

Reflection seismic methods have been used with great success in the exploration for oil and gas for over 40 years. Recently, "oil-country seismics" have been adapted to the coal mining industry. In the United States, the method is little used because it is a relatively new application of seismic exploration, and because little has been written explaining the method, how it works, and what it can achieve. Mining engineers, geologists, and management are concerned with where the coal is located stratigraphically, its thickness, the depth and structure of the seam, the presence and attitude of faults, washouts, seam splits, or burn areas. Unless geologic parameters are unusually adverse, high-resolution reflection seismic methods will extrapolate core-hole information when core-hole costs are high, and can reduce the number of core holes necessary by as much as 50%. Where overburden is thick it can locate new core holes to provide maximum information. Where faulting is present it can determine strike and hade. Further, it may locate washouts and seam splits depending on depth and associated geologic conditions. The high-resolution reflection seismic method will provide an improved picture of the geology ahead of the coal face for the mine planners, thereby maximizing production and profit.

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Mass Wasting on Continental Rise of Eastern South America

Although slumps and associated deposits appear to be widespread beneath parts of the continental slope, recent studies of sedimentation and near-bottom processes on the continental rise of eastern South America indicate that mass wasting (slumps, slides, debris flows, etc) is of only limited or local extent. This conclusion is based on detailed examination of moderate- to close-spaced 3.5-kHz echograms and seismic reflection profiles plus examination of several hundred piston cores. Zones identified as mass-wasting deposits are usually of small regional extent ($<$50 km) and are confined to the upper rise or to regions adjacent to many of the large seamount chains (e.g., North Brazilian, Fernando de Noronha, and Columbia-Trindade Ridges) which cross the rise. Thus, on the basis of available data, the continental rise of eastern South America does not appear to have large, widespread slump or debris-flow complexes that cover thousands of square kilometers and extend hundreds of kilometers downslope as they do on other parts of the Atlantic continental rise (e.g., northwest Africa and eastern United States). However, the present data spacing on the South American Rise may preclude recognition and delineation of the regional extent of many mass-wasting deposits.

An exception appears to be the Amazon Cone, a large deep-sea fan that crosses the continental rise off the Amazon River. Recent studies have delineated two major zones of failure and associated debris-flow complexes which extend 300 km downslope and are up to 100 km wide. The morphology of these features is complex, and recognition is complicated by the fan channels and their associated levees plus the high ($>$50 cm/10^3 year) Quaternary sedimentation rates. The eastern slide or debris-flow complex heads at about 2,500-m depth (middle fan) and appears to terminate downslope against the Ceará Rise at a depth of about 4,200 m. The associated debris flow near the Ceará Rise is particularly well defined, and scarps are recognizable at the head of the complex. Three cores from the region of the flow indicate that the age of the flow is older than late Wisconsin. The slide or debris-flow complex on the western side of the cone appears to head near a depth of 500 m in a narrow ($\sim$25 km) scar. The associated debris flow extends to at least 3,750 m. A core indicates a late Wisconsin age for the flow. The occurrence of these two large slide or debris flows emphasizes the possible importance of mass-wasting processes to the formation and growth of large deep-sea fans even though such processes have generally been disregarded in most deep-sea fan models.

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Paleoenvironmental Implications of Oceanic Sedimentation Rates

Examination of long cores collected by deep-sea drilling shows that, at least during the Cenozoic, oceanic sediments accumulated at rates which varied widely in space and time, and that there are many gaps in the sedimentary record. Locally, sedimentation may be extensively controlled by ocean circulation and chemistry. Comparison of data from different regions, however, reveals broad, globally synchronous fluctuations in rate of sediment accumulation, the oceans apparently oscillating between periods of high (middle Eocene, early Miocene) and low (Oligocene, Paleocene) accumulation. Hiatuses in the record are common during periods of generally low accumulation. Such global changes in the rate of deep-sea sediment accumulation can be related to both sea-level fluctuations and global climatic changes, and their influence on sediment supply and ocean circulation.

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