Northwest Borneo orogene. The shelf widens to more than 300 km toward the south in Sarawak and measures about 100 km in the north in Sabah. Structural deformation is most severe onshore and decreases toward the offshore, where all the currently producing East Malaysian fields are located.

The two largest offshore oil fields, the Baronia field in northern Sarawak and the Samarang field in southern Sabah, are both situated in areas characterized by synsedimentary tectonics. Production is from upper Miocene coastal-plain and coastal sands, which have been charged with hydrocarbons from land-plant-derived source rocks.

The large gas fields are located offshore central Sarawak, and the gas is trapped in upper Miocene carbonate reefs.

SHERIDAN, R. E., Univ. Delaware, Newark, Del.; J. A. GROW, U.S. Geol. Survey, Woods Hole, Mass.; D. G. ROBERTS, Inst. Oceanog. Sciences, Wormley, England; L. MONTADERT, Inst. Francais du Petrole, France; E. SEIBOLD, Univ. Kiel, Kiel, Germany; K. HINZ, Bund. Geowissen. Rohstoffe, Hannover, Federal Republic of Germany; and P. R. VAIL, Exxon Prod. Research, Houston, Tex.

Recent Advances in Passive-Margin Research

Recently available multichannel-seismic data have provided a detailed look at many Atlantic passive margins. DSDP holes and COST wells have provided geologic calibration. Reefal–carbonate-bank underpinnings provided a mechanism for slope migration seaward of the original continental edge, especially in the Jurassic–Early Cretaceous. Tertiary defacement by erosion and mass-wasting has caused large landward retreats of the slope. These events are nearly coeval on both sides of the Atlantic Ocean, indicating their significance.

Deeper crustal layers are identified on the modern reflection and refraction data. Intermediate seismic-velocity layers, 7.1 km/sec, near the continental edge on both sides of the Atlantic might be characteristic of transitional-type crusts, or merely continuations of layer 3b under the slope and shelf.

Deep-cutting, listric normal faults are observed where the soles of the faults merge into a lower crustal layer (6.3 km/sec velocity). Thinning with listric faulting of apparent continental crust has brought the mantle (8.2 km/sec) to within 14 km depths. Viscous creep in the lower continental crust appears necessary to account for the measured thinning.

Detailed analysis of the multichannel data permits sequence identification within the thick margin sediments. Sea-level cycles can be identified, and correlations reveal the configuration of genetically related stratigraphic units. Such analyses define the subsidence history and paleobathymetry of the margins. Some passive margins start with an uplift and rifting phase, whereas others are rifted through previous deep basins without uplift or volcanism. Other margins are dominated by volcanism in the early stages, and outer-ridge structures have formed.

SHERWOOD, JOHN, PHILIP SCHULTZ, JIN LIN, and DAVID JUDSON, Digicon, Inc., Houston, Tex.

Depth Migration of Seismic Data

Conventional time migration of seismic data results in the incorrect positioning of reflectors where there are significant lateral variations in the velocity of the overburden. In such situations the basic migration procedure should use the provided velocity information and obey the wave equation with adequate accuracy to produce a cross-sectional representation of the reflectors in true depth.

A method involving finite-difference approximations to the wave equation has been implemented for obtaining migrated depth sections. The initial seismic data have the properties of an upcoming wavefield recorded at the earth's surface. This is projected downward in small increments of depth, making appropriate corrections for the transmission of the seismic waves through the assumed velocity variations within the layer. Thus, at an intermediate stage of processing, the data consist of an imaged depth section above the depth Z, followed by "conventional" unmigrated seismic data associated with shooting and recording at depth Z.

This depth-migration procedure applies to both two- and three-dimensional common depth point stacked data, where it is expected to be particularly important for oil field development projects. The method has also been developed for application to conventional unstacked two-dimensional data which have been recorded on a uniform grid with a shot at each receiving group. Although this latter mode becomes relatively expensive, it does offer the possibility of improved detailing of zones of exploration interest overlain by complex geology with rapid lateral velocity variations. The method also can be reversed to yield synthetic seismic data consistent with a given geologic model.

SHIDELER, GERALD L., U.S. Geol. Survey, Corpus Christi, Tex.

Surface Turbidity and Hydrographic Variability on South Texas Continental Shelf, Gulf of Mexico—Time-Sequence Study

Regional surface-water turbidity patterns and associated hydrography were monitored on the south Texas continental shelf over an 18-month period (fall 1975 to spring 1977). During six monitoring cruises, quasi-synoptic surface measurements were made of water transmissivity, suspended-sediment concentrations, temperature, salinity, and drifter trajectories. Time-sequence patterns of these parameters illustrate substantial temporal and spatial variability; temporal variations occur at both the seasonal and annual time scales.

Turbidity and hydrographic patterns indicate a surface-sediment dispersal system regulated by a shelf-water exchange process consisting of opposing lateral movements of inner-shelf and outer-shelf water masses. Relatively turbid inner-shelf waters reflect the offshore and alongshore transport of coastal-derived sediment. The inner shelf has a regional gradient of shoreward-increasing turbidity; superimposed local gradients are established at major tidal inlets that serve as prominent