ern shoreline was probably everywhere microtidal as a result of dissipation of tidal energy across the very shallow eastern shelf of the basin.

The Arafura Sea displays a tidal pattern that may be similar to that of many ancient epeiric seas. Though smaller and shallower, it is thought to be a good modern analog for the interior Cretaceous seaway.

SACKETT, WILLIAM M., Univ. South Florida, St. Petersburg, FL

Organic Matter in Sediments Underlying Ross Ice Shelf

Eleven gravity cores (maximum penetration 102 cm) were obtained in December 1977 below the Ross Ice Shelf at Site J9. The sediments proved to be middle Miocene glaciomarine mud. The sediments may reflect a recent grounding of the Ross Ice Shelf which probably resulted in the erosion of the Pliocene-Pleistocene section. The sediment cores contained two lithologic units: an upper, light olive-gray unit from 5 to 20 cm thick, and a lower darker unit.

Concentrations and stable isotope compositions of the total organic carbon were determined for 13 samples in two of the cores. Three samples from the upper unit contained 0.17, 0.18, an 0.19% organic carbon with $\delta^{13}C_{PDB}$ compositions of -25.5, -25.3, and -24.3‰, respectively. Ten samples from the lower unit contained more than twice as much organic carbon, ranging from 0.35 to 0.46%, and slightly lower $\delta^{13}C_{PDB}$ values, ranging from -25.1 to -26.1 ‰. The amounts and isotopic compositions of the organic carbon in these sediments are probably controlled by the relative amounts of kerogen derived by erosion of rocks from the Transantarctic Mountains and organic carbon fixed by photosynthetic organisms in the Miocene ocean.

SALVESON, JAMES O., Chevron Resources Co., San Francisco, CA

Generation, Migration, and Entrapment of Petroleum in Extensional Basins

The interplay of tectonics, thermal regime, and depositional history generally determines the petroleum potential of individual basins. The application of these factors to a review of several extensional basin systems (Rhine graben, North Sea basin, Reconcavo basin, Gulf of Suez basin, Red Sea basin, Bass basin, and Gippsland basin) provides the basis for this analysis.

Extensional tectonic systems provide a mechanism for thinning the crust and upper mantle (the lithosphere). The result is a progressive rift-basin evolution starting with graben formation and ending in the development of continental margins. However, if tensional stress stops at any stage, a post-rift phase of subsidence, regulated by thermal decay, begins.

Sedimentary rocks deposited prior to extension (pre-rift sediments) are preserved in the graben areas but eroded from the horsts. Rift sediments (usually clastics) deposited during extension are eroded from the uplifted areas, but carbonate rocks and evaporites may be deposited if the climatic environment is favorable. Sediment deposition is continued after extension stops (post-rift sediments).

Source beds can be in the pre-rift, rift, or post-rift sediments but generation does not occur until they are buried to the depth of the generative window. Generation is aided by the high heat flow caused by the thinned crust. The kind of petroleum generated is dependent on the type of organic material present and the deepest zone of generation reached.

Extensive normal faults contribute to trap geometry but inhibit long distance migration. Consequently, except in the post-rift section, entrapment of petroleum requires that the source and reservoir rocks are in close proximity, which can be accomplished by faulting, interfingering, or the superposition of source rocks on reservoir rocks at unconformities. The most favorable conditions for generating and trapping large oil fields are commonly in or near the deepest part of the basin.

SANDBERG, CHARLES A., U.S. Geol. Survey, Denver, CO, and RAYMOND C. GUTSCHICK, Univ. Notre Dame, Notre Dame, IN

Sedimentation, Biostratigraphy, and Source-Rock Potential of Deseret Starved Basin (Mississippian), Western United States

Dark, organic-rich starved-basin sediments of the basal, phosphatic member of the Deseret Limestone and equivalents were deposited west of a westward-prograding carbonate platform in Osagean to early Meramecian time. These sediments comprise mainly pelletal, peloidal, oolitic, and conglomeratic phosphorite; phosphatic shale enclosing large calcareous concretions; bedded spiculitic and radiolarian chert; cherty micritic limestone; siltstone; and mudstone. The starved basin extends for more than 700 km from southeastern Nevada to southeastern Idaho. Rate of sedimentation of starved-basin sediments is calculated from the conodont zonation to be about 10 m/m.y. Slope sediments that intertongue westward with basinal sediments and eastward with carbonate-platform sediments consist mainly of thin-bedded clinoform micrite interbedded with some debris-flow encrinite. These sediments were deposited on a gentle foreslope of 5° or less at a rate of 16 to 18.5 m/m.y. Time-equivalent carbonate-platform sediments were deposited at a rate of about 113 to 130 m/m.y.

The biota of the basinal sediments is mainly planktonic radiolarians, nektonic goniatites and conodonts, benthonic agglutinate foraminifera and sponges, and infaunal traces of burrowing organisms. The sparse shelly fauna consists mainly of small solitary corals and a few brachiopods. The bathymetry of the foreslope and shelf, considered together with the character and biota of the basin sediments, suggests that the floor of the central basin lay in the dysaerobic zone at a depth of about 300 m.

Organic-carbon and hydrocarbon content of outcropping phosphatic shales that have been deeply weathered, leached, and biodegraded are difficult to evaluate. Analyses generally produce values that are much lower than values that can be expected in the subsurface, where the same rocks have generated or are generating petroleum. Nevertheless, the following organic-carbon yields have been obtained from carefully selected out-