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Frontier Basins of Bering Sea

The Bering Sea contains three hydrocarbon provinces: shelf, slope, and abyssal basin. The shelf province, which is underlain by three exceptionally large sedimentary basins (Bristol, St. George, and Navarin) has been extensively covered by geophysical surveys. Exploratory wells in this province have not discovered economic hydrocarbon deposits.

Frontier basins, with future economic prospects, lie beneath the mostly unexplored slope and abyssal provinces of the Aleutian and Bowers basins of the Bering Sea. These expansive deep-water basins cover an area nearly two-thirds the size of Alaska. Sedimentary rocks of late Mesozoic(?) and Tertiary age make up the 3 to 11-km thick section that covers the entire area. These pelagic and fine-grained terrigenous rocks overlie slowly subsiding oceanic crust, which was trapped in the Bering Sea after the Aleutian Ridge formed during the Eocene.

Thick (6-11 km) sedimentary sections and high basement relief (0.5-1.0 km) underlie parts of the 1,700-km long Beringian-Koryak slope and rise. At the base of the margin, nearly flat strata of the Aleutian basin drape and overlap faulted acoustic-basement rock. Sparse information from the Deep Sea Drilling Project and U.S. Geological Survey dredging indicates that source and reservoir rocks may exist within the upper and, possibly, lower parts of the sedimentary section. Beneath the central part of the abyssal basin, the sedimentary sequence is only 2-4 km thick, and buried basement relief is greater than 1.0 km. Near-surface temperature gradients are high (average = 58°C/km), and acoustic anomalies that may be indicative of hydrocarbons (velocity-amplitude anomalies, VAMPs) are present.

The slope and abyssal basins of the Beringian-Koryak margin have received minimal exploratory attention because water depths that cover the area are typically 2,000-3,700 m. Advances in deep-water production technology will eventually make these frontier basins attractive for hydrocarbon exploration.