phyllosilicate pore fill, (4) late calcite and siliceous overgrowths and formation of prehnite and epidote.

The Poul Creek Formation is the richest source rock present in the Gulf of Alaska. It has acted as the source of most of the oil seeps in the area. The lower Tertiary section has been a minor source section for oil and gas in the area. The Yakataga Formation is mainly glacial in nature and is a very poor source rock. Organic maturity parameters indicate all formations except the Yakataga have experienced sufficient time-temperature conditions to be fully mature and in a generative hydrocarbon stage. Normalized interval-velocity analysis of offshore geophysical data suggests likelihood of poor source and reservoir rocks over much of the Gulf of Alaska basin.

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Speculations on Petroleum Resource Potential of Antarctica

Significant deposits of hydrocarbons are probably present beneath the continental margin of Antarctica in the areas of the Ross, Amundsen, Bellingshausen, and Weddell Seas. The onshore areas of Antarctica have uncertain petroleum potential, because the sedimentary rocks that do extend above the ice sheet are largely metamorphosed and intruded by igneous rocks. Large basins containing sedimentary rock may underlie the thick (average 3 km) moving ice sheet (e.g., Wilkes and Polar basins and areas west of the Pensacola Mountains).

Widely spaced marine geophysical surveys (by *Eltanin* and other ships) have been carried out over parts of the continental shelf, but only the Norwegian (1976-77) and German (1977-78) expeditions have collected modern deep-penetration multichannel seismic data. No systematic aeromagnetic surveys of the continental margins exist, although data from the early 1960s to 1978 suggest a section of sedimentary rocks several kilometers thick above magnetic basement. The Deep Sea Drilling Project (DSDP) sampled rocks that were as old as Miocene beneath the Ross Sea continental shelf (maximum penetration of 443 m) and as old as Oligocene to early Miocene beneath the Bellingshausen Sea continental rise. The only traces of hydrocarbons recovered so far are methane, ethane, and ethylene from DSDP cores beneath the Ross Sea shelf.

Comparisons with other continents in the Southern Hemisphere suggest the likelihood of thick Cretaceous and Tertiary sedimentary sections beneath the continental margins of the Ross, Amundsen, Bellingshausen, and Weddell Seas. Some of the areas of other continents adjacent to these parts of the Antarctic continental margin in the Gondwanaland reconstruction contain significant amounts of oil and gas. By analogy, therefore, the Antarctic continental margin may also. Published estimates suggest that undiscovered petroleum resources may be in the range of tens of billions of barrels in place.

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Middle Paleozoic Sedimentation and Paleogeography of Southern Great Basin

Based on detailed analysis of conodont distribution, middle Paleozoic rocks in the southern Great Basin have been divided into refined time intervals. These include late Middle through Late Ordovician; early to middle Early Silurian; late Early Silurian; Late Silurian; and Early to early Middle Devonian. Rocks of these intervals consist of fine-grained limestone, fine to medium-grained dolostone, and lesser amounts of silty limestones and impure calcareous shales. Based on the distribution of lithofacies, deposition occurred on an eastern craton margin and within inner- and outer-shelf regions on the Cordilleran miogeocline. Offset of these regions can be used to estimate movement along major faults (e.g., the Death Valley–Furnace Creek fault zone).

The craton margin was a region of supratidal to very shallow subtidal environments during part of this time interval. Regression and erosion of the craton margin during Early and Late Silurian time provided a source of carbonate mud as well as silt to sand-sized quartz which were redeposited on the shelf areas in the west. An unconformity separates Upper Ordovician rocks from overlying Lower Devonian rocks. Intertidal to subtidal environments with nearly continuous deposition existed on the inner shelf, providing evidence of regional regression during early and middle Early Silurian and Late Silurian time. The outer shelf was an area of complex environments including platforms and local basins. Uplift and erosion in Late Silurian time affected part of the outer shelf. In the northern Inyo Mountains an unconformity separates upper Lower Silurian rocks from overlying Lower Devonian rocks.

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Reservoir Morphologies for Gulf Coast Turbidite Sandstones, Texas

Turbidite sandstones form gas reservoirs in the deeper Tertiary section of the Gulf Coast province of Texas. Turbidite reservoirs are of three types: (1) thin-bedded sandstones of middle-shelf origin, (2) constructional-channel-fill sandstones, and (3) stacked-channel turbidites. Production in all these reservoirs is associated with structures, but it appears that stratigraphic control exerts a fundamental influence on the accumulation of gas.

Oligocene Frio sandstones at Nine Mile Point field are turbidites which formed in water depths of about 300 ft (100 m). The thin-bedded sandstones are interbedded with bioturbated shales. Sandstones are largely channel turbidites of the "AE" and "ABE" types, but more complete sequences are also present. Bed associations resemble those of submarine fans, but Frio turbidites are concentrated on the downthrown sides of major normal faults, and adjacent anticlinal crests are nearly barren of porous sand. The sandstones are clayey, and maximum permeabilities are in the range of 10 to 50 md.

Eocene lower Wilcox sandstones at Northeast Thompsonville field are massive turbidites of channel