depositional environment, and correlation. Wireline measurements together with direct measurements of the rock in the form of cuttings and cores must be understood by the geologist and geophysicist using them to achieve the proper confidence in their interpretation.

Examples of some of the limitations of borehole measurements illustrate a wide variety of problems that can occur. However, with understanding of these limitations, remarkably sound interpretation can be made.

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Carboniferous-Permian Boundary Sequence of Northern Oquirrh Basin, Idaho-Utah

The Carboniferous-Permian boundary occurs in the middle of the Oquirrh Group in the northern part of the Oquirrh basin, the largest basin formed east of the Antler tectonic belt during the middle Carboniferous. Good sequences of fusulinid faunas for the northern part of the basin are exposed in the Sublett and Deep Creek Ranges of southern Idaho, a position midway between the basin's bathymetric low and the basin edge. In the Sublett Range, Late Pennsylvanian-Early Permian fusulinids occur through 1,500 m of mixed quartose sands and limestones of the Trail Canyon Formation and basal part of the overlying Hudspeth Cutoff Formation. The Missourian interval is thin relative to the Virgilian interval. Near the base of the Trail Canyon Formation, possible Missourian fusulinid faunas appear containing *Triticites* and *Eowaeringella,* and extend through a 250-m section, which is overlain by a 400-m section with Virgilian fusulinids, including *Triticites* sp. aff. *T. cullomenensis* and *T.* sp. aff. *T. subventricosus.* The Carboniferous-Permian boundary occurs at about the top of the middle limy unit of the Trail Canyon Formation, and Wolfcampian fusulinids, including *Schwagerina and Pseudoschwagerina,* occur through 800 m of section. *Pseudofusulinella* is common through Virgilian and Wolfcampian interval on the western side of the Sublett Range, but has not been found in this interval on the eastern side. Leonardian fusulinids have yet to be found here, contrary to earlier published reports.

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Formation and Evolution of Nonmarine Petroleum in Songliao Basin, China

We will discuss the geochemical characteristics of the formation of nonmarine petroleum and its evolution regularities in the Songliao Basin and put forward the most favorable conditions for the formation of petroleum of nonmarine origin. The nonmarine kerogen of China can be classified into three types with two subtypes by composition and three types with six subtypes by both origin and composition.

In large lake basins, source rocks containing combined sapropelic kerogen have a high transformation ratio and a high genetic potential for petroleum. They offer the material basis for the formation of a large nonmarine oil field. On the basis of geologic and geochemical data and the results of thermal simulation of kerogen, we confirm that the maturation sequence of kerogen is Type-1, Type-2, and Type-3. The petroleum formation from combined sapropelic kerogen has its own characteristics, and it is necessary to set up a new model.

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Elmworth Gas Field, Alberta, Canada: Depositional Environments and Diagenetic Consideration of Low Permeability Gas Reservoir

Elmworth is a giant gas field in low permeability sedimentary rocks and is considered part of the Deep Basin in Alberta, Canada. Gas production is obtained mostly from conglomerates with unusually high permeability but with some difficulties in producing from lower permeability zones. The study of Falher conglomerate and sandstone (Lower Cretaceous) reveals that this low permeability gas reservoir owes its origin to an unique combination of depositional environments and diagenetic processes.

A detailed study of Falher A and B units shows that sediments were deposited during a regression in the following coastal environments: beach, shore, lagoon-bay, coastal plain, and fluvial. Cyclic patterns of vertical sequences indicate an oscillating shoreline and five such sequences are recognized.

Conglomerate and coarse sandstone occur in beach facies, while fine sandstone rich in detrital clays and organic matter predominates in shore facies. Detrital dolomite is characteristically distributed in shore facies and this is taken to indicate the direction of transport. Conglomerate and sandstone are overlain by carbonaceous shale and coal deposited in a swamp environment.

Vitrinite reflectance data indicate that the sediments were subjected to deep burial and associated important diagenetic processes.

Authigenic minerals are found to be most significant in Falher sediments. Quartz in the form of overgrowths and microcrystalline crystals is most extensively developed in sand-supported conglomerates and mineralogically mature sandstones in various environments. Kaolinite is predominant in most conglomerates and in sandstone, which show high primary porosity and permeability. Illite is more common in sandstone than in conglomerate though this trend is obscured by detrital clays in shoreface sandstone. Carbonate cement, mostly calcite and dolomite, is important, as it reduces porosity drastically. Diagenetic processes are strongly related to the depositional environments and their study is important not only in understanding the nature of the reservoir but in delineating the reservoir quality.

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Wrench-Related Folds in Neogene Sediments Developed Along Offshore Sandspit Fault Trend, Queen Charlotte Basin. British Columbia

Net movement on the Sandspit fault, which marks the western edge of the Queen Charlotte basin, is a combination of dextral strike slip movement with significant downdrop of the east block. Evidence of Neogene-Holocene strike slip on Queen Charlotte Islands includes slickensides and offset drainage patterns, topographic features, and geochemical anomalies. The northwest-trending fault parallels the better documented Rennel-Louscoone wrench fault system and the Queen Charlotte transform fault.

Continuous reflection seismic and magnetic profiling in western Hecate Strait was conducted to investigate the offshore extension of the fault zone. A broad magnetic trough in Hecate subbasin, colinear with the Sandspit trend, suggests a crustal dislocation developed in "basement" Cretaceous sediments and Upper Jurassic volcanic rocks. En echelon, gen-