

Overview of the hydrocarbon potential of the Iranian South Caspian Sea

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The South Caspian Basin is the southern extension of the Caspian Sea, controlled by major structural elements including onshore areas in northern Iran, eastern Azerbaijan and western Turkmenistan. This region is endowed with abundant petroleum resources, and oil and gas production has played an important commercial role in the region for more than 150 years; however serious petroleum exploration activities have been started only in the past 50 years in the Iranian side. To date, however, there are only a few exploration wells in the Iranian offshore Caspian. This relative scarcity of exploration wells is largely due to the overall water depth conditions in this part of the basin. The deepest water at approximately 1,025 m, for example, is situated in the southwestern part of the Caspian Basin, in the Iranian segment.

Based on the Khazar-1 exploration well and the interpretation of 3D reflection seismic data, the most important hydrocarbon reserves are concentrated at 4,500–5,500 m depth, within the Middle Pliocene Cheleken Formation of shallow-marine, deltaic to lacustrine origin. However, some gas shows were also observed in a secondary reservoir target, the Upper Pliocene Apsheron Formation.

Brownish colored clay stone layers within the Cheleken Formation have been considered as a potential source rock for the Cheleken petroleum system, although Upper Cretaceous and perhaps even Jurassic deposits could have contributed to the active charge based on oil seep and biomarker studies. Upper Pliocene clays and marls are the main cap rock sequences for the Cheleken petroleum system. The subsidence of the Iranian South Caspian had a major impact on hydrocarbon generation/expulsion and the source kitchen is expected to be mainly in the gas window today in southernmost part of the Caspian Basin.

Currently, the National Iranian Oil Company is drilling one of the major prospects in the deepwater area of the western part of the Iranian Caspian Sea.