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Paleozoic depositional system in Morocco: Geology and Play concepts

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Exploratory drilling in the Paleozoic basins has established significant Paleozoic petroleum potential. The discovery of gas and condensate in the Essaouira basin, oil production in the Sidi Fili trend, and various oil and gas shows encountered in the Paleozoic rocks in a number of wells drilled in Morocco have stimulated considerable interest in exploring and studying petroleum potential of the Paleozoic depositional system.

Geochemistry analyses suggest that these hydrocarbons are generated from Paleozoic source rocks. They were trapped in structures that are essentially Hercynian structures that were cut later in the Triassic by normal faults.

The tectonic events responsible for the structuring of the Paleozoic beds are the passive margin stage that lasted from the Cambrian to Middle Devonian and was followed by the Upper Devonian to Carboniferous synsedimentary compression.

During this folding event, a series of ridges and depocenters took place. These ridges may have regional size such as the Western Meseta. This uplift introduced progressive unconformities, changes in thicknesses, and variations in source and reservoir distribution during the Hercynian.

All these geological considerations led to definition of a new play concept that will make more attractive the Paleozoic Series and minimize risks in future exploration. The previous oil and gas discoveries in the country are to a great extent related to the Hercynian structures that were cut later by normal faults. This makes the Paleozoic petroleum system viable. Similar and larger prospects are present and will be tested.