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Hydrocarbon - Bearing Paleozoic Rocks: A Prediction in Venezuela

Hydrocarbon - bearing Paleozoic rocks in Venezuela might be expected. Sparse subsurface data and a few surface exposures allow the subdivision of the Paleozoic section into seven stratigraphic packages on the basis of major tectonic cycles. This paper represents a first attempt to understand the spatial and time relationship of these rocks within a conceptual model.

Early Cambrian represents a time of rifting. Late Cambrian to Late Devonian time represents a continuous passive margin from Western South America to Northern Africa, in which a Silurian and Devonian source beds were deposited and account for 43% of the oil and 84% of the gas reserves in the latter region. From Early Carboniferous to Early Permian this passive margin was segmented and transformed into foreland basins. Subsequent uplift and erosion was followed by Mesozoic rifting of the Tethyan seaway.

A potential, and economically attractive, Paleozoic Petroleum System, as it exists in Northern Africa, is proposed for Venezuela in the light of new data and technology. As part of this system, two main types of structural traps have been recognized: low relief anticlines of Late Carboniferous - Early Permian age next to the Pre-Cambrian shield, and inverted normal faults related to the Late Miocene - Pliocene deformation. Stratigraphic traps might be expected as updip pinch-out of Carboniferous - Permian sandstones. Reservoir rocks are mainly clastic with minor carbonate and fractured/weathered igneous basement.

An important effort is currently being made to acquire new geological, geochemical and geophysical data to improve definition and evaluation of the Paleozoic opportunities.