

The Last Frontier for Supergiant Oil and Gas Accumulations in the Onshore Brazilian Basins: The Solimoes Province, Amazon Area, Brazil

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With the discovery of Juruá gas field (in 1976) and Urucu oil field (in 1986) in the Paleozoic pre-salt sequence of this onshore basin, the exploration perception changed completely in the Solimoes Basin. At final, the paradigm against the existence of Silurian & Devonian super giant hydrocarbon system, beneath the salt sequences in the Amazon Jungle has been destroyed.

After 34 years of production of more than 210 million barrels of 42 degrees API oil, in Carboniferous aeolian sandstones, with only 76 wells, recoverable reserves are mentioned to be in the order of more than 500 million bbls of oil equivalent. On the other hand, the basin has the potential to bear reserves up to 15 to 20 Tcf of gas and 4-6 billion of light oil. Recently, the discovery of a Devonian oil accumulation, in deeper horizons, suggests that the potential is indeed much larger, opening up a huge new frontier for exploration in the Basin

To carry out this work, a petroleum system approach was used to highlight the lessons learned from initial unsuccessful drilling ventures in the pre-salt hydrocarbon province of Solimoes Basin, and how geologists have added critical information values to change exploration failure to a successful discovery venue.

The lessons learned emphasized the needs to evaluate and assess the interplay among source, reservoirs, seals and trap geometries. The use of state-of-the art technology in seismic reprocessing was important to improve the quality of structural maps and trap geometries. Careful modeling of burial and igneous controlled thermal evolution of the basin together with high resolution geochemistry (HRGT) were important to predict the degree of source rocks transformation, hydrocarbon types, charge, timing of migration, accumulation, preservation and oil quality. Mass balance derived from the modeling approach was important for volumetric assessment of the oil and gas accumulated in proved and potential reservoirs. The study was based on detailed geological, geochemical and geophysical information provided by HRT Oil and Gas.