

The Majunga Basin of Madagascar – Review of Petroleum Systems and Exploration Potential

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The Majunga Basin is located along northwest Madagascar. It is a frontier basin with only eight NFWs drilled and no hydrocarbon discoveries so far. Lack of success can be attributed to the failure of wells to test valid closures, and poor understanding of source rock distribution, timing of charge versus trap formation and reservoir/seal combinations.

Two speculative petroleum systems are recognized. The Beronono - Cretaceous is likely to be the primary petroleum system, which could be active in the western passive margin of the province. The organic rich shale of Upper Liassic Beronono Formation is the main potential source rock, and Cretaceous sandstones, deposited during the prograding clastic margin shelf from Aptian to mid-Turonian times, are the principal reservoirs. Traps are structural and stratigraphic including lateral facies changes, incised valley fill, lowstand wedges and basin-floor fans.

The Middle Sakamena - Sakamena/Isalo Petroleum System is expected to be active in the failed rift portion of the province. Lower Triassic shale of the Middle Sakamena Formation is the principal source rock. Potential reservoirs include Lower/Upper Sakamena terrestrial sandstones of Late Permian to Early Triassic age, and Isalo sandstones of Middle Triassic to Early Jurassic age. The Sakamena/Isalo Play is proven onshore Madagascar and could be present in the failed rift province. Salt-related plays are identified in the deepwater part (Tari et al., 2004) but are considered as the most challenging plays. The main exploration risks are the timing of trap formation versus source rock maturation and generation, and reservoir and seal qualities.