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Petroleum prospects of Lamu Basin, South-Eastern Kenya

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The hydrocarbon potential of the sub-surface Lamu basin (SE Kenya) offshore sedimentary rock sequences of Mesozoic age formed the premise of this study. Major similarities and some differences in structural styles can be seen between the offshore Lamu and the Gondwana basins along the margins of Indian Ocean and Carnarvon basin along Australia's North West Shelf, where oil pools have been discovered. The existing well results and recent 2-D seismic data have been interpreted to identify various structural styles and play fairway segments, which bolster the possibility that the Karroo to late Tertiary sedimentary mega-sequences (~3000–13000 m thick), suitable for hydrocarbon exploration, could be visualized in both the onshore and offshore Lamu basin areas. Similarly, major reservoir-seal and potential source intervals have been identified in the present study. The hydrocarbon indicator from the well-log data shows that oil potential in complex multiple petroleum systems, ranging in age from Triassic to Tertiary, have tested gas deposits. Well control of only one exploratory well per 25,000 sq km in the offshore Lamu basin shows evidence of the existence of at least two active petroleum systems. The Lamu basin has evolved consequent to a complex tectonic activity related to continental rifting and block faulting of the Lamu-Anza and Central African rift systems. An attempt has been made to recommend the probable prognostic structural leads, which are controlled by NW-SE trending faults sympathetic to the Anza-Lamu rift systems, for future essential sub-surface features of source rocks, reservoir rocks and the cap rocks in the Lamu basin.

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