

Unveiling the Potential of Lower Cambrian Karim Formation in the Eastern South Oman Salt Basin through Sedimentology and Stratigraphic Evaluation

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Abstract

The Lower Cambrian Karim Formation in the Sultanate of Oman is a continental siliciclastic sediment that followed deposition of the restricted marine to hypersaline deposits of the Ara Group. These sediments were sourced from the Arabian plate in the west and the Indian plate in the east and are deposited across Oman by widespread fluvial-alluvial systems that eventually splayed and terminated in evaporite and mud rich sabkha- playa conditions. The deposits are divided stratigraphically into three members: Runib, Irad, and Khaleel based on its log patterns due to absence of fossils. Following the recent discovery of oil reserves within Irad member of the Lower Cambrian of Karim Formation the eastern South Oman salt basin, an integrated semi-regional evaluation using wells and newly acquired seismic volumes was carried out to better understand the overall Karim Formation reservoir sand fairway and play segment to further support exploration and development activities. This evaluation included multi-disciplinary approaches that ranges from stratigraphic framework refinement, facies analysis, provenance study, reservoir properties and seismic interpretation to predict the development of good reservoir-seal pairs areas within confined salt-induced mini basins of Karim unit and identify sweet spot potential in area of interest. By integrating the sedimentology and stratigraphy results with seismic interpretation, several promising opportunities were identified, both stratigraphically and structurally for further maturation. These findings are expected to significantly contribute to the ongoing efforts in this area of interest, guiding future exploration activities and development strategies.