

Hercynian Subcrops of Paleozoic Successions, Saudi Arabia

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ABSTRACT

The Hercynian Orogeny truncated the pre-Unayzah stratigraphy of Paleozoic successions in varying extents over the Arabian Plate. The mapping of the Hercynian subcrop edges of Paleozoic formations is crucial to understand the Paleozoic petroleum systems and play concepts. The study presents an updated subcrop map derived from an integration of well-logs, palynological results, seismic interpretations and gravity/magnetics data. Detailed distribution and geometry of the Paleozoic formations were mapped, particularly Qalibah, Tawil, Jauf, Jubah and Berwath formations. The study shows that the Berwath formation was deposited and preserved in limited basinal areas during the late Carboniferous. Middle to late Paleozoic sediments onlap paleo-escarpments of Cambrian Ordovician successions as a result of a regional transgression. The detailed subcrops mapping of the Hercynian Unconformity, confirmed the presence of two main basins bounded by three paleo highs within the Arabian Plate. The study introduces a new Hercynian subcrop map and a Paleozoic exploration evolution model that has implications on hydrocarbon potential within Saudi Arabia.