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Reservoir Sedimentology, Sequence Stratigraphy and Seismic Geomorphology of the Late Triassic to Early Jurassic Minjur Formation, Abu Dhabi.

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Abstract

The Late Triassic to Early Jurassic Minjur Formation represents an unconformity-bound, transgressive-regressive sequence composed of channelized sandbodies and coastal floodplain/playa mudrocks, deposited along the northern margin of Gondwana. A comprehensive sedimentological, sequence stratigraphic, and seismic geomorphological analysis of the Minjur Formation in Abu Dhabi has significantly enhanced our understanding of its depositional environments, reservoir distribution controls, and overall exploration potential.

Reservoir distribution within the Minjur Formation has been interpreted through an integrated approach involving seismic geomorphology, core and wireline log analysis, and regional stratigraphic correlations. In the southwestern onshore region of Abu Dhabi, sinuous, potentially marine-influenced axial channel networks indicate persistent sediment transport toward the Neo-Tethys Ocean to the north. Conversely, the eastern onshore region exhibits a broader drainage system composed of smaller, northeastward-flowing isolated and branching channels. These channels tend to narrow downstream, suggesting more intermittent flows that likely terminated inland within floodplain or playa settings.

The deposition of the Minjur Formation was likely influenced by a combination of tectonic activity, eustatic sea-level changes, and climatic variability. From an exploration perspective, the pronounced lithological contrast between the channelized sandbodies and surrounding floodplain mudrocks—along with the presence of bounding unconformities and syn-depositional halokinesis—offers substantial potential for stratigraphic trapping throughout the region.