

The Potential of Stratigraphic Traps for the Arabian Plate

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ABSTRACT

The Middle East hosts much of the Earth's proven hydrocarbon resources, with the largest fields having been discovered decades ago. The vast majority of the Arabian Plate's discovered reservoirs reside within simple structural traps. Exploration has traditionally focused on these "easy-to-find" structures; however, with the exception of the Zagros fold and thrust belt, most have been drilled. There are many untested, underexplored, and often overlooked stratigraphic play concepts that offer potential, attractive, conventional targets. Thus, a change in exploration focus to more subtle trapping styles associated with stratigraphic (lateral facies changes, onlap pinch-outs, depositional reliefs, sub-crops, and erosional truncations) and diagenetic variations is necessary. Carbonate lowstand plays were first recognised in the 1950s in Kurdistan, where Oligocene carbonate platforms forestep the older Eocene platform. Aptian lowstands in the Shu'aiba Formation strongly influence reservoir distribution and production characteristics. Carbonate lowstands are likely associated with significant incision at the top of the exposed Mishrif, Sarvak, and Natih highstand platforms. These incised channels were either back-filled with coarse siliciclastics, fine-grained siliciclastics, or contain iron-rich and carbonate facies associations, depending on the hinterland geology. Thus, knowledge of the region is paramount. Relative sea-level, siliciclastic lowstands have occurred periodically and offer significant exploration potential across the region. Notable examples are the Cretaceous Tuwayl Formation of Abu Dhabi and the Early Cretaceous Zubair and Burgan Formations of Kuwait and southern Iraq. While, at times, these siliciclastic systems remained stranded on extremely wide shelves, at major lowstand periods, which originate from the combined effect of eustatic fall and tectonism, it is anticipated that these systems can generate basin margin-perched siliciclastic deltas, with corresponding deep-marine fan deposits. Other levels of major siliciclastic reservoir potential deserve further analysis. Recent discoveries in the Late Triassic and Early Jurassic of the Rub al Khali Basin demonstrate the importance of the rejuvenation of old structures, leading to sand reworking and the generation of new plays. This paper will present an analysis of these and other stratigraphic traps to assess the significant exploration potential across the Arabian Plate.