
Petroleum Systems in Onshore Kuwait : from Paleozoic Deep Targets to Cretaceous

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A comprehensive 3D geological synthesis and basin modelling study has been carried out on Kuwait onshore, with the objectives of understanding the HC generation, migration and entrapment process, as well as the potential of new exploration targets. New geochemical data have been acquired, including isotopic gas measurements, Sulfur studies on Jurassic source-rocks and compositional kinetic parameter determinations.

The origin and volume of Cretaceous giant accumulation is mostly related to the sulphur rich, prolific Najmah/sargelu source-rock complex of marine type. The hydrocarbons have crossed the efficient Gotnia salt seal, through weakness areas represented by the few faults crossing the seal. These faults control the high overpressure observed in the Jurassic and below. The Cretaceous pressure regime controls the vertical distribution of some Cretaceous accumulations which present significant GOR and °API difference.

The Jurassic HC accumulation are mostly originated from the same Jurassic source-rock complex, although some locally high °API and GOR accumulations can be partly related to a much deeper source, probably of Paleozoic origin, and partly related to Oil to gas cracking within the reservoir themselves.

Recent gas/condensate shows discovered in the Triassic Sudair/Khuff complex are also of probable Paleozoic origin, as suggested by new isotopic gas data and modelling.

The 3D model characteristics will be presented, including the predicted pressure regime, the organization of drainage areas, and the consequences for the gas/condensate potential in deep targets, and overall HC resources remaining to be delineated in Jurassic prospects.
