

Regional Overpressure Modeling in Onshore Kuwait : Impacts on Pressure Prediction before Drilling and Petroleum System Behaviour

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The entire Jurassic section and some areas of the Lower Cretaceous section in onshore Kuwait are characterized by high overpressures, well above the hydrostatic regime. This pattern extends apparently down to the Triassic and Paleozoic section.

The understanding of the pressure regime and its causes is important for pressure prediction before drilling as well as for HC exploration, as pressure drives the flow of HC.

The pressure regime has been investigated through a review of available pressure data (well tests, mud weights) and an integrated 3D basin modelling study, using IFP Temis package.

A consistent pressure model has been developed, including:

- the presence of tight shales in Ratawi fm, in the N and NW Kuwait, responsible for overpressure in the Lower Cretaceous
- the presence of an impervious fault corridor to the N, separating hydrodynamically the Sabriyah and N Rhaudatain fields in the Cretaceous
- the regional extend of very low permeability Gotnia salt, which acts as a pressure barrier throughout Kuwait, locally incised by poorly permeable faulted areas (E and W of Burgan), acting as “security valves” for the overpressure regime, but allowing the hydrocarbon to leak into the Cretaceous.
- the existence of lateral barriers within the Jurassic in NW Kuwait, isolating Mutriba and Kra Al Maru area from the Jurassic of N, E and W Kuwait which appear to be relatively well connected.

The pressure model characteristics in terms of Permeabilities related to the lithologies will be presented, together with its prediction for drilling depending on the geological context.