

## **Gotnia Formation-Cracking the Code!**

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### **Abstract**

This study aims to understand the role of tectonic episodes in reactivating faults that breach seals—thus facilitating upward migration of geological fluids. The study performed at the regional scale links formation water geochemistry to the history of Kuwait's sedimentary basin. This is made feasible by a large database of formation water chemistry that covers most of Kuwait's known stratigraphic column. The study found that Cretaceous and shallower oil reservoirs in north Kuwait have received sodium-saturated abnormally saline waters, where present these waters are at chemical disequilibrium for their depth. It is suggested that the stratigraphically lower Gotnia (Halite) Formation probably the source for waters. From fluid characterization perspective, to date this is the only evidence implies that the Gotnia Formation sourcing fluids to shallower reservoirs.

The regional scale study present a qualitative assessment based on spatial (lateral/geographical and vertical/stratigraphic) variation in formation water chemistry in Kuwait. This variation can be rationalised with respect to current knowledge and basin models; e.g. the presence of physical barriers and periods of tectonic activity. Given the ubiquity of samples of formation water, applying formation water geochemistry to Kuwait and other petroleum systems would appear a good method for evaluating basin models.