Play Fairway Development Within Highstand and Lowstand Platform Systems in the Late Cretaceous of Northern Arabia

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Deeper water conditions were established across most of northern Arabia during the Late Cretaceous (Turonian-Maastrichtian) concomitant with the opening of deep transtensional basins such as Sinjar, Anah, Euphrates, and Azraq. Stratigraphies show two distinct divisions; a paleohigh, shallow-water dominated stratigraphy; and a paleolow, deeper-water dominated stratigraphy.

Paleohigh stratigraphies are dominated by shallow-water carbonate platform/sabkha-salina systems. The main shelf system was developed to the SW, but towards the Zagros margin, platforms are often isolated. Deeper-water sediments that represent maximum flooding surfaces are thin and are dominated by calcisphaerulids (‘oligostegina'). Truly deepwater sediments rich in globotruncanid fauna dominate paleolow stratigraphies. During lowstands, there was abrupt establishment of carbonate platforms (e.g. the Lopha Limestone and Emam Hasan members of Iran; the Hartha limestone in the Anah graben) and there was localised input of siliciclastics and olistoliths (e.g. in Jebel Abd El Aziz, the Abba-1 well and in the Azraq graben) whilst locally, volcanics and evaporites have been recorded (e.g. the Euphrates and Azraq grabens).

This stratigraphic interval has not been economically significant, despite some small production from fields in the Najmah-Qaiyarah area, the Massive Limestone of NE Syria, and small fields in S.E. Turkey. One reason is that the majority of the exploration objectives have historically been surface anticlines that are often inversions of the half graben of Late Cretaceous age which tend to find the basinal rather than shelf facies, as seen in surface exposures of the Abd-el Aziz anticline in NE Syria, and the Jebel Sinjar exposures in NW Iraq. Wells targeted at palaeohighs (often modern-day synclines) would be expected to encounter a greater degree of reservoir facies development but run the risk of lateral seal failure and possible trap/topseal/charge problems, whilst lowstand platforms in the shallower basinal areas may offer an ideal combination of reservoir within valid and sealed traps.