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Foreland Basin System of the Northeastern Arabian Margin, Kurdistan Region, Iraq ; Impact on Oil Accumulations

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ABSTRACT

Part of the convergence history of the Arabian margin during Upper Cretaceous –Pliocene time is documented in megasequence of two successor foreland basins. A close up look of this sequence's outcrops and subsurface sections through facies and lithostratigraphic correlation as well as sequence stratigraphic analysis invoke reinterpretation and evaluation of their tectonostratigraphic origin and basin differentiation. The early one is represented by the proto Zagros foreland basin. It is developed upon obduction of radiolarite-melange suites over the Arabian margin during Late Turonian age. The Dokan oligostiginal limestone, Gulneri marine shale, and the Kometan oligostiginal-globigerinal limestone formations represent the starving, pre-flysch stage of the basin. The extensive intra-Turonian unconformity which bottoms these units marks the onset of this foreland basin formation. The major filling stage is represented by the Upper Campanian-Paleocene pelagic Shiranish marlstone and the thick, (up to 3Km.) flysch sequence of the Tanjero and Kolosh Formations. Basin inversion and shoaling is demonstrated by the punctuation of the upper part of the flysch sequence with reefal to shoal limestone of the Aqra-Bekhme (Ma'astrichtian) and the (Upper Paleocene-lower Eocene) Sinjar nummulitic limestone and the Khurmalah dolostone Formations. The red silciclastic sediments of the Gercus Formastion constitute the continental molasse filling stage. Deformation is limited and confined to the proximal areas.

Foreland evolution is interrupted by a continental sagging and the development of a carbonate dominated seaway over the Arabian margin from Middle Eocene to Early Miocene. It predates the newly developed syn-collisional foreland basin the so called "Mesopotamian Foredeep basin". The sequence of this Middle Miocene - Pliocene overfilled foreland basin overly a cross-basin Middle Miocene unconformity with shallow marine carbonate-siliclastics (Fatha Formation) and the transitional silicicalstics (Injana Formation). The overwhelming molasse sediments of the final basin fill stage is represented by the thick conglomerate sequence of the Mukdadiya and Bai Hassan Formations.

The stratigraphic architecture, mixed carbonate silicicalstic facies variation, and the foreland folding of these basins controls the distribution of sources, reservoirs, seals and the structural traps of this hydrocarbon rich megasequence.