



Crude oil families and mixing in the Euphrates Graben, Syria

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This study focuses on the geochemical characteristics of the crude oils in the Euphrates Graben, SE Syria. The lagoonal cherty R'mah formation (Upper Cretaceous) is regarded as the main source rock charging the main reservoirs in Upper Triassic Mulussa Fm. and the Lower Cretaceous Rutbah Fm. Additionally organic-rich Silurian and Uppermost Cretaceous (Shiranish Fm.) sediments may act source rocks.

82 oil samples from Paleozoic, Cretaceous and Tertiary reservoirs were analysed by whole oil gas chromatography. Furthermore, 30 representative crude oils were investigated by gas chromatography-mass spectrometry for detailed analysis of facies and maturity biomarkers.

Based on compositional parameters such as the pristane/phytane ratio, three geographical areas representing different depositional environments of potential source rocks were recognised. The analysis of facies and age-related biomarkers enabled the distinction of two major oil families in the graben. The family A is most likely sourced by Silurian source rocks (Tanf Fm.). In contrast, the oil family B is characterized by signatures indicative of Cretaceous source rocks. Moreover, the family B can be subdivided into two distinct sub-families (B1, B2) due to their different levels of maturation. Data of compound-specific stable carbon and hydrogen isotope analyses support the general distinction into two oil families. Maturity parameters (e.g. diamondoids) refer to a high maturity level of the family A oils, whereas the oils of the family B are ma-

ture in general with a small difference between B1 and B2 sub-families which could attributed to a mixing charge from different sources.

In summary, oils sourced by Cretaceous source rocks are concentrated in the graben centre. On the other hand, oil derived from Silurian source rocks predominantly occurs in the southeastern graben region. Oil mixing from Cretaceous and Silurian source rocks predominantly occurs on the northeastern margin of the Euphrates graben due to strong regional faulting.