

GEOCHEMICAL CHARACTERIZATION OF OILS AND SOURCE ROCKS FROM THE MESOPOTAMIAN BASIN, SOUTHERN IRAQ

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In spite of significant oil accumulations in Iraq, relatively little geochemical information has been published in recent years on the characteristics of these oils and their potential source rocks. In this paper we will provide an overview of the geochemical characteristics of a number of Cretaceous oils and potential source rocks from several fields in eastern region of Iraq. Whilst this is certainly not a comprehensive study it probably represents the most recent work on oils and source rocks from this geographical region.

The Cretaceous succession in southern Iraq is extremely important both for its source and reservoir characteristics. A number of previous studies were directed towards understanding the depositional history of the basin during the Cretaceous. Beydoun (1991) indicated that the Sulaiy Formation represented one of the most significant source rocks in southern part of Iraq, Kuwait and Saudi Arabia. The Sulaiy Formation in southern Iraq can be readily recognized through its palynological facies and associated depositional environments. It is also characterized by high total organic carbon (TOC) values, type II kerogen and a maturity level within the oil window (Al-Ameri *et al.*, 1999). Towards the eastern part of the region, the Yamama/Sulaiy formations comprise two types of kerogen, type II towards the east (Tigris Subzone) and mixed type II/III towards the west (Euphrates Subzone; Saleh, 1999). In a study of the lower Cretaceous in Southern Iraq, Al-Shahwan (2002) proposed the Yamama, and Ratawi formations as well as the Sulaiy also represented good to very good source rocks. Two other potential source formations in the region, the Zubair and Nahr Umr formations, although characterized by a good quality organic matter and TOC content do not appear to be mature enough to be in the oil generation window in this region.

A few organic geochemical studies have been undertaken on the oils or potential source formations and several reports published in regional journals. Organic geochemical characteristics of the Ratawi and Zubair formations, including maturity and migration pathways in the East-Baghdad oil fields have been discussed by Al-Atroshi (1989). Evaluation of the source and reservoir characteristics of the Alpine rock succession, southern Iraq lead Ibrahim (1983) to conclude that accumulated hydrocarbons in the Nahr Umr

Formation were generated from deep Cretaceous rocks of the Sulaiy and Yamama formations.

In the present study 7 oils from Cretaceous reservoirs representing both clastic and carbonate reservoirs in the Zubiari, Rumalia, Nahr fields were examined. In addition Upper, Middle, and Lower Cretaceous rock samples from 9 wells in the same region were characterized. All of the oils appeared to have a common source and derived from a carbonate source rock. The isotopic, biomarker, and chromatographic data were similar for all of these samples and showed a good correlation with the carbonate samples examined from the Sulaiy Formation in the Hafia 5 well. Isotopic composition for all the oils averaged -27.5 per mil, the hopanes were dominated by the C₂₉-norhopane and the sterane chromatograms showed a lack of diasteranes. The results of this geochemical investigation would support earlier results suggesting the Sulaiy Formation is the major source for the oils in this area of eastern Iraq.

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