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Organic Geochemistry of the Late Cenomanian–Early Turonian Source Rock in Central and Northern Tunisia

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Abstract : The Late Cenomanian-Early Turonian laminated, black, organic-rich limestones were described in Central Tunisia and attributed to the Bahloul Formation. It covers central and northern Tunisia, and the northern part of the Gulf of Gabes. The Bahloul Formation is considered as one of the main source rocks in Tunisia and is composed of outer-shelf to slop-laminated and dark-gray to black-colored limestones and marls. This formation had been deposited in a relatively deep-marine, calm, and anoxic environment. Rock-Eval analysis and vitrinite reflectance (Ro) measurements were performed on the basis of the organic carbon content. Several samples were chosen for molecular organic geochemistry. Saturate and aromatic hydrocarbons were analyzed by gas chromatography (GC) and GC–mass spectrometry. Geochemical data of the Bahloul Formation in northern and central Tunisia show this level to be a good potential source rock as indicated by the high content of type II organic matter. This formation exhibits high total organic carbon contents (as much as 14%), with an average value of 2% and a good to excellent petroleum potential, ranging between 2 and 50 kg of hydrocarbon/ton of rock. The extracts from the Bahloul Formation are characterized by Pr/Ph ratios ranging between 1.5 and 3, a moderate diasterane content, a C27 sterane approximately equal to C29 sterane, a high C28/C29 ratio, low gammacerane index, a C35/C34 homohopane ratio less than 1 and carbon isotope compositions between -24 and -26‰. The thermal maturity is relatively low, corresponding to the beginning of the oil window in the western area near the Algerian border, in the oil window in the eastern area (Sahel basin) and late mature in northern part.

Keywords : biomarkers, organic geochemistry, source rock, Tunisia
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