

Applications of Multivariate Statistical Methods on Geochemical Data to Evaluate the Hydrocarbons Source Rocks and Oils from Ghadames Basin, NW Libya

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Abstract : The Principal Component Analysis (PCA) was performed on a dataset comprising 41 biomarker concentrations from twenty-three core source rocks samples and seven oil samples from different location, with the objective of establishing the major sources of variance within the steranes, tricyclic terpanes, hopanes, and triaromatic steroid. This type of analysis can be used as an aid when deciding which molecular biomarker maturity, source facies or depositional environment parameters should be plotted, because the principal component loadings plots tend to extract the biomarker variables related to maturity, source facies or depositional environment controls. Facies characterization of the source rock samples separate the Silurian and Devonian source rock samples into three groups. Maturity evaluation of source rock samples based on biomarker and aromatic hydrocarbon distributions indicates that not all the samples are strongly affected by maturity, the Upper Devonian samples from wells located in the northern part of the basin are immature, whereas the other samples which have been selected from the Lower Silurian are mature and have reached the main stage of the oil window, the Lower Silurian source rock strata revealed a trend of increasing maturity towards the south and southwestern part of Ghadames Basin. Most of the facies-based parameters employed in this project using biomarker distributions clearly separate the oil samples into three groups. Group I contain oil samples from wells within Al-Wafa oil field Located in the south western part of the basin, Group II contains oil samples collected from Al-Hamada oil field complex in the south and the third group contains oil samples collected from oil fields located in the north

Keywords : Ghadamis basin, geochemistry, silurian, devonian

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