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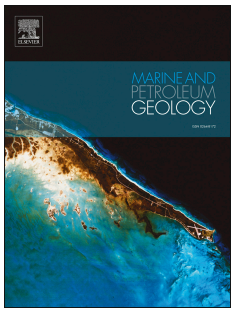

Pyrolysis analyses and bulk kinetic models of the Late Cretaceous oil shales in Jordan and their implications for early mature sulphur-rich oil generation potential

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Pyrolysis analyses and bulk kinetic models of the Late Cretaceous oil shales in Jordan and their implications for early mature sulphur-rich oil generation potential

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Abstract

In this study, oil shale samples were collected from Late Cretaceous Muwaqaar Chalk Marl Formation (MCM) in Jordan to study their petrologic and organic geochemical properties. Pyrolysis and bulk kinetic techniques were performed on the Late Cretaceous oil shales. The results of this study were used to characterize the different organofacie types in the Late Cretaceous oil shales and their effect on the petroleum type generated during thermal maturation and the temperature of petroleum generation. On the basis of the geochemical results, the analysed Late Cretaceous oil shales contain predominantly Type II and rarely Type I kerogens.

These kerogens are consistent with the high dominate of sapropel organic matter (i.e., alginite and amorphous organic matter). A good correlation is noted between increasing abundance of organic matter and the kerogen type that was derived from an open pyrolysis–gas chromatography (Py–GC). The Py–GC data indicate the analysed oil shale samples contain heterogeneous organic matter of the kerogen Type II-S. It is interesting to know that this sulphur-rich kerogen (Type II-S) can generate high sulphur oils at low maturity ranges. This is consistent with the predicted temperature petroleum generation from bulk kinetic models. The bulk kinetic models in this study indicate that the main phase of petroleum formation from the thermally immature Late Cretaceous oil shales