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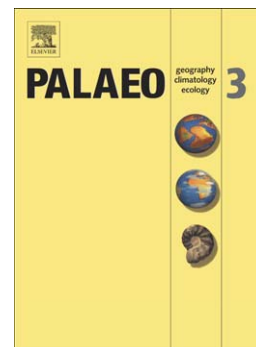
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Biological markers and carbon isotope composition of organic matter in the Upper Cretaceous coals and carbonaceous shale succession (Jiza–Qamar Basin, Yemen): Origin, type and preservation

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ABSTRACT

Bituminous coals and carbonaceous shales, located in the Jiza–Qamar Basin, on the eastern Yemen, were analysed based on a combined investigation of organic geochemistry and petrology to define the paleodepositional environment condition, organic matter inputs and their thermal maturity. Carbon isotope compositions and various biomarkers were performed on coals and carbonaceous shales within the Upper Cretaceous Mukalla Formation in the Jiza–Qamar Basin. The $\delta^{13}\text{C}$ values range from -29.2‰ to -24.5‰ with average values around -26.7‰, whereas the organic carbon contents in most sediment samples are consistently high (>3%), indicating that the organic matter in the Mukalla coal and carbonaceous shale sediments has a predominantly terrigenous origin with slightly marine influence during burial. This has also been identified from kerogen microscopy, which is characterized by dominance of vitrinite and liptinite organic matter.

The investigated biomarkers indicated that the Mukalla coals and carbonaceous shales contain high contribution of land plants with a minor aquatic organic matter input that were deposited in a fluvial to deltaic environments and preserved under relatively oxic conditions. This has been achieved from acyclic isoprenoids, terpane and sterane biomarkers of saturated hydrocarbon and dibenzothiophenes, alkyl-naphthalenes and methylphenanthrenes biomarkers of aromatic hydrocarbon.

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