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Simulating the timing of petroleum generation and expulsion from deltaic source rocks: Implications for Late Cretaceous petroleum system in the offshore Jiza-Qamar Basin, Eastern Yemen

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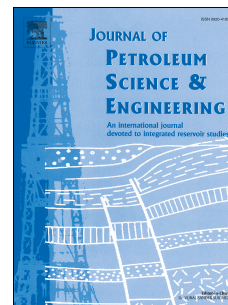
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14 **Abstract**

15 The Mukalla Formation is one of the important petroleum source rocks in the Jiza-
16 Qamar Basin, Eastern Yemen. In this study, coal, coaly shale and shale samples from
17 three wells (Al-Fatak-1, 16/G-1 and 16/E-1) in the offshore Jiza-Qamar Basin were
18 studied. The organic matter richness, kerogen type, thermal maturity, and petroleum
19 generation potential of the Mukalla organic-rich samples were investigated.

20 The analysed Mukalla source rock samples are potentially rich in organic matter of
21 1.01-84.40% TOC, ranging from good to excellent source rocks. The Mukalla source
22 rocks primarily contain Types II, II-III and III kerogen, anticipating generating
23 mainly oil and gas. This is generally consistent with the pyrolysis-gas
24 chromatography results and further indicates that the Mukalla source rocks can
25 produce high wax oil and condensate/gas. The thermal maturity parameters reveal the
26 Mukalla source rocks are in mature to late-mature and are capable of generating oil
27 and wet gas at the present time. In addition, this study was integrated the geochemical,
28 geo-thermal and geological data in term of basin modeling study to simulate the
29 timing of hydrocarbon generation and expulsion from the Mukalla deltaic source
30 rocks.

31 The basin model results indicate that the oil generation commenced during the late
32 Eocene to late Oligocene, with a conversion ratio of 10-50 TR%. Furthermore, based
33 on TRs of more than 50%, the most of oil was expelled along the micro-fracturing of

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