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Preliminary source rock evaluation and hydrocarbon generation potential of the early Cretaceous subsurface shales from Shabwah sub-basin in the Sabatayn Basin, Western Yemen

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12 **Abstract**

13 A conventional organic geochemical study has been performed on the shale samples  
14 collected from the early Cretaceous Saar Formation from the Shabwah oilfields in the  
15 Sabatayn Basin, Western Yemen. The results of this study were used to preliminary  
16 evaluate the potential source-rock of the shales in the Saar Formation. Organic matter  
17 richness, type, and petroleum generation potential of the analysed shales were  
18 assessed. Total organic carbon content and Rock-Eval pyrolysis results indicate that  
19 the shale intervals within the early Cretaceous Saar Formation have a wide variation  
20 in source rock generative potential and quality. The analysed shale samples have TOC  
21 content in the range of 0.50 and 5.12 wt% and generally can be considered as fair to  
22 good source rocks. The geochemical results of this study also indicate that the  
23 analysed shales in the Saar Formation are both oil- and gas-prone source rocks,  
24 containing Type II kerogen and mixed Types II-III gradient to Type III kerogen. This  
25 is consistent with Hydrogen Index (HI) values between 66 and 552 mg HC/g TOC.

26 The temperature-sensitive parameters such as vitrinite reflectance (%VRo), Rock-  
27 Eval pyrolysis  $T_{max}$  and PI reveal that the analysed shale samples are generally  
28 immature to early-mature for oil-window. Therefore, the organic matter has not been  
29 altered by thermal maturity thus petroleum has not yet generated. Therefore,  
30 exploration strategies should focus on the known deeper location of the Saar  
31 Formation in the Shabwah-sub-basin for predicting the kitchen area.

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