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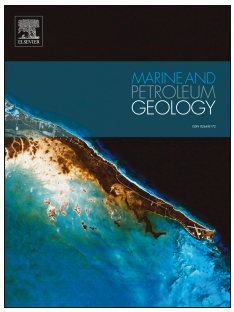

Enrichment and distribution of shale oil in the Cretaceous Qingshankou Formation, Songliao Basin, Northeast China

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Enrichment and distribution of shale oil in the Cretaceous Qingshankou Formation, Songliao Basin, Northeast China

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Abstract: The Songliao Basin is a large-scale petroliferous basin in China. With a gradual decline in conventional oil production, the exploration and development of replacement resources in the basin is becoming increasingly important. Previous studies have shown that the Cretaceous Qingshankou Formation (K_2qn) has favorable geological conditions for the formation of shale oil. Thus, shale oil in the Qingshankou Formation represents a promising and practical replacement resource for conventional oil. In this study, geological field surveys, core observation, sample tests, and the analysis of well logs were applied to study the geochemical and reservoir characteristics of shales, identify shale oil beds, build shale oil enrichment models, and classify favorable exploration areas of shale oil from the Cretaceous Qingshankou Formation. The organic matter content is high in shales from the first member of the Cretaceous Qingshankou Formation (K_2qn^1), with average total organic carbon (TOC) content exceeding 2%. The organic matter is mainly derived from lower aquatic organisms in a reducing brackish to fresh water environment, resulting in mostly type I kerogen. The vitrinite reflectance (Ro) and the temperature at which the maximum is release of hydrocarbons from cracking of kerogen occurred during pyrolysis (T_{max})