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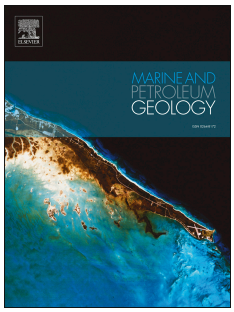

Organic geochemical characteristics and accumulation of the organic matter in the Jurassic to Cretaceous sediments of the Saihantala Sag, Erlian Basin, China

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Organic geochemical characteristics and accumulation of the organic matter in the Jurassic to Cretaceous sediments of the Saihantala Sag, Erlian Basin, China

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Abstract: The organic petrology and organic geochemistry of Jurassic to Cretaceous hydrocarbon source rocks from the Saihantala Sag, the Erlian Basin, have been analyzed to determine their geochemical characteristics, hydrocarbon potential and organic matter accumulation. The mudstones of the Alatanheli Formation (J_{1+2}al), the Aershan Formation (K_1ba), the lower Tengger member (K_1bt^1) and the upper Tengger member (K_1bt^2) and the Saihantala Formation (K_1bs) contain variable total organic carbon concentrations and organic matter type. The observed macerals in the J_{1+2}al, K_1ba, K_1bt^1 and K_1bt^2 mudstones are sapropelinites (including lamalginites, mineral-bituminous groundmasses and rare telalginites), vitrinites and inertinites in order of abundance, whereas vitrinites and inertinites are the predominant macerals in the K_1bs mudstones. The vitrinite reflectances are lower than 0.7% in the studied samples, suggestive of their low organic maturity, which is consistent with the strong yellow fluorescence of the lamalginites and telalginites, low T_{max} values, the presence of 17β(H), 21β(H) hopanes and hop-17(21)-enes, and aliphatic and aromatic thermal maturity parameters. The studied samples were mainly deposited under anoxic saline lake environments. The major biological sources in the J_{1+2}al, K_1ba, K_1bt^1 and K_1bt^2 mudstones are bacteria and algae, whereas higher plants are the more important biological source in the K_1bs mudstones as indicated by biomarkers and maceral contents. The J_{1+2}al, K_1ba, K_1bt^1 and K_1bt^2 mudstones mainly have more capacity to generate oil than gas, whereas the K_1bs mudstones are mainly gas prone. Despite the low thermal maturity of the studied mudstones, abundant oil has been found in the Saihantala Sag with mature source rocks. The nature of their generated products was due to their different formation mechanisms of organic matter accumulation. The organic matter accumulation in the J_{1+2}al, K_1ba, K_1bt^1 and K_1bt^2 mudstones