



Reconstruction of Maastrichtian paleoceanographic settings in the southern Tethyan Ocean: Insights from oil shale deposition

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Integrated approaches of organic, inorganic geochemical, mineralogical and biostratigraphic data have been applied on three Maastrichtian oil shales horizons from Egypt. Maastrichtian oil shales were deposited within intracratonic sedimentary basins on the stable shelf across the northeast African Craton. These basins were developed during the Paleozoic and Mesozoic and initiated during the closing stages of the Pan-African event as a response to cooling, thermal relaxation, deformation, structural differentiation and subsidence of parts of the rigid cratonic African plate. Maastrichtian oil shales accumulated during ~ 70.6 to 67.7 Ma. The broad shelf area which reconstructed for the Cretaceous sediments in the Central Eastern Desert was deepened to the north towards the Tethyan oceanic belt. Various geochemical proxies and discrimination diagrams indicate that the studied oil shales were mainly derived from intermediate igneous source rocks. The source rocks of the investigated Maastrichtian oil shales experienced moderate to intensive chemical weathering. These oil shales were formed under warm greenhouse climate (arid-humid) during a general cooling trend accompanied by a regional sea-level rise. The warming episode during early-to-late Maastrichtian was attributed to intermediate oceanic circulation. Remarkable fluctuations in the detrital inputs, nutrient fluxes, primary productivity, seawater salinity, ocean stratification of water mass, oxygen deficiency level and ocean water circulation were observed during the deposition of early and late Maastrichtian oil shales. Additionally, the preservation and accumulation of the organic matter were greatly influenced by the paleo-oceanographic and paleoclimatic changes.