Cretaceous Anoxic Intervals Preserved in Parh Formation, Mughal Kot, Pakistan

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The trace element analysis of warm Cretaceous periods found in the Parh Formation at the Mughal Kot Section has been addressed in this work. The Cenomanian-Turonian oceanic anoxic event (OAE) was identified in the Mughal Kot section based on biostratigraphy and microfacies, correlated with the earlier OAEs reported elsewhere. Black shales, which are deposits with abnormally high levels of organic materials deposited in them, are a defining feature of the OAEs. The evolution of planktons across the OAEs during the Cretaceous was driven by shifting environmental conditions. These OAEs are responsible for the significant biotic and sedimentological changes seen in various Cretaceous strata. Test- secreting plankton showed higher rates of diversification and extinction near OAEs in various regions across the world. The Weissert and Selli event (OAE1a) in the early Cretaceous and the Bonarelli (OAE2) event in the late Cretaceous are two major OAEs from the Cretaceous period that have been extensively documented in literature. The evolution of planktonic foraminifera has been influenced by changes in the environment during the OAE2. The prevalence of OAE in the studied area indicates that these events occurred frequently worldwide. The depositional environment of the organic rich (Cenomanian–Turonian) intervals preserved in the Parh Formation is the outer ramp setting, evident by the microfacies details. Anoxic water conditions suggested by the abundance of both the organic matter and pyrite, represents an OAE. The elevated concentrations of the trace elements are the main cause of extinction of organisms, suggested by the geochemical analysis along these organic rich intervals. Other possible explanations include oceanic circulation, nutrient fluxes and ocean acidification. The concentration, toxicity and effects of trace elements on marine biota has been addressed in this study in detail.