Paleoceanographic reconstruction of Maastrichtian from the hemipelagic sediments of Pakistan, Eastern Tethys

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The evolution of planktonic foraminifera in Cretaceous is forced by the paleo-oceanographic changes associated with Oceanic Anoxic Events (OAEs). The paleo-oceanographic conditions including global sea level rise, loss of ocean stratifications and subsequent loss of niche partitioning, ocean acidification and warming were common during early-middle Cretaceous. The evolution of planktonic foraminifera is associated globally with such changes in oceans. The global warming of early to middle Cretaceous was replaced by a period of cooling during early Maastrichtian. The stratification in global oceans resumed and the diversity of planktonic foraminifera increased. This study deals with signals of paleo-oceanographic conditions of Maastrichtian time preserved in Mughal Kot Section, Eastern Tethys.

A thick succession of hemipelagic sediments of Maastrichtian age is exposed in Mughal Kot Formation, Indus Basin, Pakistan. The studied section revealed abundant taxa of Globotruncanita, Globotruncanana and Heterohelix. Based on these taxa a local assemblage biozone of Maastrichtian (~76--69 Ma) age is erected. The overall species richness in the studied section is very low. This significantly low richness is thought to be associated with high sedimentation rate as 1100 meter thick strata is deposited during Maastrichtian. Presence of turbidite beds supports such high sedimentation rates. However, a consistent decrease in species richness from base (early Maastrichtian) to the top (late Maastrichtian) is recorded in the section. This decrease is associated with the dominance of opportunistic taxa of Heterohelix. The proliferation of opportunistic taxa at the expense of specialized taxa during late Maastrichtian gives a strong clue that the global cooling of early Maastrichtian was replaced by warming during late Maastrichtian. Such warming may have resulted in the melting of polar ice, uniformity in the physical properties of water masses in global oceans and hence destruction of habitat for the dwelling of specialized foraminifera.