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Abrupt productivity shift recorded during early-middle Holocene, in the NE Arabian Sea



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Using the planktonic (PFA) and benthic (BFA) foraminifera abundance, stable isotope: Total Organic Carbon (TOC), Total Nitrogen (TN) and sand percentage (%) reveals a major change in the biological productivity and sedimentary influx of NE Arabian Sea sediment core (SK 240/496) during the early-middle Holocene (~10 - 4 Ka B.P.). The sand %, chemical and biological dataset demonstrate an abrupt change in oceanic environment within a small window of time (around 7–6.5 Ka) during the early-middle Holocene. PFA and BFA responded to climate change around 7Ka, that was 500 years earlier than recorded in organic chemical composition (TOC, TN) and sand % (6.5Ka). Based on the event that took place around 7-6.5 Ka, we can divide the studied core in 2 climatic phases; viz. 1) pre-6.5 ka phase – relatively lower PFA and BFA, suggest that biological productivity was comparatively lower. This was probably due to higher particulate influx of river derived turbidity as reflected in the sand % (higher percentage of sand fraction), planktonic/benthic foraminifera (P/B) ratio and TOC/TN ratio. However, higher TOC and TN could be due to refractory nature of deposited organic matter, and/or their better preservation caused by oxygen deficiency. 2) Post-6.5 phase – during this period relatively higher PFA and BFA, indicates a comparatively higher biological productivity. The sand % (lower fraction of sand) and TOC/TN ratio suggest a lower influx of river derived particulate matter. But, during this phase TOC and TN was relatively lower, that suggest higher degradable fraction of organic matter and/or a poor preservation condition induced by better oxygen condition.

