

## ABSTRACT

During the Neogene, Earth's land-atmosphere-ocean regime witnessed significant climatic changes across low and high latitude regions. These changes in various parts of the Earth have been captured by various proxies as recorded in different studies. To understand monsoon-induced paleoclimatic and paleoceanographic changes in the western Arabian Sea during the Neogene, we examined benthic and planktic foraminifera, stable isotope values of benthic foraminifera and trace elements at Ocean Drilling Program (ODP) Hole 730A, Oman Margin. Factor and cluster analysis of highest ranked benthic foraminiferal species was carried out that enabled to identify eight biofacies (*Bq-Em*, *Ec-Nt*, *Db-Ta*, *Cw-Ee*, *Be-Fb*, *Ou-pb*, *Tl-Ss* and *Cc-Rs*) at Hole 730A, characterizing distinct deep-sea environments during the studied interval. A major shift in benthic assemblage during 13-11 Ma suggests increasing strength of the Indian monsoon that shaped the benthic foraminiferal regimes during this time. The species diversity (S, H, E and Sanders' rarefied), biofacies of benthic foraminifera,  $\delta^{13}\text{C}$  values of benthic foraminifera and *Globigerina bulloides* abundances from Hole 730A indicate that the Indian monsoon-induced upwelling and increase in surface productivity began around 13 Ma which peaked during 12-11 Ma. This was perhaps the onset or major strengthening of the Indian monsoon wind system. Results of Total Organic Carbon contents, redox sensitive trace elements (Zn/Al, Cu/Al and Mo/Al) and low oxygen tolerant benthic foraminifera (*Bolivina seminuda*, *Bulimina aculeata*, *Bulimina exilis*, *Chilostomella ovoidea* and *Uvigerina peregrina*) show combined effect of Indian monsoon induced productivity, oxygen minimum zone and anoxic deep water on benthic faunal regimes during ~13-11 Ma. The high surface productivity strengthened OMZ in the Arabian Sea as is indicated by low values of Sr/Ca ratio during the onset of the Indian monsoon. This also roughly coincides with increase in  $\delta^{18}\text{O}$  values of *Cibicides* spp. during 12-11 Ma. The present day monsoon wind system was permanently established since ~7 Ma. During the Northern Hemisphere Glaciation (3.2-2.3 Ma) no significant changes are observed in benthic foraminiferal diversity and biofacies but a positive correlation between mixed layer species, high productivity indicator *Uvigerina proboscidea*, oxygen minimum zone proxy Sr/Ca ratio and upwelling proxy *G. bulloides* suggest that deep-sea environment of the northwestern Arabian Sea was affected more by the southwest Indian monsoon than by the polar water circulation.

Keywords: Indian Monsoon, Foraminifera, Oxygen Minimum Zone, Neogene, Total Organic Carbon, Major and Trace elements.