



Century scale climatic rhythms in the equatorial Indian Ocean during the late Quaternary: Faunal and geochemical proxies from the Maldivian Archipelago

S. Sarkar and A. K. Gupta

Wadia Institute of Himalayan Geology, Dehra Dun 248001, India (sarkar@wihg.res.in, +91-135-2525264)

The equatorial Indian Ocean is swept by the Indian Ocean equatorial westerlies (IEW) which are strong during monsoon transitions in April-May and October-November, driving Eastward Equatorial Current (EEC) in the upper ocean. This study is based on the biogenic sediments from Ocean Drilling Program (ODP) Hole 716A, recovered beneath the narrow equatorial track (7 Degree North to 7 Degree South) along which the IEW prevail. We analyzed 300 Kyr record of benthic and planktic foraminifera, pteropods combined with stable isotope values measured on planktic foraminifer *Globigerinoides ruber* from 451 core samples to understand paleoceanographic and paleoclimatic changes in the equatorial Indian Ocean during the late Quaternary (~450 – 150 Kyr). Factor and cluster analyses of the 53 highest-ranked benthic foraminiferal species enabled to identify five biofacies, indicating varied nature of deep-sea environments during the late Quaternary, with a major shift across the middle Brunhes epoch (across Marine Isotope Stage 9 and 8). Biofacies *Robulus nicobarensis* - *Trifarina reussi* (Rn-Tr), *Uvigerina porrecta* - *Reussella simplex* (Upo-Rs) and *Cymbaloporella squammosa* - *Bolivinita* sp. (Cs-Bsp) document high organic flux with low oxygen paleoenvironment dominating before the mid-Brunhes event, similar to *Globigerina bulloides* population, while benthic foraminiferal biofacies *Hoeglundina elegans* - *Miliolinella subrotunda* (He-Ms) and *Uvigerina peregrina* - *Quinqueloculina seminulum* (Upe-Qs) record high seasonality in food supply with well-oxygenated deep water after ~300 Kyr. These changes are also visible in planktic foraminifera and pteropod record. In the present day, the strength of the IEW is inversely related to the Indian Ocean Dipole (IOD). The IEW weakened across MIS 9/8 during which time the IOD strengthened, causing heavy rains and floods over the equatorial East Africa and deficient rainfall over Australasia. The proxy response changed from low to high frequency cycles across the mid-Brunhes event with a shift towards stronger precessional signal. The weakening of the IEW was coupled with the strengthening of the IOD and was related to changes in the West Pacific Warm Pool-Southern Oscillation. This study establishes a link between long-term IOD dynamics and climate of the Indian Ocean region in the paleo record and captured IOD-IEW-driven changes from the late Quaternary marine biogenic sediments of the equatorial Indian Ocean.