

Primary productivity dynamics in the northeastern Indian Ocean since the Last Glacial Maximum: Toward a better understanding of tropical climate changes

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Ocean primary productivity (PP) is regulated by atmospheric and oceanic circulation, which may control upper sea-water stratification and mixing, and thus impact nutrient distribution in the euphotic zone. While several reconstructions of PP variations have been obtained for the tropical Indian Ocean (TIO) to document oceanic and climatic changes in the past, PP records in the northeastern Indian Ocean (NEIO), including the Bay of Bengal and the Andaman Sea, are relatively scarce. The aim of this study was to reconstruct PP changes in the NEIO since the Last Glacial Maximum (LGM) in order to understand their dynamics, identify the forcing factors behind them, and get a clearer picture of climate evolution during this time interval.

We reconstructed two palaeoproductivity records over the last 26,000 years, using two sediment cores from the northeastern Bay of Bengal (NE-BoB) and northwest of Sumatra (NWoS). The palaeoproductivity was derived from the coccolith assemblages and, more particularly, the relative abundance of *Florisphaera profunda*. These two variations showed diverse patterns at both the millennial and orbital scales. In the NE-BoB, there was no significant difference in PP between the LGM and the Late Holocene, but peaks occurred around 17–15 ka BP and 12–9 ka BP. In contrast, the NWoS record shows that PP was about 15% higher during the LGM than during the Late Holocene, and a significant decrease was observed during deglaciation. Comparisons with other published PP records and a new climate model output (IPSL-CM5A-LR) suggest that the NE-BoB PP record is most probably associated with changes in Indian Monsoon dynamics, while TIO Walker circulation might play a more important role in PP variations in the NWoS.