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The warm Pliocene: Bridging the geological data and modelling communities

Plio-Pleistocene productivity reconstructions in the Indian Monsoon region

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The Indian Summer Monsoon (ISM) brings seasonal winds and rains to the Indian subcontinent. The winds cause surface ocean mixing in the southern Bay of Bengal (BoB), bringing nutrients to the surface that fuel ocean productivity and export of carbon to the sea floor. To improve the understanding of the role of monsoon winds in low-latitude surface ocean productivity and carbon export, the Plio-Pleistocene interval is ideal because boundary conditions were evolving. We aim to reconstruct variability in surface ocean and export productivity across the late-Pliocene and early-Pleistocene in response to ISM wind-driven mixing in the southern BoB.

Here we analyse sediments from IODP Site U1443 (Exp. 353) from ~1.9-2.8 million years ago. A new benthic oxygen isotope ($\delta^{18}O$) stratigraphy (at ~3-thousand-year resolution) and age model tied to the global benthic $\delta^{18}O$ stack are presented. We utilise these sediments to obtain bulk sediment X-ray fluorescence (XRF) core scanning elemental data and coccolithophore assemblages to infer changes in summer monsoon runoff and surface ocean productivity influenced by monsoon wind strength. We use % *Florisphaera profunda* (coccolithophore assemblage) along with bulk sediment XRF Br as productivity indicators and a "terrigenous" bulk sediment XRF elemental composition stack as a wind strength and runoff indicator. We observe increased productivity during glacials (MIS 96, 98, 100), coinciding with increased terrigenous input. This observation is coherent with previous low-latitude productivity records from the equatorial Pacific. However, in contrast to equatorial Pacific productivity records, influenced by obliquity, our southern BoB records show robust surface productivity (% *F. profunda*) and summer monsoon runoff (terrigenous stack) peaks in both the obliquity and precession bands. We will discuss linkages between monsoon wind and runoff across the Plio-Pleistocene in context with other monsoon records.