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Similar magnitudes of Holocene and Eemian monsoonal precipitation and vegetation types of India as revealed by biomarker hydrogen and carbon isotopes

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At orbital time scales it is commonly assumed that the dominant control of monsoonal systems is local summer insolation, because time series of paleomonsoon strength coincide remarkably well with changes in the Earth's precessional cycle. Interglacial periods such as the Holocene (0-10ka) and the Eemian (114—130ka) both underwent comparable changes in orbital configurations, but the magnitude of insolation change was greater during the Eemian. Up to date, no clear evidence is available for differences in monsoonal precipitation during different interglacial periods. As a case study for the Indian Monsoon system with the Ganges and Brahmaputra River catchment we present the preliminary results for δD and δ^{13}C of sedimentary leaf wax *n*-alkanes a from a marine sediment core collected on the Bengal fan (core SO188 17286-1; 19°44′48″N, 89°52′76″ E) asindicators for paleo-precipitation and vegetation changes, together with records of the alkenone derived sea surface temperatureand riverine input (XRF core scanning and foraminiferal δ^{18}O) in the Bay of Bengal for the Holocene and Eemian.

Throughout the 130 kyr record of core SO 188 17286-1, $U^{K'}_{37}$ sea surface temperature trends closely resemble those in the *G. ruber* δ^{18}O record. The temperatures for the Holocene and Eemian appear to be identical at about 28.5°C. The δD of multiple *n*-alkanes, a proxy for the amount of continental rainfall, also reflects increased precipitation during the Holocene and Eemian at a similar magnitude. Enhanced precipitation is in accordance with high SSTs. The log (Ti/Ca) ratio, a proxy for lithogenic vs. marine input, also closely tracks the trend of δD of *n*-alkanes, indicating that enhanced monsoon rainfall is the primary driver for larger terrigenous organic matter flux during the Holocene and Eemian. The δ^{13}C of four individual *n*-alkanes shifted to more depleted values ($\sim$-30‰) during the interglacials in comparison with the glacial periods ($\sim$-20‰), indicating expansion of C_3 vegetation or/and increased humidity in a warm climate. Our preliminary results imply that despite the difference in insolation forcing ocean temperatures and monsoonal precipitation over India experienced similar magnitudes for the Holocene and the Eemian.