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Hydrographic changes in the northeastern Arabian Sea during the past 80 ka

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Paleoclimatic studies have shown that abrupt changes in monsoon intensity in the Arabian Sea are correlated to the Dansgaard/Oeschger (DO) cycles and Heinrich events known from Greenland ice cores and north Atlantic sediment cores. However, the extent, timing and modes of interaction with high-latitude climate are still under debate. To explore this issue, we present a high-resolution paleoceanographic multiproxy reconstruction for the past 80,000 years from sediment core SO130-289KL (23˚07.34´N, 66˚29.84´E), which was retrieved off the Indus River mouth. DO events and the Holocene section are characterized by laminated sediments enriched in organic carbon (up to 4 % TOC) whereas bioturbated sediments with low TOC contents ($<$ 1 % TOC) appear during Heinrich events. High TOC contents are accompanied by elevated Fe/Al and Ti/Al ratios which imply increased fluxes of terrigenous material during DO cycles as compared to Heinrich events. A comparison to near-surface sediments, where highly variable Indus River discharge rates due to human activity are known, suggests that high discharge rates are accompanied by elevated marine organic carbon production. This implies that increased nutrient injection via the Indus River provoked enhanced marine productivity (e.g. haptophytes and diatoms) during DO events and low discharge rates lead to reduced productivity during Heinrich events. Redox-specific biomarkers (e.g. tetrahymanol) as well as redox-sensitive trace elements (U, Cd, Mo, Sb) show synchronous enrichments in intervals of en-

hanced productivity indicating a strong coupling of productivity and intensity of the oxygen minimum zone. This inference is corroborated by the stable oxygen and carbon isotopes of planktonic and benthic foraminifera. Vertical δ^{18}O gradients are more pronounced during DO events, suggesting stronger water-column stratification. The alkenone-based SSTs show continuously increasing temperatures (of about 1.5 ˚C) as exemplified for DO9 to DO8, across H4. This gradual temperature rise correlates well with the temperature increase in the Antarctic Byrd ice core. The detailed paleoceanographic reconstruction of hydrographic conditions off the Indus River implies a strong atmospheric teleconnection to the northern hemisphere via the hydrological cycle as well as oceanic changes related to the SW monsoon in the Arabian Sea.