Provenance discrimination of siliciclastic sediments in the central Bay of Bengal and their implication for paleoenvironmental records since 42.8 ka

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Abstract: Siliciclastic grain-size, rare earth elements (REEs), major elements and clay minerals of core sediments from the central Bay of Bengal were analyzed for the identification of sediment origins and paleoenvironment evolution reconstruction since 42.8 ka BP. Discrimination plots based on geochemical and clay mineral parameters suggest that the cored sediments are predominately derived from the Himalayan source transported by the Ganges-Brahmaputra (G-B) rivers with minor contributions from the Indian peninsula. Based on the clay mineral compositions, contribution percent of the Himalayan source and the Indian source were calculated. Sedimentary signals including contribution percent of two provenances, Chemical Index Alteration (CIA) and Al_2O_3 (%) imply that the sea level changes play important roles in the terrigenous input to the core site areas by controlling the depositional regime between the lowered sea level stands and the high stands of sea level. However, the Indian summer monsoon (ISM) play primary roles in the terrestrial material input and the chemical weathering intensity (CWI) in the millennial scale. The Dansgaard/Oeschger (D/O) pattern was discovered over the last glacial and deglacial periods. Warmer interstadials correlate with higher contribution percent of the Himalayan source, CIA values and Al_2O_3 (%) than colder stadials. According to the variations of these records, paleoenvironment evolution since 42.8 ka BP was reconstructed and divided into six stages (Ⅰ: 42.8-37.4 ka BP; Ⅱ: 37.4-29.3 ka BP; Ⅲ: 29.3-23.5 ka BP; Ⅳ: 23.5-15.8 ka BP; Ⅴ: 15.8 ka BP-10.7 ka BP and Ⅵ: 10.7 ka BP~).