Sea level-controlled sediment transport to the eastern Arabian Sea over the past 600 kyr: Clay minerals and Sr-Nd isotopic evidence from IODP Site U1457

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Long marine sequences deposited in the eastern Arabian Sea and drilled during International Ocean Discovery Program (IODP) Expedition 355 make it possible to study the orbital sensitivity of sediment dynamics from a source-to-sink perspective. The clay mineralogy and Sr-Nd isotopic compositions have been analyzed for the detrital fraction of sediments from IODP Site U1457 located in the Laxmi basin to constrain the sediment sources and reconstruct a high-resolution record of sediment export to the Indus deep-sea fan over the past 600 kyr. The $^{87}Sr/^{86}Sr$ ratio (varying from 0.7154 to 0.7255) and εNd (varying from -12.9 to -9.5) imply a mixing of sediments derived from not only the Indus River but also the rivers draining the Deccan Traps. The variations in the smectite/(illite+chlorite) ratio combined with Sr and Nd isotopes permit the reconstruction of past changes in the relative proportions of sediments derived from the Indus

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River (mainly illite, chlorite and kaolinite) and the Deccan Traps (smectite). The wavelet and cross-spectral analyses further reveal that sediment transport to the eastern Arabian Sea since 600 kyr is mainly dominated by sea-level variations in the eccentricity (100-kyr) band, while the Indian summer monsoon might contribute moderately to the precession (23-kyr) band. The εNd and turbidite frequency indicate that more turbidite events are associated with Indus River-sourced sediments at IODP Site U1457 during sea-level lowstands, which might reflect a reconnection of deep-sea channels to the Indus River mouth and/or reworking of previously deposited Indus River sediments located northward.

Key words: Arabian Sea Monsoon; Expedition 355; sea level; Indus River; Deccan Traps; IODP Site U1457.