

Anthropogenic influence on sedimentation during the past 30 years: Insights from rock magnetic properties of Beypore Estuary sediments, Kerala, India

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Environmental magnetism is a simple, rapid, inexpensive, sensitive and non-destructive tool to determine paleo environment and paleoclimate. We used it, in conjunction with geochemical, textural and geochronological (Excess Pb-210) data, to demarcate recent changes in the depositional environment in the Beypore Estuary, SW India. This is a tropical, micro-tidal, diurnal wave-dominated system.

Results and Discussion

The sedimentation rate in the Beypore Estuary is 3.32 cm/yr. Magnetic susceptibility values range from 22.72 to 499.13 $\times 10^{-8} \text{m}^3/\text{kg}$ in core sediments. The values are high in the middle of the core, corresponding to 2007-2001 AD period. Magnetic grain size is finer during the past decade and a half. The ratio of magnetic parameters like χ_{ARM} , $\text{SIRM}/\chi_{\text{lf}}$, $\chi_{\text{ARM}}/\chi_{\text{fd}}\%$, S ratio, $\chi_{\text{fd}}\%$, SIRM , $\chi_{\text{ARM}}/\chi_{\text{lf}}$, etc. show considerable changes, during the period presented in the core. The susceptibility values range from 15.84 to 112.89 $\times 10^{-8} \text{m}^3/\text{kg}$ in surficial sediments. The values are anomalous in meandering regions. These are attributable to hydrodynamic parameters such as waves and tides, anthropogenic activities along the banks of the river and the effect of dredging and construction of harbours, groins etc. Based on these proxies, the spatio-temporal variations of the various rock magnetic parameters have been studied for the sediments.