

Sedimentary Sulphur isotopes as tracers for sea level variability at southern Saurashtra coast (Gujarat, Western India)

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Sedimentary Sulphur (S) isotopic variability provide clues to oxygenation history of depositional environments. Depleted $\delta^{34}\text{S}$ values (-20 – -30%) indicate pyrite formation environments under bacterial sulphate reduction (BSR). In contrast, sea water sulphates are enriched and $\delta^{34}\text{S}$ of present day sea water is typically $\sim 21.0\%$ worldwide. Modern sediments (shale), surface soils and atmospheric particulates typically show $\delta^{34}\text{S}$ values between ~ 3 – 6% . In coastal environments such as Saurashtra region (Gujarat, western India), $\delta^{34}\text{S}$ could reveal past sea level variability vis-à-vis anoxic bacterially mediated S biogeochemistry. In this study, we report $\delta^{34}\text{S}$ depth profiles of ^{14}C dated three mudflat sections from southern Saurashtra coast covering mid-Holocene to present.

Two major shifts in sea level regressions ~ 3200 and ~ 1500 cal yr BP are inferred which appear to have transformed the studied site from coastal lagoon to mudflat region with a shift in $\delta^{34}\text{S}$ from -30% to 11% .

Saurashtra coast being tectonically active region, inferred sea regressions could be local in nature, requiring more spatial geomorphic evidences. Nonetheless above findings encourage exploitation of sedimentary $\delta^{34}\text{S}$, as a potential tracer of past sea level changes.