

Distribution of Minerals and Sediment Accumulation Rates on the Continental Margin of Southwestern India – Implications for Provenance, Palaeoenvironmental and Palaeoclimatic Significance

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Three sediment cores from the continental margin of southwestern India were analysed for minerals (clay and non-clay) to know the provenance, palaeoenvironmental and palaeoclimatic aspects. Smectite, illite, kaolinite and chlorite are the clay minerals in the clay fractions of the cores. The relative abundances of minerals in the cores suggest that the sediments are mainly detritus, derived from the adjacent hinterland of southwestern India. In the core SK-177/12 (upper continental slope; 332 m water depth), the amount of sand is high (13-71 wt %) in the top 35 cm and is almost negligible (<1 wt %) further below. The rate of sedimentation during the Holocene at this core location is very low (0.01 mm/yr). Whereas the core SK-177/11 (mid continental slope; 776 m water depth) consist of mainly silty-clay and clayey-silt sediment (sand fraction is <1 wt %). The sedimentation rate during the Holocene at this core location is 0.16-0.19 mm/yr. The higher sedimentation rates (16 to 19 times) on the upper slope than the mid slope region is contrary to the generally expected trend of decreasing sedimentation rates with the depth on the continental margin. The sandy nature of sediment (13-71 wt %) and very low sedimentation rates (0.01 mm/yr) at the location of the core SK-177/12 suggest that the upper slope, like outer shelf region, is not suitable for the deposition of finer sediments. The prevailing bottom topography, gravitational redeposition, hydrographic and other depositional conditions on the upper slope region may not be conducive for sediment deposition. We interpret the lateral and temporal variations in sediment texture, mineral abundances, rate of sedimentation and, organic matter and calcium carbonate contents to the prevailing Late-Quaternary palaeoenvironmental setting on the continental margin and palaeoclimatic conditions on the adjacent hinterland of southwestern India.

Keywords: minerals, clay minerals, sedimentation rate, continental margin, India, provenance, palaeoenvironment, palaeoclimate