

Luminescence chronology of fluvial and marine records from subsurface sediment cores: An insight into the geomorphic evolution of Kaveri delta, India

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Long-term evolution of river deltas is a result of forcings (tectonics, climate, sea level, avulsion, compaction etc). We present the results of luminescence dating of sediments from four sediment cores (VKI, TNR, SY and KKI) of 25 m depth each, retrieved from the Kaveri delta in south India. The coring sites are ~2.5 km, ~11 km, ~17 km and ~20 km away from the present coastline respectively. The cores were analysed for OSL dating, ¹⁴C dating, lithology and microfossils and represent various stages of fluvial and marine activity in the region over the last ~150 ka. The chronology of the core closet to the coast (VKI) reflects eight major phases of increased sea level during the late quaternary period (142-140 ka, 104-100 ka, ~121 ka, 87-81 ka, 60-57 ka, 9-6 ka, ~5 ka and ~3 ka) partly coinciding with the global climate cycles MIS 6, MIS 5, MIS 3, MIS 1 respectively. During ~121 ka and 9-6 ka, marine transgression reached the core location to leave marine signatures in the forms of foraminifera. VKI core replicates the quaternary sea level curve, showing strong control of the sea in coastal deposition.

The oldest age of VKI is ~140 ka. The three cores situated further inland give oldest/bottom most ages of ~120 ka. This indicates the coastal land has uplifted in the recent years with deeper sediments being encountered at relative shallower depth. The uplift is expected to occur around post 50 ka, creating a basin fill situation for riverine sediments to accumulate and restricting the delta to prograde. This is observed from the sedimentation pattern and robust chronology of the other three inland cores. Analysis of DEM also supported the occurrence of uplift. Thus, the present work examines the geomorphic evolution of Kaveri delta, an archive of fluvial, shoreline and tectonic activities.

Keywords: OSL Dating, Kaveri Delta , GIS, Foraminifera