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Erosion and sedimentation in Kalpakkam (N Tamil Nadu, India) from the 26 December 2004 M9 tsunami

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Abstract

Laterally extensive sandsheets deposited by the 26 December 2004 Asian tsunami provide a valuable modern analogue for comparison with older sequences. In many places on the east coast of India distinct deposits of marine sand drape the landscape and overlie the muddy soils of the coastal plain. This paper discusses detailed measurements of coastal topography, tsunami flow height, and deposit thickness made at Kalpakkam, India. Five transects were examined in detail to assess the sedimentology and spatial distribution of the tsunami deposit. Near the shoreline, the tsunami eroded approximately 10–25 cm of sand from the beach and berm. At Kalpakkam the sandsheet deposited by the tsunami begins 25 m from the shore extending 420 m inland where it becomes thin and patchy approximately 30 m from the limit of inundation. In some cases the deposit consists of 2 to 4 normally graded units, with coarse sand near the base and fine sand at the top, a characteristic observed in many tsunami deposits worldwide. Unusually, in many places the deposits also contain numerous thin laminated units, a characteristic usually associated with storm overwash. The presence of the laminated beds is indicative of the complexity of tsunami sedimentation at the coast. Such observations are essential to the formation of definitive facies models for palaeo-overwash studies that are capable of distinguishing between sediments deposited by storms or tsunami.

Key words: Tsunami deposit, Kalpakkam, coastal sedimentation, erosion, sedimen-

tology.