



Sumatra tsunami signature in sediment characteristics on the Sri Lankan coast

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The sediment deposits of tsunamis on land are, as a rule, the only available source of information about palaeo-tsunamis. Studies of tsunami sediments across stratigraphic profiles perpendicular to the coast have the potential of providing vital clues in accessing palaeo-tsunami events, and thus form the basis of tsunami risk assessment for a chosen area. As the natural first step, the present study aims to analyse and model recent tsunami sediments brought by the Sumatra tsunami on the Sri Lankan coast.

Tsunami sediments deposited by the 2004 Sumatra tsunami were studied using detailed cross sections normal to the coast line in the Southeast, Southwest and West coast of Sri Lanka analysing the measurements in the context of beach topographical variation, run up height and inundation distances. The typical sediment depositional unit observed along the west and east coasts was comparatively thin, about 3 cm. Thickness of the deposits showed no correlation with the number of incoming waves and only a weak dependence on wave height. An anomalously large sediment deposition with a thickness of about 30 cm was found to be localised in a particular area at the SW coast. This anomaly was attributed to a particular peculiarity of the local topography. The grain size distributions in the cross-shore cross sections for the Southwest and West coasts show a clear dependence on the topography, distance to the coast and the wave height. The distributions often exhibit features uncharacteristic of standard beach sand distributions (e.g. significant broadening of the distribution). These features could be a generic characteristic signature of tsunami sediments and, upon accumulating more evidence, could complement existing stratigraphic methods of distinguishing tsunami deposits, which essentially rely on local specificity.