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Paleo-tsunami and land-level change evidence from the west coast of South Andaman, Andman Nicobar Island, India

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The Sumatra-Andaman earthquake of December 26, 2004, Mw 9.3 provided an ideal opportunity to understand the pattern of paleoseismic event and paleo-tsunami deposition in Andaman and Nicobar Islands. The present investigation carried out along the west coast of Andaman Island around Collinpur village (N11°39´56.9´´ and E92°44´31.3´´) revealed excellent evidences pointing towards land-level change and tsunami deposition during recent historic past. Sedimentary records studied from the geo-slicer and trench sections collected along transect across stable beach ridges and swales between the ridges (N11°41′38″, E92°35′52″) revealed distinct change in depositional environments which have been attributed to tectonic activity.

In total we excavated 4 trenches and collected 9 geo-slicer sections. We present here our preliminary results and interpretations. Based on sedimentary structures, grain size and nature of contact and colour, sedimentary units from the trenches and geoslicers were classified into seven units (a, b, c, d, e, f, g and h) from bottom to top. The bottom most unit a is marked by poor laminations of fine silty-sand and peaty material suggestive of inter-tidal to marshy environment. This is overlain by 30 cm thick unit b – comprising coarse sand with gravel fragments (corals, shells, rock clasts etc.) in the swale and coarse sandy deposits along with broken shells, peaty material and rip-up clasts of underlying soil on the back-limb of the beach ridge. The sharp-erosive contact with the underlying and overlying sedimentary unit, distinct variation in grain marked assorted fragments, broken shell; peaty material suggests deposition by tsunami wave during recent geological past. Overlying unit c marked by partially developed peaty layer suggests marshy environment at or above mean sea level indicative of a probable uplift (?) which occurred during Event I accompanied with tsunami waves. Unit d with finer deposits comprised of silty-clay suggests deposition under sub-tidal environment; change of depositional environment from marshy to sub-tidal suggests subsidence – Event II. Thick silty-sand unit (unit e) and overlying humic soil (unit f) indicates land-level change. Based on the change in sediment grain size and well develop humic soil it is suggested that the uplift was gradual during inter-seismic period. Unit g shows yellowish medium to coarse sand with prominent laminations at the basal part and sharp contact with the underlying humic soil (unit f). This unit marks the deposition by recent tsunami generated by 2004 Sumatra-Andaman earthquakes. Marginal coseismic subsidence probably occurred during this event – Event II.

AMS ages obtained from the peaty material, charcoal, wood from the geo-slice and trench sections suggests that Event I marked by tsunami deposits occurred at around 1200-1300 AD; Event II marked by subsidence occurred somewhere during 1300-1800 AD. It is inferred that the gradual uplift during inter-seismic period occurred between 1800 and 2000 AD. Finally the area marginally subsided during 2004 Sumatra-Andaman earthquake along with deposition of tsunami sediments.