TECTONIC DEFORMATION DUE TO 2004 EARTHQUAKE— REVISITED IN ANDAMAN

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ABSTRACT

Tectonic deformation produced by the fault rupture of the great Sumatra-Andaman earthquake of 26 December 2004 shows zones of uplift and subsidence separated by neutral line (locale of zero vertical displacement) in the Andaman Islands. The ground deformation pattern estimated during May 2005 has been re-constrained on the basis of additional data collected in January 2006. A maximum uplift of 1.5 m to the west of the neutral line is recorded at the west coast of North Andaman near Temple Sound while the westernmost landmass of Middle Andaman exhibits uplift of 1.42 m and 1.3 m at Interview Island and South Reef Island respectively. Areas of subsidence east of the neutral line register 0.70 m and 1.20 m in Chidiatapu and Chatham areas of South Andaman respectively. In either side of the neutral line, signatures of post-seismic adjustment are witnessed at places. As a consequence of post-seismic incremental diurnal rise of tidal water in an otherwise domain of emergence, residual uplift of 0.50 m is estimated in Kalighat Jetty (North Andaman) in comparison to +0.95 m estimated in May 2005. Likewise, diurnal fall in tide level is observed in the submergence domain at Chidiatapu as a likely fallout of post-seismic relaxation. Inferred maximum slip at the trench in North Andaman (~5.3 m) is comparable with that in South Andaman (~4.2 m), both being much less in comparison to 10-15m estimated slip in Sumatra generating catastrophic tsunami waves. Two simple slip dislocation cartoons illustrate 160 km of locked interface of the rupture in North Andaman while in South Andaman it is 100 km from the trench boundary. Geometry of Benioff zone in South Andaman demonstrates marginally higher dip with wider accretionary prism than that in North Andaman.