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Transient Uplift Since the 2004 Sumatra-Andaman Earthquake and Deformation Cycle in the Andaman Islands

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The northwestern part of Andaman Islands was uplifted during the 2004 Sumatra-Andaman earthquake, but it was quickly recovered to almost half in three months since the earthquake. Fossilized corals suggest that such cyclic movement has repeatedly occurred in Holocene. We surveyed vertical crustal movement and tsunami height in the Andaman Islands, associated with the 2004 giant earthquake. Along the western coast of North Andaman, we found biological paleo-shoreline indicators which are uplifted micro atolls (Porites of coral) and oyster banks. The height of them suggests that the amount of uplift was 1.5-1.6 m in maximum since the earthquake. Based on the eyewitness in northern margin of Middle Andaman, over 1 m of postseismic subsidence may have occurred during three month after the 2004 earthquake. In the eastern part of South Andaman, the tide gauge data shows ca.1 m of coseismic subsidence. Therefore the Andaman Islands were tilted southeastward during the 2004 earthquake. This result indicates that the plate interface slipped beneath the Islands. Nevertheless, inundation height of the 2004 tsunami showed that the tsunami height was 1.2-5.0 m (ave.3.1 m) that is smaller than the Sumatra Island and the southwestern coast of Thailand. We also identified several levels of old micro atolls higher than those uplifted by the 2004 earthquake, and their heights are distributed at intervals of 7-10 cm. These observations indicate that the same type of uplift events and its following interseismic subsidence have occurred repeatedly. Recurrence of large earthquake can probably be evaluated by dating them. Our results provide important parameters to discuss the rupture process of the 2004 earthquake and recurrence of such giant earthquake.