Uplift Events unlike the source of the 2004 Sumatra-Andaman Earthquake, deduced from Holocene Marine Terraces in the Neil Island, Andaman Islands

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Although the Neil Island located east off the southern part of the Andaman Islands was not coseismically deformed associated with the 2004 Sumatra-Andaman earthquake, several levels of marine terraces suggesting Holocene repeated uplift events have been developed along the coast.

After the 2004 earthquake, we carried out paleoseismological survey in the Andaman Islands. Based on the height of uplifted corals and tide gauge data, it is inferred that coseismic crustal movement of the islands was southeastward tilting accompanied with uplift of 1.5 m in the northwestern part and subsidence of 0.95 m in the northeastern part (Kayanneetal,2007). Several levels of higher uplifted corals and trenching survey result suggest that same type of movement has repeatedly occurred before the 2004 event. However, such analogy cannot be applied to the Neil Island. The Neil Island which has 6 km in length and 3.5 km in width is located 25 km east off the Andaman Islands. Although this island was tectonically stable during the 2004 earthquake, several marine terraces enclose the island. We field-surveyed to clarify the uplift process of this island by identifying the marine terraces. Judging from measuring topographic profiles and satellite imagery interpretation, marine terraces can be divided into five levels named I to V in descending order. Elevations of each terrace surface are as follows; I: 6-8m, II: ca.4m, III: 1.2-3.5m, IV: 0.5-3.5m, V: 0.5-2.5m. From the I terrace, we found three reworked coral fragments that 14C dated to be 5000-5600 cal yBP, and it suggests the highest terrace emerged during Mid-Holocene. Fossil micro atolls are exposed on the III, IV and V terraces. Such micro atolls provide timing and magnitude of uplift events by measuring level and 14C age. Although some 14C dating results are scattered in range, emerged ages of each terrace are inferred as follows; III: ca. 4350 cal yBP, IV: ca. 3700 cal yBP and V: ca. 3000 cal yBP. This result suggests that coseismic event accompanied with at least 1-2 m uplift have occurred at every 700 years. The visible evidence indicates that no uplift event have occurred since ca. 3000 cal yBP, but it has to consider the relation with eustatic sea level change or hydro-isostasy.

Uplift process of the Neil Island is quite different to the main land of the Andaman Islands that was coseismically tilited southeastward during the 2004 earthquake, and

it is probably associated with slip of deeper part of plate interface or the other source of intraplate fault.

Keywords: Sumatra-Andaman earthquake; recurrence interval; marine terrace.

References

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