Geophysical Research Abstracts
Vol. 14, EGU2012-7222, 2012
EGU General Assembly 2012
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Paleoseismological investigations in northern Ramree Island, western Myanmar (Burma)

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Myanmar is located at the convergent boundary between the Indian-Australian and the Eurasian plates. Along the northernmost part of the Sunda megathrust, the Indian-Australian plate subducts northeastward underneath the Burma micro-plate, and produces a series of deformation belts with a lot of seismic activities. The active deformation is evident by wide-spread marine terraces along the coast of western Myanmar. According to several previous studies, the lowest marine terrace formed during the 1762 Arakan earthquake, with an estimated magnitude of about 7.5. From the ages of the marine terraces, these studies also proposed that the interval between large earthquakes in this area is about 900 years.

Near the town of Kyauk-Pyu in northern Ramree Island, a major coastal island in western Myanmar, we found several levels of sea-notches on a sandstone ridge next to the coast. The lowest notch is about 1 m above the present sea-notch, and it has been shown that this lowest notch represents the co-seismic uplift during the 1762 earthquake. Since there are up to four levels of uplifted sea-notches above the 1762 notch and each has a $\sim$1 m elevation difference, we suggest that there have been several paleo-earthquake events prior to the 1762 earthquake, and those events had similar magnitude to the 1762 Arakan earthquake. Unfortunately, we were unable to find age constraints for those paleo-earthquake events at this site.

Near the small village of Leik-Ka-Maw at the northwestern corner of the Ramree Island, we found many coral colonies on the wave-cut platform. Except for the present-day living corals, there are three groups of uplifted coral colonies with different elevations. U-Th ages of the uplifted corals indicate that the second group of corals was killed by co-seismic uplift during the 1762 earthquake. The other two groups of corals suggest that there were at least one event before and after the 1762 earthquake, respectively. The possible event after 1762 has not been reported anywhere else in western Myanmar, thus it may represent a minor, local event. Furthermore, since all of these three uplifted coral groups are lower than the lowest marine terrace, a step of marine terrace may require more than one earthquake event to form in this area. Therefore, the previous studies, which only used the ages of marine terraces, may have overestimated the earthquake recurrence intervals in western Myanmar.