Chronological Constraints of Past Great Earthquakes along the Andaman and Nicobar Islands

VANESSA ANDRADE, KUSALA RAJENDRAN and C.P.RAJENDRAN
Centre for Earth Sciences, Indian Institute of Science, Bangalore – 560 012, India.

Co-seismic land level changes that occurred as a consequence of the Mw 9.2 Sumatra earthquake of 2004 in the Andaman and Nicobar islands have resulted in the drawing of a pivot line, separating the uplifted areas from the subsided ones. For the 2004 event, land to the west of the pivot line was uplifted all along the Andaman Islands with a maximum value of 1.5 m at Interview Island, close to North Andaman. Subsidence was noted to the east of the pivot line, along the east coast of Middle and South Andaman. The Nicobar Islands show the highest subsidence of 1.5 to 2 m. Uplifts appear to increase northwards along the islands and are visible in the field as uplifted beaches, boulder beds and as coral terraces. Subsidence increases towards the south as is indicated by water-logging of land previously above the mean sea level and dead tree-lines below the present day surface.

Carbon samples collected over the last four years from various locations in the Islands were analyzed for radiocarbon content. The age data was calibrated to account for laboratory error and marine origin of the samples. An attempt has been made to classify samples from the near-source region into various categories depending on their quality, defined in terms of their location, context and multiplicity. This will help us determine which dates are more reliable than the others and eliminate the misleading dates. Age data reliability of samples in a given context, once established, can be extended to similar plate tectonic settings globally.

We are trying to develop a space-time diagram for the Andaman and Nicobar region in terms of earthquake periodicity to identify paleo-events of magnitude and/or rupture length similar to the 2004 event. Our results show a local clustering of dates for the 1881 event. Two regional clusters of dates are seen approximately 500 and 1000 years B.P. The result obtained is used to differentiate local ruptures from larger ones. Going further back in time will help us understand better the tsunami hazard and the destruction potential associated with great earthquakes.

Keywords: Paleoseismology; Andaman and Nicobar; Sumatra 2004; Geochronology

References

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