

Precise identification of super tsunamigenic earthquakes over the past 4,000 years in the western Solomon Islands

A strong earthquake can claim the lives of countless people in mere minutes. In collaboration with Professor Fred Taylor of the University of Texas (UT) at Austin, Dr. Chuan-Chou Shen, a Distinguished Professor in the Department of Geosciences of the National Taiwan University (NTU), published new research focused on super earthquakes in the internationally renowned journal "Nature Communications" on June 30, 2015 (ref. 1). According to their article, intertidal coastal coral can act as a seismic recorder and reveals tsunamigenic earthquakes over the past four thousand years in the western Solomon Islands, which is one of six countries in the Pacific Ocean that have diplomatic relations with Taiwan, Republic of China (ROC).

The research team conducted two field trips to Ranongga Island of the western Solomon Islands during May-June and August 2012 to collect intertidal coral fossils, which were sent to the High-Precision Mass Spectrometry and Environment Change Laboratory (HISPEC), which is directed by Dr. Shen. The ages of these fossils were determined using the uranium-thorium radiometric dating method at the HISPEC, NTU. This method has an age precision as high as ± 11 months.

The ages of the coral fossils indicate that at least four super tsunamigenic earthquakes occurred over the past four thousand years at Ranongga Island. The most recent prehistoric earthquake occurred approximately 750 years ago, and such earthquakes are expected to occur in intervals of approximately 500-1000 years. However, the current dataset suggests an absence of clear periodicity. Local tectonic uplifts induced by prehistoric earthquakes range from 2-3 m, which is higher than the 1.8 m uplift produced by an 8.1 magnitude earthquake in 2007. The 2007 earth-



Researchers searching for intertidal corals on Ranongga Island of the western Solomon Islands.

quake triggered a tsunami that reached up to 12 m in height and killed more than 50 people. These results indicate that the western Solomon Islands have experienced far larger tsunamigenic earthquakes than the 2007 event!

Reference

Kaustubh Thirumalai, Frederick W. Taylor, Chuan-Chou Shen, Luc L. Lavier, Cliff Frohlich, Laura M. Wallace, Chung-Che Wu, Hailong Sun & Alison K. Papabatu. (2015) Variable Holocene deformation above a shallow subduction zone extremely close to the trench. *Nature Communications*, 6:7607, DOI: 10.1038/ncomms8607.

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Ranongga Island of the western Solomon Islands.