

Paleo-earthquake records of the Hengchun offshore structure, southern Taiwan

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In the southernmost part of Taiwan, the Western Hengchun Tableland is a prominent topographic feature, with several steps of late Pleistocene uplifted marine terraces forming the top of the tableland, and uplifted Holocene coral reefs along the coast. To interpret the formation of this tableland, an inferred Hengchun offshore structure has been proposed as an active structure located offshore to the tableland's west. The uplift and the eastward tilting of the tableland are therefore produced by neotectonic activities of this structure. However, the presence of this structure is still debated, and no record of paleo-earthquakes related to this structure has been identified. To solve this, we utilized fossil coral microatolls as paleo-sea-level indicators to identify possible paleo-earthquake records produced by this structure. The highest level of survival (HLS) of corals is limited by the low tide level. Once living corals grow to this level, the upward growth will stop and they will grow outward instead, forming microatoll morphology with a flat top surface. This makes microatolls great tools to record local sea level history. If microatolls were uplifted and killed by co-seismic uplift, the elevation difference between microatolls and the HLS would represent the amount of uplift, and the age of the coral would constrain the age of the earthquake event. In this study, we surveyed six sites along the coast surrounding the Western Hengchun Tableland. Based on our field survey data and U-Th dating results of uplifted corals, we reconstructed a coastal uplift history of the area, and proposed several paleo-earthquake events in the past 2,500 years. These results enabled us to further understand the seismogenic properties and the possible earthquake recurrence intervals of the Hengchun offshore structure.

Keywords: coral microatolls, Hengchun offshore structure, Paleo-earthquake event

