Tectonic uplift rate in the northern coast of the South China sea: insight from the $^{10}$Be exposure dating of marine terrace in southeastern China

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Along the northern coast of the South China Sea in southeastern China, marine terraces preserved on the widespread Cretaceous granite and recorded both Quaternary uplift and sea-level oscillation. However, because sediments or materials for dating are usually absent, it is difficult to date these paleo-shoreline, which cause great difficulties in early exploration. Fortunately, as great progress on terrestrial cosmogenic nuclide dating, it is possible to yield the exposure age of marine terrace and to calculate the uplift rate along coastal line. This study focuses on two typical sequences of preserved marine terraces lying on the coastal line adjacent the Taiwan Strait in southeastern China. These two sequences of marine terraces (denoted as NZS and HJC site, respectively) both locate on the footwall (uplifting wall) of normal NE-SW trending fault (the Coastal Normal Fault) but on separated blocks subdivided by a normal NW-SE fault. At least 5 terraces and 2 terraces developed on granite at HJC and NZS site, respectively. In particularly, T1 and T3 terrace at HJC site and T1 terrace at NZS site present typical abrasion wave-cut platform with preserved sea stacks. Hence, we collected both profile and surface quarts samples on these well-preserved marine terraces for $^{10}$Be exposure dating and yielded exposure ages of 51.0±1.9 ka, 66.2±2.9 ka in T1 and T3 terrace at HJC site, and 87.9±3.5 ka in T1 terrace at NZS site. After subtracting eustatic sea-level changes from the relative sea-level curve, we measure high uplift rates of 1.13 mm/a at HJC site and 1.04 mm/a at NZS site during late Pleistocene. The similar uplift rates in different faulting blocks suggest that surface uplift can be directly linked to NE-SW fault system. Low difference of uplift rate between tow site suggest relative vertical motion of tow faulting blocks could be adjust by NW-SE faults. The regional uplift with high uplift rates is likely corresponding to the major collision between Luzon arc and the Chinese continental margin. However, because the contribution of by isostasy, e.g. surface erosion or ice-volume variation in Quaternary, remains uncertain, the calculated uplift rate maybe overestimated.