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“Shore platforms as markers of tectonic activity in Aotearoa, New Zealand”

With 17000 km of coastline, beaches and rocky coast are integral to the culture and economy of Aotearoa, New Zealand. However, rocky shore platforms and the adjacent coastal cliffs also pose significant hazard as coastal erosion regularly threatens housing and infrastructure. The combination of rising sea-levels and an active tectonic setting lead to complex response at the shore, where some coastlines are subsiding while others are uplifting. Where surface uplift outpaces sea-level rise, often as a result of fault ruptures, rocky shore platforms may be preserved as marine terraces. As such, these marine terraces have been proposed as markers of past earthquake activity and have been used throughout Aotearoa, New Zealand to help constrain seismic hazard. It is not, however, clear that all earthquakes will result in a stable marine terrace, or if all marine terraces represent past earthquakes. While radiocarbon dating can provide sound chronologies for supra-terrace deposits, previous chronological tools were unable to provide information about the timing and rate of shore platform generation and marine terrace stability. Here, I will present the results of ongoing studies into rocky shore platform creation and marine terrace preservation using cosmogenic nuclides. The investigated platforms span a wide range from tectonically stable settings to terraces uplifted during the 2016 Kaikōura earthquake. Our work shows that marine terraces from individual earthquakes can easily be removed from the rock record, with implications for interpretations of earthquake recurrence intervals and rupture magnitudes.