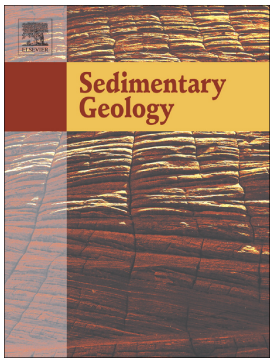

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Boulder emplacement and remobilisation by cyclone and submarine landslide tsunami waves near Suva City, Fiji

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Abstract

The characteristics of a reef-top boulder field created by a local submarine landslide tsunami are presented for the first time. Our examination of large reef-derived boulders deposited by the 1953 tsunami near Suva City, Fiji, revealed that shorter-than-normal-period tsunami waves generated by submarine landslides can create a boulder field resembling a storm boulder field due to relatively short boulder transport distances. The boulder-inferred 1953 tsunami flow velocity is estimated at over 9 m s^{-1} at the reef edge. Subsequent events, for example Cyclone Kina (1993), appear to have remobilised some large boulders. While prior research has demonstrated headward retreat of Suva Canyon in response to the repeated occurrence of earthquakes over the past few millennia, our results highlight the lingering vulnerability of the Fijian coastlines to high-energy waves generated both in the presence (tsunami) and absence (storm) of submarine failures and/or earthquakes. To explain the age discrepancies of U-Th dated coral comprising the deposited boulders, we introduce a conceptual model showing the role of repeated episodes of tsunamigenic submarine landslides in removing reef front sections through collapse. Subsequent high-energy wave events transport boulders from exposed