

# Geomorphological Evidence for Multiple Paleotsunami Events on Ahuahu Great Mercury Island, Northern New Zealand?

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## ABSTRACT

Ahuahu Great Mercury Island (GMI) contains some of the earliest records of Polynesian agriculture in New Zealand with temperatures  $\sim 1^\circ\text{C}$  above that on the adjacent mainland (Prebble et al., 2019). Here we focus on the Tamawhera catchment in the NW of GMI where a valley-fill freshwater swamp at  $\sim 6$  m asl extends inland for  $\sim 800$  m. At the crest of the boulder beach weathered rhyolite basement is overlain unconformably by imbricated, well-rounded ellipsoidal clasts in a matrix of stratified sands, that are in turn overlain by  $\sim 1$  m-thickness of randomly imbricated clast-supported clasts up to 0.6 m in diameter. The erosional contact suggests marine planation associated with higher sea level or catastrophic/high magnitude marine influx event(s) of unknown age.

It was anticipated that records of marine influx events would be contained in the sediments infilling the Tamawhera swamp as was confirmed by vibrocoreing of the sediment fill. Up to 2 m of mixed sands and well-rounded gravel were overlain by 1.3 to 1.6 m of organic-rich muds containing weathered clastic detritus sourced from the surrounding hillslopes. The basal chaotic sediments were observed to constitute multiple depositional events with matrix supported pebble layers rich in foraminifera and marine molluscs - both whole and fragmented. Several of the inferred events are rich in rafted pumice of variable appearance, density and chemistry suggestive of a possible association with submarine volcanic activity.

A marine – possibly tsunamigenic – origin for the chaotic swamp sediments was further supported by micro-XRF scanning of the cores to yield high but variable Sr, Ca, S, Br and Si content. Dating of associated Puriri seeds and other woody debris bracketed the inferred marine influx events to ca. 6850 – 6130, 5420 – 4790, 2230 – 1990 and 1805 - 1630 cal yr BP. After ca. 1600 cal yr BP no further marine-sourced influx events were observed and the change to freshwater muds with clastic detritus is coeval with influx of macroscopic charcoal that is undated but likely associated with Polynesian farming of the catchment slopes modification of the drainage for irrigation for wetland cropping (Holdaway et al., 2019).

## REFERENCES

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