

The 1917 tsunami inundation in Samoa: Discrepancies in modelled-to-observed event reconstructions

Laura Sischka¹, Shaun Williams², Cyprien Bosserelle², Ryan Paulik³, Josephina Chan Ting⁴, Malcolm Whitworth¹, Lameko Talia⁵

¹*School of the Environment, Geography and Geosciences, University of Portsmouth, Portsmouth PO1 3QL, UK.*

²*NIWA Taihoro Nukurangi, PO Box 8602, Christchurch 8440, Aotearoa New Zealand*

³*NIWA Taihoro Nukurangi, Private Bag 14901, Wellington 6241, Aotearoa New Zealand*

⁴*Disaster Management Office & National Emergency Operations Centre, Ministry of Natural Resources and Environment, Private Bag, Apia, Samoa*

⁵*Geosciences Section, Ministry of Natural Resources and Environment, Private Bag, Apia, Samoa*

Email: Laura.Sischka@myport.ac.uk, Shaun.Williams@niwa.co.nz, Cyprien.Bosserelle@niwa.co.nz, Ryan.Paulik@niwa.co.nz, Josephina.Chanting@mnre.gov.ws, Malcolm.Whitworth@port.ac.uk, Lameko.Talia@mnre.gov.ws

In the last 190 years a total of 39 tsunamis affecting Samoa have been recorded. Many of them caused by earthquakes occurring along the Tonga Trench, which is only 150 km away from the islands.

In 1917, an earthquake with a magnitude of 8.3 caused a disastrous tsunami in Samoa. Even though it was a major event, historical records are scarce and little is known about the event.

In order to overcome this lack of data, this work has modelled the aspects of the 1917 tsunami event, using available historical records. The tsunami model used an earthquake initiation, propagation along the Tonga Trench and generated inundation footprints for the islands of Samoa. Then using this model output, the impact in present-day Samoa was determined to estimate the likely exposure and damage to buildings within the inundation zone.

The study identified a number of inconsistencies between the inundation zone and the anecdotal evidence recorded at the time of the event. In addition, discrepancies were identified between the model and the records from tide gauges in Apia harbour at the time. These recorded a fluctuation of the sea five minutes after the 1917 earthquake.

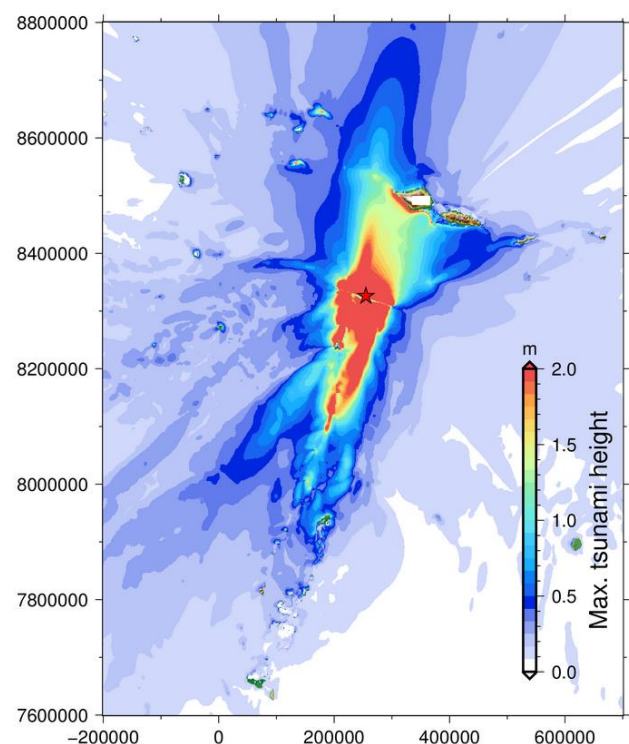


Figure 1: 1917 tsunami model in Samoa