



The Asia-Pacific effects of a megatsunami along the Tonga Trench

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A megatsunami ($M > 9.0$) along the Tonga Trench has far-reaching consequences for 4 major continents of the world, and exposure ranging from the cities of Sydney and Brisbane, the coastlines of Japan, Canada, USA, and along South America not to mention the Pacific Islands.

Using the TSUDAT software of Geoscience Australia, relevant scenarios are selected for the location. Fault mechanics and the possible regime are also then examined to create the scenario.

In this study, the effects of a megatsunami scenario are investigated including the run-up heights in coastal regions on these four continents in addition to other hazard effects. Global level DEM and bathymetry data is used to provide a first estimate of the exposed population, built infrastructure (capital stock) and GDP in the tsunami inundation area. The uncertainties of such a study are taken into account by adjusting the scenario via source mechanism, magnitude range and directivity effects.

This is combined with basic vulnerability functions from historical tsunamis in order to give an exposed and estimated loss and cost of reconstruction across the Pacific rim. Notes as to the warning times, country preparation and evacuation plans for tsunamis are also made given long lead times in some cases.