

Tsunami field survey in French Polynesia of the 2015 Chilean earthquake Mw = 8.2 and what we learned.

Anthony Jamelot, Dominique Reymond, Jonathan Savigny, and Olivier Hyvernaud

CEA/DASE/LDG, French Polynesian Tsunami Warning Center, Papeete, Tahiti, French Polynesia (jamelot@labogeo.pf)

The tsunami generated by the earthquake of magnitude Mw=8.2 near the coast of central Chile on the 16th September 2015 was observed on 7 tide gauges distributed over the five archipelagoes composing French Polynesia, a territory as large as Europe.

We'll sum up all the observations of the tsunami and the field survey done in Tahiti (Society islands) and Hiva-Oa (Marquesas islands) to evaluate the preliminary tsunami forecast tool (MERIT) and the detailed tsunami forecast tool (COASTER) of the French Polynesian Tsunami Warning Center.

The preliminary tool forecasted a maximal tsunami height between 0.5m to 2.3 m all over the Marquesas Islands. But only the island of Hiva-Oa had a tsunami forecast greater than 1 meter especially in the Tahauku Bay well known for its local response due to its resonance properties.

In Tahauku bay, the tide gauge located at the entrance of the bay recorded a maximal tsunami height above mean sea level ~ 1.7 m; and we measured at the bottom of the bay a run-up about 2.8 m at 388 m inland from the shoreline in the river bed, and a run-up of 2.5 m located 155 m inland.

The multi-grid simulation over Tahiti was done one hour after the origin time of the earthquake and gave a very localized tsunami impact on the North shore. Our forecast indicated an inundation about 10 m inland that lead Civil Authorities to evacuate 6 houses. It was the first operational use of this new fine grid covering the north part of Tahiti that is not protected by a coral reef. So we were attentive to the feed back of the alert that confirm the forecast of the maximal height arrival 1 hour after the first arrival.

The tsunami warning system forecast well strong impact as well as low impact as long as we have an early robust description of the seismic parameters and fine grids about 10 m spatial resolution to simulate tsunami impact.

In January of 2016 we are able to forecast tsunami heights for 72 points located over 35 islands of French Polynesia.