



The December 5, 2018 Mw 7.5 earthquake on the south Vanuatu subduction zone : numerical modeling and development of a scenario database for New Caledonia tsunami hazard assessment.

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At 4:18 UTC on December 5, 2018, New Caledonia, the Loyalty Islands and south Vanuatu have been struck by a powerful Mw 7.5 earthquake which epicenter has been located 168 km ESE of Tadine, Maré, Loyalty Islands. Between 30 and 45 minutes after the shake, a tsunami arrived on the coasts of Maré and Lifou where evacuation of low-lying areas has been ordered by local authorities.

Recorded by the 2 tide gauges of both previous islands, it has been also recorded by the 3 gauges located along the East coast of New Caledonia at Ouinné, Thio and Hienghène, reaching them in respectively 52 min, 51 min and 68 min after the main shock. Looking at the signal, a first sea withdrawal is followed by several waves. It also highlights a 1 m maximum wave amplitude recorded by Ouinné tide gauge but witnesses reported more important heights, especially in Yaté at the southeast coast of the “Grande Terre” and in the northeast of the Isle of Pines. The tsunami also struck south Vanuatu, especially the southernmost island of Anatom, where locals reported strong waves reaching about 4 m in a river mouth and inundations as far as 200 m inland, and even more inside rivers. Lenakel tide gage (located on Tanna Island, north of Anatom) recorded the tsunami only 23 min after the earthquake, showing maximum amplitude of 1.5 m. Witnesses also reported small inundation on Erakor Island, south of Port Vila city, Efate Island, about 480 km North of the earthquake epicenter.

According to the preliminary analysis of seismic waves by the New Caledonia Earthquake Observatory and USGS given parameters of this normal-faulting earthquake located within the subducting plate, tsunami simulations have been run and results have been compared to tide gauge records and field observations. Those results will help to build the scenario database and improve the methodology of tsunami hazard assessment for New Caledonia within the TSUCAL project.