



## **A detail modeling of the 1960 and 2010 Chilean tsunami over French Polynesia: consequences and improvements of the tsunami warning system.**

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We present here a detail study of the last two major tsunami events of Chile that were observed significantly in Tahiti : the tsunami on May 22, 1960 of Valdivia generated by the strongest earthquake ever recorded ( $M_w=9.5$ ) and the tsunami of the February 27, 2010 of Maule ( $M_w=8.8$ ).

In a first step, using numerical modeling, we will tune the seismic sources parameters to reproduce the tsunami heights given by the field-survey observations , testimonies and tide gages measurements made in Tahiti and Marquesas islands with the cartography of that time.

Then from that validation, we are able to study these tsunamis more precisely to evaluate their coastal impacts on the actual shore of 2015 using recent tsunami inundation elevation models.

We also study the sensibility of the tsunami height over the Polynesian coasts by modeling the impact of the tide (about 0.6 m in Tahiti and 1.30 m in Marquesas islands) but also punctual rises of the sea level induced by extreme meteorological phenomena like cyclonic waves, tropical storm or tropical rains that can each increase drastically the sea level of the lagoon around Tahiti by one meter or more.

As a practical consequence of this study, the French Polynesia tsunami warning system could plan to take into account the tide in the warning context for a more accurate inundation forecast.

Moreover, we can consider that a better understanding of catastrophic events that would combine a tsunami with an extreme meteorological phenomena will contribute to update the tsunami hazard knowledge of Tahiti.