

# **A Numerical Simulation on Tsunami Inundation for Southwestern Taiwan**

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## **ABSTRACT**

The primary objective of this study is to develop a preliminary early-warning system, which derived from numerical simulation of tsunami-generated inundation and possible catastrophe in southern Taiwan, which triggered by subduction at Manila Trench. Cracking of the unsteady, straight, and continuous fault zone adjacent to southwestern Taiwan heightens the stress for potentially devastating conflict with powerful temblor of magnitude 8.0 or larger (Lin, 2008, and Anat Ruangrassamee, 2009). Numerical model 'COMCOT ' which developed by Cornell University, USA, with a set of seismic parameters extracted from Dao, et al, 2009, was employed to predict the severity of big submarine quake of magnitude 8.7.

Numerical model result from plausible future ruptures produced the potential areas at risk of tsunami intrusion and flood inundation in southern Taiwan. Figure 1 indicated the distribution of potentially risky areas. The Eastern portion revealed a very low chance of being inundated due to the reflection of tsunami wave caused by the steep topographical slope, whereas the low-lying Western part existed a high probability of disastrous inundation by reason of the vulnerable topography which led to shallow effect. For the purpose of further investigation on tsunami-inundated prone sites, the study extracted time-series data of water-level-altitude at each site. Maanshan nuclear power plant, located in Houbihu, Kenting, in the vicinity of Nanwan lowland suffered the first wave with wave height of 3.5m and short 21-minute response time. The coast area between Fangliao, Pingtung and Kaohsiung is relatively flat and low-lying, and moreover, the coastline oriented toward the transmitting direction of tsunami wave and was direct exposure to high-energy tsunami which caused large inundation area here especially for Tainan city and Qijin, Kaohsiung. The possible reason is that tsunami wave propagated upstream which severely destroyed Tainan city, Qijin was submerged due to its low elevation, and as for run-up in Yongan, Qieding, Hunei, and Mituo may reach six kilometers ashore.

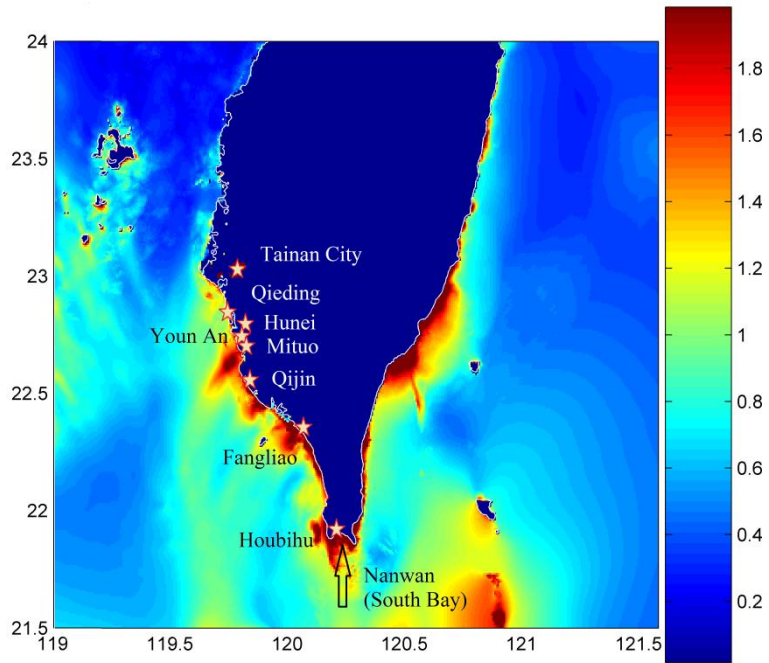


Figure 1. Tsunami simulation result: The distribution of inundation prone areas in southern Taiwan.

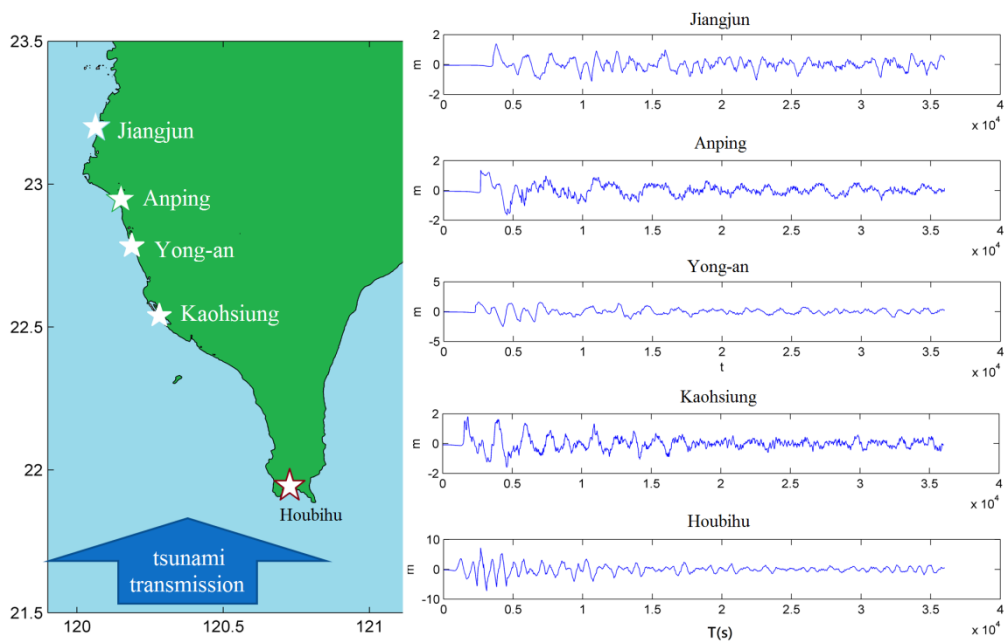


Figure 2. Time series variation of sea-level-altitude at sites with potential risk.