

Using the TATA Method to study the Impact of a long distance tsunami on Taiwan: A Case Study of the 1960 Tsunami in Chile.

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The 1960 earthquake in Chile was the largest one which magnitude was Mw 9.5 in the record. Then, the tsunami effected most of the cities in Pacific Ocean. In Taiwan, the tsunami height were 30cm and 66cm which were recorded in Keelung and Hualien. Although the event has been long time ago and there was no sever tsunami disaster happened after that, a big earthquake which was Mw 8.8 had been occurred again in 2010. Also, the tsunami height were recorded 52cm and 66cm in Houbihu and Wushi. It supposed to be faced up carefully as the area might be a potential dangerous zone. In this study, the tsunami numerical model COMCOT (Cornell Multi-grid Coupled Tsunami Model) was used for simulation and analysis. The analysis method was Impact Intensity Analysis (IIA) and was further combined with the Tsunami Arrival-Time Analysis (TATA). The IIA method was based on the Green's function. The tsunami was discretization as a point source, and the tsunami impact coefficient of each point source was analyzed to show the intensity of tsunami impact on the study site in each region. However, the tsunami directionality was ignored in IIA method. The tsunami directionality is especially important to the trench-type tsunami. In order to overcome this problem, we newly developed the TATA method to inspect the effect of similar arrival time from a series of unit-sources. According to the result of IIA, the signal of Keelung Port and Chile were stronger than Hualien. After analyzing the isochronism by the TATA method, simulate the condition by moving the epicenter northward for 500 km. The results have been shown the maximum wave height in Keelung Port was over 1 meter and negative wave was over 2 meters. As to Hualien area, the maximum wave closed to 1 meter. Therefore, the impact of earthquake tsunami in 1960 and 2010 on Taiwan were not the most serious two. All in all, Taiwan shall not ignore the potential tsunami risk in earthquake belt of Chile.

Keywords: earthquake tsunami, Tsunami Arrival Time