Tsunami Risk Map-a Case Study of Gongliao District

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ABSTRACT

A great tsunami had struck the northern coast of Taiwan in 1867. The study area is focused on Gongliao District, New Taipei City. The assumed earthquake scenario originated from Yap Trench is used for Cornell University tsunami model (COMCOT model) which simulates the wave height and wave speed of the tsunami triggered by the earthquake. The wave heights of the northern coast of Taiwan are then used as boundary conditions for overland flow simulation. Risk due to tsunami is defined as hazard multiplying by vulnerability. The maximum water depth, the maximum water speed due to tsunami and rising rate of water surface level are used for production of tsunami hazard map. As for vulnerability, population and habitat environment are taken into account. After evaluating hazard and vulnerability, the high tsunami risk area can be delineated, and can take suitable measures to reduce loss of life and properties.

KEY WORDS: Tsunami; risk; hazard; vulnerability

INTRODUCTION

The 2004 Indian Ocean earthquake caused 220,000 causalities, and 510,000 people were wounded. The tsunami wave height is about 30 m (Paris et al., 2007). 2011 Tohoku earthquake (Mw=9.0) triggered the tsunami with wave running up to 40.5 m and also caused huge damages (Fig. 1 and Fig. 2). As for Taiwan, a big tsunami (triggered by an earthquake of Ritcher Scale 7.0; Fig. 3) occurred in northern Taiwan in 1867 (Hsu, 1983). The most affected areas are Ji-long-tou (now Keelung City) and Jin-bao-li (now Jinshan District, New Taipei City). Epic center of this earthquake is labeled in Fig. 3. Several hundred people drowned, wave surged, and houses were damaged according to historical records (Chen, 1871).