

TSUNAMI DATABASES FOR THE NATIONAL TSUNAMI EARLY WARNING CENTRE OF MALAYSIA : TOWARD THE IMPLEMENTATION PLAN OF REGIONAL TSUNAMI WATCH PROVIDERS (RTWP)

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ABSTRACT

The purpose of this study is to develop a tsunami database for the National Tsunami Early Warning Centre of Malaysia, towards the implementation plan of Regional Tsunami Watch Providers (RTWP). Firstly, we determined the tsunami source points along the most active subduction zones at an interval of 0.5 degree (~50 km) with 5 magnitudes (M_w 6.5, 7.0, 7.5, 8.0 and 8.5) and 4 depths (0, 20, 40 and 60 km). The coastal and forecast points are located along the coastal area at 1 and 50 m of bathymetric contour depth with random interval distance, respectively. In numerical simulations, TUNAMI-F1 (Tohoku University's Numerical Analysis Model for Investigation of Far-field tsunami, No. 1), TUNAMI-N2 (Tohoku University's Numerical Analysis Model for Investigation of Near-field tsunami, No. 2) and NAMI-DANCE version 4.7 are used to calculate the tsunami waveforms at the outpoint points. Green's Law calculations are then applied to the tsunami heights at forecast points to estimate the reliable tsunami heights for the coastal points. Tsunami arrival times at the coastal points are then calculated by inverse tsunami arrival time using the TTT (Tsunami Travel Times) software. The empirical equations of the Scaling Law are used to determine the fault parameters of earthquake which is controlled by moment magnitude. Tsunami databases are then constructed by using MySQL database which combined 3 major components at the Malaysian National Tsunami Early Warning System (MNTEWS). This pre-computed tsunami database contains more than 30,000 earthquakes scenarios covering the most active subduction zones historically. Combinations of PHP scripting language and SQL command syntax are performed to retrieve the database output by simple, interpolation, extrapolation and maximum risk methods. The threat levels of warning, alert and watch are issued based on wave amplitude and arrival times of tsunamis at the coastal points.

Keywords: Numerical simulations, Green's Law, TTT, Scaling Law, Threat levels.