

The relation between the tsunami heights of offshore and coastal stations

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The tsunami warning is issued, based on the magnitude, location and depth of the earthquake estimated from seismograms. However, there is a large uncertainty of tsunami heights due to the lack of information on the rupture process just after the earthquake occurrence. The real tsunami heights observed by offshore tsunami recorders will contribute to a reduction of uncertainty. Aiming to predict tsunami heights at coast by the use of offshore tsunami heights, we investigate the relation between the tsunami heights of offshore and coastal stations.

We use data of ocean bottom tsunami recorders, which are installed as a part of the ocean bottom seismometer system off-Tokai and off-Boso. The data are contaminated with pressure variations accompanied with seismic waves as well as the tidal components. In order to extract the tsunami component, time series data of ocean bottom tsunami recorders are filtered.

Tsunami maximum amplitudes observed by ocean bottom tsunami recorder off Tokai and off Boso are compared with those at coastal stations. The relation is investigated by calculating means and standard deviations for the ratio of coastal tsunami maximum amplitudes to offshore ones.

Next, according to Baba et al. (2004), we take effects of the installation depth of ocean bottom tsunami recorder and reflection at the coastline into consideration. Assuming Green's Law and reflection at a fixed edge, the maximum amplitude is amplified by 2 times h to the minus one-fourth power, where h is the water depth. For near-field tsunamis, the difference of distances to offshore and coastal stations from sources should be corrected. We also investigate the relation between tsunami maximum amplitudes at coastal stations and corrected ones at offshore stations.