

Tsunami early prediction using DONET: tsunami amplification factor and area mapping of sudden pressure decrease

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We investigated correlation between coastal and offshore tsunami height for our observational array of ocean-bottom pressure gauges, DONET, in the Nankai trough. Many tsunami calculations were conducted to make correlation diagrams between coastal tsunami height and ocean bottom pressure change. We at first created slip models for the calculations. The slip models were constrained on the plate interface because we focus on near-field great subduction zone earthquakes in this study those likely cause tremendous tsunami disasters. It was found that the tsunami amplification factor of 0.067m/hPa between DONET and Owase tide station, and the standard deviation error from the predicted tsunami height is 0.9m. By the aspect of tsunami amplification factor, we would be able to estimate tsunami height at the coast within roughly 10-15 minutes after earthquake occurrence from the ocean-bottom pressure gauge array.

But unfortunately, it seems to be difficult to predict tsunami accurately within several minutes after the earthquake from the method of tsunami amplification factor. We are also considering another approach to predict it earlier. At the seafloor above the upper edge of fault, ocean bottom pressure indeed suddenly decreases after the earthquake. If we know extent of the region where sudden pressure change occurred after the earthquake, which is consistent with the fault dimension. We finally emphasis that ocean-bottom pressure array should be deployed to cover the whole source region so that tsunami could be predicted with high-accuracy less than several minutes.

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