

Advancement of real-time tsunami inundation forecast system by multiple tsunami scenario selection procedure

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We have developed a prototype system to perform the real-time tsunami inundation forecast for Chiba prefecture, eastern Japan, using off-shore pressure data observed by the seafloor observation network for earthquakes and tsunamis along the Japan Trench (S-net) (Aoi et al., 2015, JpGU). Because the tsunami inundation simulation requires a large computation cost, we have employed a database approach by searching the pre-calculated tsunami scenarios which reasonably explain the observed S-net pressure data from tsunami scenario bank based on the multi-index method (Yamamoto et al., 2016, EPS). The scenarios are selected for making forecast information in the multi-index method if all the three indexes, i.e., the correlation coefficient and two types of variance reduction, which have different sensitivity for over- and under-predictions, of the peak hold of the absolute pressure changes, meet the criterion values. The method works well for selecting possible tsunami scenarios, however, it is sometimes difficult to judge whether the selection is plausible for the scenarios with the tsunami sources located near the edge or outside of seafloor observation network based only on the ocean bottom pressure data. Therefore, we test the introduction of source information to narrow down the possible scenarios. We use the location and timing of the source information for second selection after the first scenario selection using the multi-index method but do not use the magnitude because the magnitude may be underestimated immediately after earthquakes. From the examination for simulated data for past damaging earthquake tsunamis, it is found that the combination of multi-index method and source information selection results in more reasonable scenario selection. It is also considered effective for stabilization of the scenario selection due to high waves caused by storm.

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