

Development of Tsunami Forecasting system based on offshore tsunami data assimilation

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Meteorological Research Institute (MRI) and NEC Corporation developed a prototype system for real-time prediction of near-field tsunamis using offshore tsunami data in the first half of 2012. The main part of the system is based on the tFISH algorithm, in which offshore tsunami waveform observations are inverted for spatial distribution of initial sea-surface displacement as a tsunami source model and then tsunami waveforms at an offshore point near a coastal site (a reference point, hereafter) are synthesized by linear superposition of the pre-computed tsunami Green's functions using the estimated source model (Tsushima et al., 2009). The predicted tsunami heights at the reference points are amplified to obtain those at coastal sites using the amplification factors derived from actual tsunami observations empirically (Hayashi 2010). Because the whole system is designed smartly, the single calculation including the low-pass filtering and the preparations for the real-time inversion can be accomplished within a few minutes. Once seismic magnitude fed into the system exceeds the pre-defined threshold, the forecasting calculation starts automatically and is carried out repeatedly at short intervals by renewing the offshore tsunami waveform data. The figures of the forecasting results such as the inverted source model and the predicted tsunami waveforms are also produced automatically and a user can view them with a Web browser. Also in real time the spatio-temporal tsunami wave-field data resulted from the estimated tsunami source model can be calculated. This software is installed on a hardware that is well designed for the operation of the software. The hardware includes servers for real-time analyses as well as large amounts of storage for the database of tsunami Green's functions that Kokusai Kogyo Co. Ltd. constructed. The examples of the application of the system will be presented at the meeting.

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