A prototype of database-driven system for tsunami inundation prediction using the JMA's disaster information XML

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The Nankai earthquakes are anticipated to occur accompanied by large tsunamis. Emergency disaster operations should be started rapidly and properly to save lives after the great tsunami disasters happen. In order to enhance the emergency disaster operation, we need to provide a possible tsunami inundation area as soon as possible. Although a site survey will be conducted after a half day or a day by using a helicopter for example, numerical tsunami predictions using the real-time seismic and tsunami observation are solely available until the first 12 hours to draw a big picture of the disaster. This study developed a prototype predicting tsunami inundation to the coastal area in Tokushima prefecture. The basic algorithm of prototype is similar with that of the national tsunami early warning system in Japan that selects an appropriate earthquake scenario from pre-computed tsunami database based on the epicentral location and magnitude. A difference between the JMA's system and this study can be seen in prediction target. They predict tsunami height at the coast line, but our system will predict tsunami inundation on land. We applied an open source platform, JoruriDms, to carry out the prototype. JoruriDms is a disaster management system equipped with GIS and various functions to support operations of the local government during disaster, which has been already used in the Tokushima prefecture. We defined about 220 earthquake scenarios possibly occurred in the Nankai subduction zone with a range of magnitude from 6.5 to 9.0. We here assumed heterogeneous slips on the fault planes. We repeatedly calculated tsunamis by changing the earthquake scenarios to evaluate tsunami inundation on land with spatial resolution of 5 m interval. All data were stored in a tsunami database. A logic tree was constructed to select only one scenario from the tsunami database based on the epicentral location and magnitude provided by the JMA's disaster information XML. However, this algorithm doesn't take into account earthquake rupture extent. It is also not good at tsunami earthquake which generates a large tsunami with weak seismic shaking. We accordingly added a function to upgrade (re-select) scenario based on tsunami height observations off shore and at the coast, which are provided by follow-up information of the JMA's XML. We will also discuss further plans in the presentation to improve the prediction accuracy by increasing number of the earthquake scenarios and adopting real-time data provided by the ocean bottom pressure array (DONET) in the Nankai trough.

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