

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



HDS026-15

Room:101

Time:May 22 18:00-18:15

Real-time Tsunami Inundation Prediction Using Inversion Method and GPU

Daisuke Tatsumi^{1*}, Takashi Tomita¹

¹Port and Airport Research Institute

The present authors have developed the method to predict tsunami inundation quickly from the tsunami profiles observed at the offshore locations such as GPS Buoy. This prediction method consists of the following two steps: First, the tsunami profiles in near shore areas where non-linear effect is negligible are predicted from the offshore tsunami observation by the inversion method and the principle of linear superposition. Secondly, the fast tsunami numerical calculation using Graphics Processing Unit (GPU) predicts tsunami inundation from the predicted tsunami profiles in near shore areas.

One of the innovative features of this prediction method is to reduce the tsunami observation time required for the inversion method by using the location of the epicenter as a priori information. Furthermore, the present authors reduce the time required for tsunami numerical calculation by the utilization of GPU.

The accuracy of this prediction method is confirmed by the numerical experiments using the actual bathymetry and the historical earthquakes in Nankai Trough. The tsunami arrival time, and the tsunami height and the inundation caused by the first wave of tsunami can be predicted from the tsunami profiles observed for 15 minutes at the five offshore locations. The whole prediction procedure can be completed in from 15 minutes to 20 minutes after the occurrence of earthquake.

Also, the developed real-time tsunami inundation prediction is applied to 2010 Chilean Tsunami, and the results of this application will be presented.

Keywords: tsunami prediction, inversion method, GPU, GPS Buoy, 2010 Chilean Tsunami