

Tsunami Inundation Estimation System to Improve Reliability of Evacuation Information

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(Key words) *Tsunami, inundation prediction, disaster response, evacuation*

1. Introduction

When the Chilean earthquake tsunami struck Japan at the end of February 2010, many residents did not evacuate despite the tsunami warnings, evacuation directives and recommendations which were issued, and the tsunami formed tidal bores which flowed upstream in several rivers, forcing the long-term closure of roads along the coastline, which was the region targeted by the tsunami warning. In order that from immediately after an earthquake until the danger of inundation by a tsunami has ended, river managers and other facility managers make appropriate decisions to send out patrols and to set the range of these patrols and take other disaster response measures such as restricting access to areas at risk, it is essential to predict the range and depth of inundation according to the predicted tsunami height announced in tsunami warnings instead of the largest predicted inundation range of tsunami shown on tsunami hazard maps.

This research is intended to improve facility managers' disaster response to tsunami warnings by building the Tsunami Inundation Database, which can reflect the most recent progress in the seismic retrofitting of coastal dikes etc. to rapidly estimate the range and depth of a tsunami inundation according to the predicted tsunami height announced in a tsunami warning, and at the same time, the Tsunami Inundation Calculation System, which can accurately revise the inundation estimation range at an appropriate time by reflecting the state of opening/closing of sluice gates, and the Tsunami Inundation Attenuation Prediction Model, which can predict the duration of the tsunami inundation.

2. Outline of the systems

The Tsunami Inundation Database is a database of inundation estimations calculated in advance by tsunami height in line with the state of seismic retrofitting of coastal dikes etc. In the case of a near-field earthquake, the predicted tsunami height announced immediately after the earthquake is entered to the database, which can then confirm the range and depth of inundation estimated according to the tsunami height. If it is later confirmed that the sluice gates are closed and the dikes are not damaged, the inundation estimated by the Tsunami Inundation

Database might be too high. It is now possible to improve the precision of inundation estimations by entering the state of opening/closing of sluice gates to the Tsunami Inundation Calculation System to perform an inundation calculation. This system can even be used in the case of a far-field earthquake, when tsunamis arrive a long time after the earthquake. The Tsunami Inundation Estimation System formed by supplementing these with the Tsunami Inundation Attenuation Prediction Model has the potential for application not only to disaster responses by facility managers, but also to the evacuation of residents.

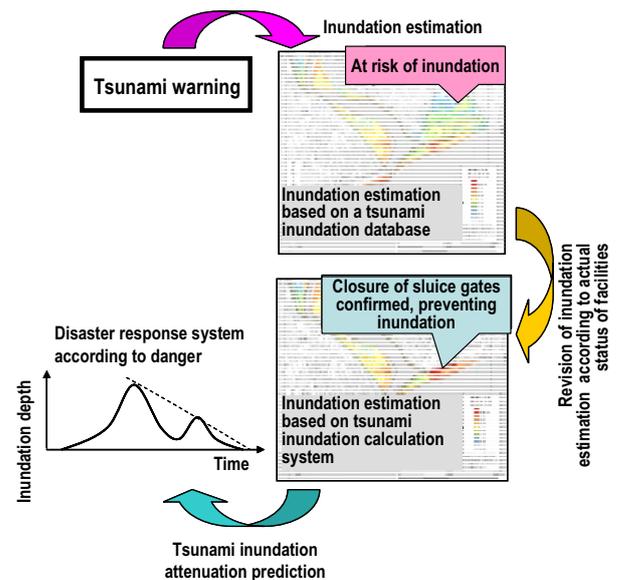


Figure 1. Outline of the Tsunami Inundation Estimation System

3. Future plans

This research is scheduled to continue for three years beginning in 2011.

[Reference]

F. Kato, Y. Suwa: Survey of evacuation from the Chilean Tsunami of 2010, Technical Note of NILIM 622