
Forecast and Visualization of Floods with River Level Forecast Basic System (Study period: FY2015 to FY2018)

- Installation of the river level forecast technology and visualization method -

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1. Introduction

In light of the incident of delay etc. in escape from the flood of the Kinu River caused by the 2015 Kanto-Tohoku Heavy Rain, NILIM launched "Flood Risk Visualization Project." In this Project, NILIM is also developing a method of visualizing flood risk for transmitting the risk and urgency of flood at a nearby site in real time and, as a core technology for realizing such a method, a technology for grasping / forecasting the profile water level.¹⁾

It has recently been decided to build a river level forecast basic system provided with the method of flood risk visualization and the technology to grasp / forecast river profile water level, which NILIM has been studying. The river level forecast basic system consists of indication system and forecasting system. This paper outlines the visualization method and the technology to grasp / forecast river profile water level, both of which are to be installed in the indication and forecast systems, and describes the background for construction of the river level forecast basic system.

2. Development of water level information from dots to lines and indication of flood risk

Water level information on rivers is important as one of the information for grasping the river condition in case of a flood. The present system in operation indicates forecast water levels as dots based on observation data from each gauging station. The river level forecast basic system indicates (visualizes) when, where and to what extent a flood could occur consecutively in the upstream / downstream (flood risk) by analyzing the relationships between river profile water level, levee height, and flood danger water level, etc. Accordingly, more effective evacuation behavior and crisis management are expected from grasping the urgency of flood, extent of damage in case of flood, etc. under this system.

3. Grasp / forecast technology of river profile water level and accuracy enhancement

The present flood forecasting system in operation forecasts river levels in the reference gauging station with

the flood forecasting model mainly consisting of runoff models. The river level forecast basic system is provided with the flood forecasting model consisting of runoff, river channel model, and multipoint water level data assimilation technology. Introduction of the river channel model enables the grasp and forecast of river profile water level. In addition, grasp and forecast of river profile water level with higher accuracy are expected from the incorporation of observed water level data and successive model optimization with the multipoint water level data assimilation technology.

4. Acceleration of actions to upgrade river level forecast

Since no standard method is established for flood forecasting method, different models are used according to each river. It is therefore difficult to share the findings etc. from the flood forecasting methods used for other rivers, and improvement has been conducted independently in each river. Hence, introduction of the river level forecast basic system also aims to raise the levels of forecast technology and accuracy and to improve the efficiency of accuracy management, model improvement, and new technology introduction, etc. by forecasting river floods in the country with the same flood forecasting method and accumulating / sharing findings collected across the country.

The flood forecasting system has been established and operated by each river office, while the river level forecast basic system will be established in each Regional Development Bureau and flood forecast will be conducted for all the rivers in each region.

5. Future plan

Each Regional Development Bureau is constructing the river level forecast basic system for completion by the end of fiscal 2018. NILIM is going to continue various studies to provide technical support and install the technology for Regional Development Bureaus.

☞ See the following for details.

1) 2017 NILIM Report, p.62