Visualization of Flood Risk with Flood Risk Line

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1. Introduction

Launching the "Flood Risk Visualization Project," the NILIM has been developing a method of visualizing flood risk for transmitting the risk and urgency of flood in real time and a technology for grasping / forecasting the profile water level as a technology for realizing such a method. [1] We have recently developed a system called "Flood Risk Line," which indicates (visualizes), as information of the "lines" along rivers, when and where a flood can occur (flood risk) through relationships etc. of river profile water levels and the dangerous water levels set for each profile, etc. In addition, the Floor Risk Line was introduced during the flood season of this year in the Arakawa (Ara River, Tokyo etc.), Yamakuni River (Oita-ken etc.), and Sendai River (Kagoshima-ken etc.) to provide the information of Flood Risk Line to the municipalities etc. concerned on a trial basis.

2. Flood Risk Line

"Flood Risk Line" system consists of the river level forecast system and the flood risk indication system. The river level forecast system computes the present status of each river profile (at the interval of 200-400 m) and water level forecast using run-off model, channel model, and the river level forecast model consisting of the multipoint water level data assimilation technology. The flood risk indication system evaluates as risk the relationship between the water level of each profile and the dangerous water level set for the relevant profile and indicates the danger levels of each profile as Flood Risk Line by color-coding them along the river. The Figure is an example of Flood Risk Line indicated by recognizing the difference between the dangerous water level and the present river level as risk. Two lines in the Figure show Flood Risk Lines, which indicate risks according to the right and left sides of the river through evaluation. The risks indicated are color-coded, such as red when the river level is higher than the dangerous water level or orange when the water level is 0 to 1 m below the dangerous water level. Further, risk assessment using forecast water level instead of present water level enables indication of changes in Floor Risk Line for 6 hours in advance.

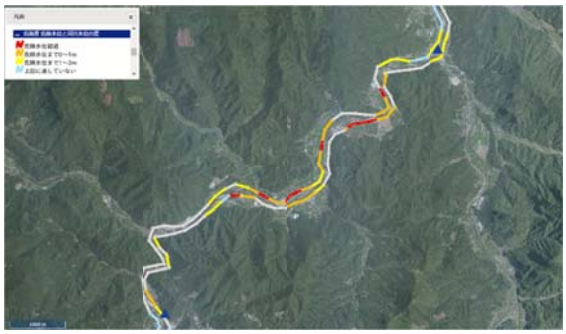

Fig. Display example of "Flood Risk Line"

3. Trial of Flood Risk Line and future

For this year's flood season, in the three rivers where the Flood Risk Line system was introduced on a trial basis, there was no flood that reached the floor danger level since the introduction (late July 2018) and Flood Risk Line was therefore not colored drastically. However, high interest in the Flood Risk Line system is recognized from the access of multiple municipalities etc. to the system when flood is expected due to approach of a typhoon etc. In the future, utilization of the Flood Risk Line is expected for more efficient evacuation actions and crisis management. Based on the results of trial introduction, the NILIM is also working for addition of the function to indicate average rainfall in basins, study of the method of longitudinal correction of river levels, etc. We plan to expand the introduction of Flood Risk Line in all the first-class river systems, and each Regional Development Bureau is constructing the system etc. NILIM is going to provide technical support to Regional Development Bureaus and conduct various studies.

☞See the following for details.
1) 2018 NILIM Report, p. 60
2) Press release of the MLIT http://www.mlit.go.jp/report/press/mizukokudo03_hh_000954.html