Study on Urban Inundation Damage Control Measures Using Inundation Forecast Information

(Research period: FY2014 to FY2018)
SENOU Shin-ichi, Researcher, ITAGAKI Osamu, Head,
Flood Disaster Prevention Division, River Department

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1. Introduction

Flood disasters have been frequently caused by record-breaking heavy rain etc. Particularly in urban areas, where concentration of population and assets, intensive use of underground space, etc. are proceeding, maintenance of sewerage and rivers is important since enormous damage is expected from incubation, and it is desirable to strengthen measures for reducing damage in the event of inundation since heavy rain exceeding the capacity of flood control facility is now frequent.

The inundation forecast system, which has been developed by Flood Disaster Prevention Division since 2014 under the SIP (Strategic Innovation Program (by Cabinet Office), receives measurement / forecast rainfall and river level data every 10 minutes, computes the flow of river, sewerage, and ground surface in an integrated manner, and distributes the forecast inundation depth, etc. one hour ahead within 10 minutes after receiving data.

2. Inundation forecast example and verification

Inundation depth was calculated based on the result and forecast rainfall data in the western Tokyo heavy rain on Aug. 13, 2018 and compared with the inundation depth obtained from the image of inundation on the website. The result showed 15 cm as estimated inundation depth in actual rainfall, 12 cm as estimated inundation depth in forecast rainfall, and about 20 cm as inundation depth read from the picture when actual inundation occurred. Thus, a certain level of accuracy was confirmed. We also recognized the importance of improving the accuracy of rainfall forecast since heavy rain was forecast immediate before the occurrence of inundation.

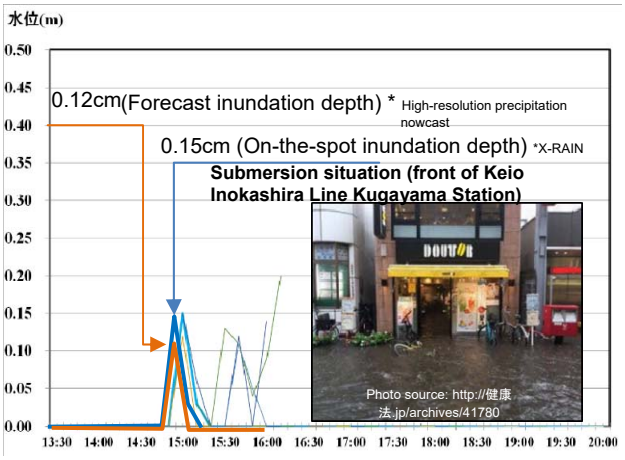

Fig. 1: Results of actual / forecast inundation depth calculation and image of inundation

3. Social experiment

We continually conducted a social experiment involving about 50 people from local governments and local disaster prevention associations including those from the area prone to inundation in the basin of the Kanda River.

We confirmed that many of the participants use the inundation forecast information as a "trigger" for obtaining other information (TV etc.).

We also started a joint study with academic experts in order to expand the system to the eastern part of Tokyo for use of the inundation forecast system in local heavy rain to prepare for the 2020 Tokyo Olympic Games / Paralympics and to cover the entire area of Tokyo 23 Wards.

Fig. 2 shows the area of system expansion to the eastern Tokyo.

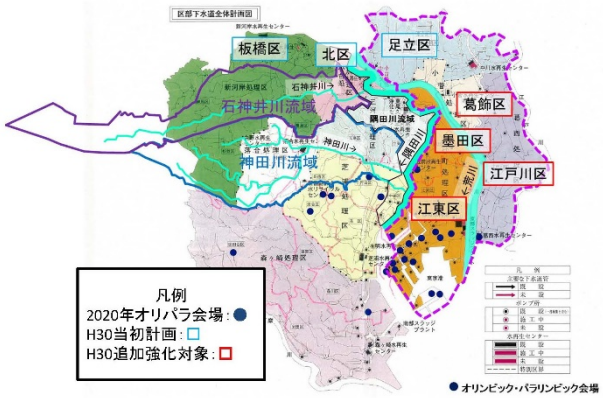

Fig. 2: Area of system expansion to the eastern Tokyo

4. Future vision

We intend to improve the accuracy of inundation forecast through the use of new rainfall observation / forecast technologies including new model weather radar and continue to study inundation damage prevention / mitigation measures using inundation forecast information.

☞See the following for details.

1) Flood Disaster Prevention Division, River Department, NILIM
http://www.nilim.go.jp/lab/rcg/newhp/index.htm