

A Study on Flood Risk in Downstream Region of Ane and Takatoki River

Michinori Hatayama^{1*}, Hirokazu Tatano¹

¹DPRI, Kyoto University

Based on recent studies on flood losses in Japan, the flooding area is decreasing because of the active behavior on implementation of flood mitigation. However, the flood damage density (property damages in unit inundated area) is increasing because of the concentration of population and assets in flood plains. Fukuoka flood of 1999 and Tokai flood of 2000 demonstrate the

importance and necessity of integrated flood risk Management. In our study, we proposed an effective method for providing the flood risk information and developed a flood risk mapping system for integrated flood risk management.

We are considering the following 2 requirements would be important for providing the effective flood risk information. 1. to recognize the spatial distribution of flood risk, 2. to evaluate the effect of integrated flood risk management by the changing of spatial distribution of flood risk. Flood hazard map is considered to be the most effective tool for providing the flood risk information at this time. The maximum depth of inundation is the measure to evaluate the flood risk in flood hazard map. However, because the definition of flood risk is the probability distribution of loss, we think it is not the best way to evaluate the flood risk by single measure. In our study, we proposed a method to evaluate the flood risk by the risk towards human lives and the risk towards property. In particular, we consider the occurrence probability of human life damage as the measure to evaluate the risk towards human lives. Furthermore, we provided the conceptions of negative human life damage map and optimistic human life damage map in order to illustrate the indeterminacy of human risk, complementarily. Negative human life damage map is composed of the mapping result of maximum depth of inundation (maximum damage scenario) and optimistic life damage map is composed of the mapping result of maximum depth of inundation (minimum damage scenario). On the contrary, we consider the expect damage rate and expect damage amount as the measures to evaluate the risk towards property. In particular, the distribution of expect damage rate illustrates the potential risk towards the property, while the distribution of expect damage amount illustrates the present risk towards the property. Therefore, the mapping result of expect damage rate is considered to be more effective for land-use management.

In this paper, we built a prototype system model according to the above mentioned requirements and developed a flood risk mapping system based on a geographic information system. Also, we evaluated the effect of our proposed flood risk mapping system in the evaluation experiment.

