E12

Development of Flood Exposure Map considering Dynamics of Urban Life

○Yuling LIU, Norio OKADA, Dayong SHEN, Yoshio KAJITANI

The vulnerability to natural hazards in urban areas has been increasing with the expansion of urbanization and diversification of urban activities. This paper addresses the problem that an effective evacuation planning has to be flexible in accordance with spatial and temporal change of human activities.

Night time population density is widely used as a measure of exposure to flood hazards in many researches. However, it is noted that people who live and work in cities are engaged in different activities at different time and place. The spatial- temporal distribution of human activities exposes people to different types and severities of flood hazards, which significantly affects and constraints people's response to a flood disaster.

This paper aims to develop dynamic a flood exposure map by involving the dynamics of urban life. The dynamic exposure map is developed through an overlap of information of people's exposure and flood hazards as shown in Fig.1. The 4th person trip (PT) survey for Keihanshin Metropolitan Region serves as the data source for people's exposure on a daily base. The flood hazard map of Kyoto City is used to represent the information on flood hazards. Nakagyo Ward, Kyoto is taken as the case study area.

The spatial analysis is conducted within four input zones, the smallest unit for PT survey data. The temporal analysis is based on four time period as 7am to 10am, 11am to 3pm, 4pm to 8pm and 9pm to 6am on the next day. The spatial-temporal analysis is conducted in both individual level and group level. As a result, two sets of dynamic exposure maps have been generated for weekdays and weekends. The analytical results demonstrate conditions for evacuation when people are engaged in different activities. The paper concludes with a discussion of the findings and policy implications.

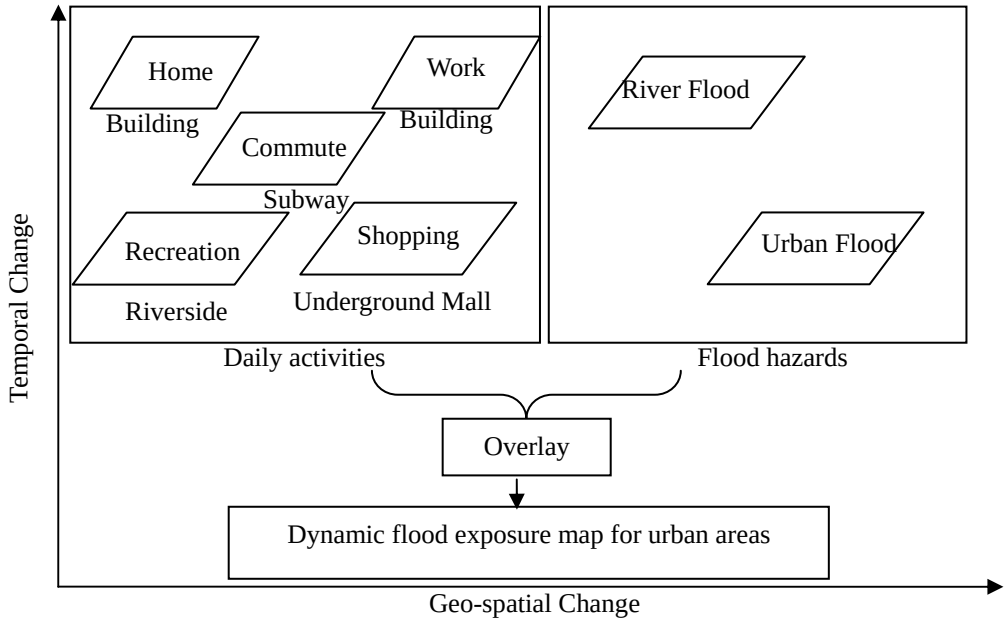

Fig. 1 Flow diagram of dynamic flood exposure maps