

A Methodology for Assessment of Spatial Distribution of Flood Risk: Considering Multiple Flood Sources

Xinyu JIANG, Hirokazu TATANO

¹ PhD candidate, Graduate School of Informatics, Kyoto University
(Gokasho, Uji, Kyoto 611-0011, Japan)

² Disaster Prevention Research Institute, Kyoto University, Japan

Flood risk assessment is one important subject for flood risk management. In flood risk assessment, one difficulty we faced is how to evaluate the joint effects from multiple flood sources for the flood affected area. The most common case is the joint effects due to river floods and inundation. If the joint effects ignored, it may lead to the flood risk in the area to be misestimated. A possible solution for this problem is to develop integrated rainfall-runoff-inundation model to simulate river flood and inundation together. As input of the model, rainfall is very significant because it connects the simulation to statistic risk analysis. Traditional methods of rainfall design are not proper for flood risk assessment considering multiple flood sources because they fail to reflect the relationship between characteristics of river floods and characteristics of inundation. For example, three hours rainfall may be important for flood peak from a large river, while two hours rainfall is enough for the flood peak from small rivers and immediate rainfall is sufficient for inundation without any concentration time. These important correlations should be reflected in rainfall design for flood risk assessment. In this paper, a copula based rainfall design method is presented for flood risk assessment which considering the correlation of rainfall characteristics of river floods and characteristics of inundation. A case study in Otsu river basin, Osaka prefecture, Japan is conducted to demonstrate this methodology.

Key word: flood risk assessment, multiple flood sources, rainfall design, copula