Application of flood risk indices using constrained multiple regression methods for different flood damage types

Myojeong Kim, Hyungon Cho, Yeonsu Do, and Gwangseob Kim

Kyungpook National University, School of Architectural, Civil, Environmental and Energy Engineering, Korea, Republic Of (myojeong@knu.ac.kr)

Flood can cause various types of damages (human, economical, and agricultural crop etc.). Typical flood risk indices are hard to represent flood risk status according to different flood damage types. Customized flood risk indices are essential to evaluate current condition and to plan the optimal countermeasures according to flood damage types. In this study, we developed the customized flood risk indices, for different damage types, using constrained multiple regression methods and ancillary data such as the annual precipitation, daily maximum rainfall, hourly maximum rainfall, ten minute maximum rainfall, total days of heavy rainfall, density of population, density of asset, road statistics, river maintenance ratio, supply ratio of water supply and sewerage, pumping capacity, reservoir capacity etc. The developed index was compared with typical flood indices using FVI (Flood vulnerability index) approach, PSR (Pressure-State-Response) approach, and DPSIR (Driving force-Pressure-State-Impact-Response) approach. Results showed that the developed indices show better test statistics than that of typical indices. The developed indices should allow us to evaluate current status of target watersheds and to plan optimal flood defense measures.