Reginal Frequency Analysis Based on Scaling Properties and Bayesian Models

Hyun-Han Kwon (1), Jeong-Ju Lee (2), and Young-Il Moon (3)

(1) Professor, Department of Civil Engineering, Chonbuk National University, Jeonju-City, South Korea(hkwon@jbnu.ac.kr), (2) Ph.D Candidate, Department of Civil Engineering, Chonbuk National University, Jeonju-City, South Korea, (3) Professor, Department of Civil Engineering, University of Seoul, Seoul, South Korea

A regional frequency analysis based on Hierarchical Bayesian Network (HBN) and scaling theory was developed. Many recording rain gauges over South Korea were used for the analysis. First, a scaling approach combined with extreme distribution was employed to derive regional formula for frequency analysis. Second, HBN model was used to represent additional information about the regional structure of the scaling parameters, especially the location parameter and shape parameter. The location and shape parameters of the extreme distribution were estimated by utilizing scaling properties in a regression framework, and the scaling parameters linking the parameters (location and shape) to various duration times were simultaneously estimated. It was found that the regional frequency analysis combined with HBN and scaling properties show promising results in terms of establishing regional IDF curves.