A Development of Hierarchical Bayesian Network-Beta Model for Forecasting Summer Seasonal Rainfall and Extreme Rainfall

Yong-Tak Kim, Hong-Geun Choi, Minkyu Jung, and Hyun-Han Kwon

Sejong University, Republic of Korea (kyongtak0225@gmail.com)

In this study, we proposed a hybrid forecasting model based on a four-parameter distribution which allows a simultaneous season-ahead forecasting for both summer seasonal rainfall and daily maximum rainfall. The proposed model mainly utilized a set of time-varying predictors and the associated model parameters are estimated within a Bayesian nonstationary rainfall frequency framework. The hybrid forecasting model was validated through a cross-validatory experiment using the recent rainfall events during 2014∼2017. The seasonal precipitation results showed a good agreement with that of the observed rainfall, which is about 0.9 in terms of the correlation coefficient. Similarly, for the extreme rainfalls at sub-daily scale, the mean absolute percentage error between the observed and simulated rainfalls is ranging from 0.3 ∼ 34%.

KEYWORDS: Hierarchical Bayesian Model, Extreme rainfall, Climate Information, Beta