A Multiscale Precipitation Forecasting Framework to Seasonal and Daily Extreme Rainfall Prediction

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(a) Purpose of study or research hypothesis
These models are generally designed to downscale climate information, such as predictive large-scale GCM outputs and climate state variables, either to seasonal rainfalls or daily rainfall sequences (or extreme rainfalls) in a separate manner.

(b) Key issue(s) or problem(s) addressed
Their contribution to summer rainfall anomalies and extreme rainfall and their potential predictability over South Korea are still not well understood. In particular, skillful prediction of intra-seasonal extreme rainfall over South Korea has not been well demonstrated in either dynamical or statistical forecast systems for the specific locations.

(c) Methodology or approach used
In this study, we developed a hybrid forecasting model combining a generalized linear regression model and a four-parameter Beta distribution based extreme downscaling model which allows a simultaneous season-ahead forecasting for both seasonal rainfall and duration maximum rainfall.

(d) Results or conclusions derived from the project
The seasonal precipitation results showed a good agreement with the observations in terms of correlation coefficient within a leave-one out cross-validation process, which is ranging from 0.69~0.78 to 0.68~0.76 in Han-River and Geum-River watershed, respectively. Similarly, for the 24-Hour maximum rainfalls, the results showed a good correspondence between the observed and predicted rainfalls with a ranging from 0.67~0.73 to 0.50~0.63.

(e) Implications of the project relevant to congress themes
It can be concluded that the proposed model could be used to better consider climate variability at multiple time scales.

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