Geophysical Research Abstracts
Vol. 21, EGU2019-19131-1, 2019
EGU General Assembly 2019

Bayesian approach to Gumbel Mixture distribution for nonstationary rainfall frequency analysis

Hong-Geun Choi, Yong-Tak Kim, Dinh-Huy Nguyen, and Hyun-Han Kwon
Sejong University, Republic of Korea (chlghdrms@gmail.com)

It has been well recognized that extreme rainfall process often features a nonstationary behavior, which may not be effectively modeled within a stationary frequency modeling framework. Furthermore, extreme rainfall patterns often can be identified as mixture distribution to cover distinct rainfall patterns such as summer monsoons and tropical. In this perspective, this study explores a mixture distribution based nonstationary frequency (MDNF) model in a changing climate within a Bayesian framework. It was found that the MDNF model can effectively account for the time-varying moments (i.e. mean and variance) as well as the time-varying mixing ratio in a two-component mixture distribution. Moreover, this study will further investigate the role of climate variables (e.g. SSTs and SLPs) on extreme rainfall as inputs in the MDNF model. A comparison of the results highlighted that the MDNF models with climate variables substantially improved the overall performance, confirming the assumption that climate patterns over the distinct rainfall patterns might affect the design rainfall estimates.

KEYWORDS: Nonstationary, Mixing ratio, SST

Acknowledgement

This work is supported by the Korea Environmental Industry & Technology Institute(KEITI) grant funded by the Ministry of Environment(Grant 18AWMP-B083066-05).