

## Future flood frequency analysis from the heterogeneous impacts of Tropical Cyclone and non-Tropical Cyclone rainfalls in the Nam River Basin, South Korea

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### Abstract

Flooding events often result from extreme precipitations driven by various climate mechanisms, which are often disregarded in flood risk assessments. To bridge this gap, we propose a climate-mechanism-based flood frequency analysis that accommodates the direct linkage between the dominant climate processes and risk management decisions. Several statistical methods have been utilized in this approach including the Markov Chain analysis, K-nearest neighbor (KNN) resampling approach, and Z-score-based jittering method. After that, the impacts of climate change are associated with the modification of the transition matrix (TM) and the application of the quantile mapping approach. For this study, we have selected the Nam River Basin, South Korea, to consider the heterogeneous impacts of the two climate mechanisms, including the Tropical Cyclone (TC) and non-TCs. Based on our results, while both climate mechanisms have significant impacts on future flood extremes, TCs have been observed to bring more significant and immediate impacts on the flood extremes. The results in this study have proven that the proposed approach can lead to a new insights into future flooding management.

**Keywords :** Tropical Cyclone; Flood Frequency Analysis; Nam River Basin; Climate Change

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