

Regional Frequency Analysis for Annual Maximum Rainfall Data

KYUNG DUK KIM¹, JUN HAENG HEO², and WOO SUNG NAM²

¹*Korea Infrastructure Safety & Technology Corporation, Korea*

²*School of Civil & Environmental Engineering, Yonsei Univ., Korea*

The main objective of this study is to obtain reliable rainfall quantiles in Korea based on regional frequency analysis. Sample sizes of annual maximum rainfall data in Korea are usually smaller than 50 years. Generally, single-site analysis is not appropriate if the record length is short than target return period T . Therefore, it is essential to use regional frequency analysis for more than 100 years return period of rainfall quantiles.

The identification of homogeneous regions is very important and requires the greatest amount of subjectively judgments, of all the stage in a regional frequency analysis. However, the regional analysis will still yield much more accurate quantile estimates than single-site analysis even though a region may be moderately heterogeneous.

In this paper, regional frequency analysis was performed based on the clustering techniques such as Ward and Fuzzy-c means (Mucha, 1996) and the results were compared using simulation experiments. The Monte Carlo simulation was designed to investigate the effects of sample sizes, the number of sites, and some degree of heterogeneity for specified regions.

As results, observed rainfall sites in Korea was divided into 14 regions based on Fuzzy-c means and Generalized logistic (GL) model was found to be an appropriate one by goodness of fit tests (Hosking and Wallis, 1997). The Fuzzy-c means method was superior to Ward's one and GL model provided the best fits like UK annual maximum floods. Finally, National Atlas with rainfall quantiles according to rainfall duration and return period were produced.

References

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