



A Study on Nonstationary Frequency Analysis to incorporate Hydrologic Trend

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ABSTRACT

Global climate change will impact across various sectors, and the frequent occurrence of the disaster is expected to cause damage. Summer heavy rainfalls and winds driven by typhoons are the most frequent cause of climate related disasters in Korea. This study employed a non-stationary frequency analysis and applied to annual maximum rainfall series to incorporate its inherent trend. To begin with, a relationship between MAMR (Mean of Annual maximum Rainfall) and two parameters (e.g. location and scale parameters) of Gumbel distribution is derived with two different ways that are the successive averaged and moving average method. The moving average method showed better performance in terms of recognizing short-term variability. There are advantages to have a stronger relationship between MAMR and Gumbel distribution parameters compared to the successive average method based MAMR. On the other hand, the moving average method is more or less sensitive to the extremes so that the estimated results can be unreliable for limited-size data set. Finally, the proposed model is applied to estimate design rainfall for main weather stations in Korea and a rigorous comparison with existing approach is provided.

KEYWORDS: Climate Change, Disaster, Frequency Analysis, Non-Stationary, Drainage system

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