



## **The optimal rainfall network using Entropy in South Korea**

Taeyong Kwon (1), Junghyun Lim (1), and Sanghoo Yoon (2)

(1) Department of Statistics, Daegu Univiversity (hero6504@naver.com), (2) Division of mathematics and Big Data Science, Daegu University (statstar@daegu.ac.kr)

It is important to evaluate whether the gauged stations are installed in the proper location. Entropy theory is widely used in hydrology. Joint and conditional entropy were calculated to find the optimal rainfall network. The study data was collected from 11 automated synoptic observing system (ASOS) between 1986 and 2016 at Daegu-Gyeongbuk province in South Korea. MAE(Mean Absolute Error), RMSE(Root Mean Squared Error), bias and correlation coefficient were considered to select the optimal rainfall network. As the result, conditional entropy was the best. The optimal number of rainfall network was also determined according to the RMSE is decreased when rainfall network is larger. Then, we applied conditional entropy to total 67 gauged stations(Automatic Weather System 56 + ASOS 11) between 2001 and 2016. We conducted that it can be applied to optimize the rainfall network in remote and large areas.