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Assessing likelihood of sectoral drought impact occurrence in South Korea

Jungho Seo¹, Jaehyeong Lee², and Yeonjoo Kim³

¹Yonsei, Civil&Environment Eng, Seoul, Korea, Republic of (krmsuh@yonsei.ac.kr)

²Yonsei, Civil&Environment Eng, Seoul, Korea, Republic of (wogud64777@naver.com)

³Yonsei, Civil&Environment Eng, Seoul, Korea, Republic of (yeonjoo.kim@yonsei.ac.kr)

Drought is the most complex natural hazard that can cause a wide range of impacts affecting the environment, the society, and the economy. Drought is often quantified with one or a set of drought indices, yet these drought indices are limited in capturing such various impacts. This study aimed to understand quantitative relationship between drought impact and drought occurrence in South Korea. We there constructed drought impact inventory by collecting data not only from the existing datasets but also by using a web-crawling method. The collected drought impact data were classified into categories such as agriculture and livestock farming, public water supply, wildfire, and water quality. Also, to quantify the drought occurrence, the standardized precipitation and evapotranspiration index (SPEI) was used as a drought index. We derive the likelihood of drought impact occurrence as a function of the drought index with using the log-logistic regression as well as the random forest algorithm as well as the random forest algorithm. Note that the logistic regression is appropriate with binary data such as drought impact occurrence and Note that the logistic regression is appropriate with binary data such as drought impact occurrence and the random forest algorithm is powerful algorithm to develop a predictive model based on classification and regression trees. As a result, the sector-specific likelihood of drought impact occurrence over the regions are identified. We show the highest likelihood of drought impact occurrence in public water supply for Jeonnam area, wildfire for Gangwon area and water quality for Gyeongnam. This study suggests that such drought impact information can support the decision-making for drought risk reduction.

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