Classifying meteorological drought severity using a hidden Markov Bayesian classifier

Muhammad Nouman Sattar*, Dong-Hyeok Park, Hyun-Han Kwon***, Tae-Woong Kim******

ABSTRACT

The development of prolong and severe drought can directly impact on the environment, agriculture, economics and society of country. A lot of efforts have been made across worldwide in the planning, monitoring and mitigation of drought. Currently, different drought indices such as the Palmer Drought Severity Index (PDSI), Standardized Precipitation Index (SPI), Standardized Precipitation Evapotranspiration Index (SPEI) are developed and most commonly used to monitor drought characteristics quantitatively. However, it will be very meaningful and essential to develop a more effective technique for assessment and monitoring of onset and end of drought. Therefore, in this study, the hidden Markov Bayesian classifier (MBC) was employed for the assessment of onset and end of meteorological drought classes. The results showed that the probabilities of different classes based on the MBC were quite suitable and can be employed to estimate onset and end of each class for meteorological droughts. The classification results of MBC were compared with SPI and with past studies which proved that the MBC was able to account accuracy in determining the accurate drought classes. For more performance evaluation of classification results confusion matrix was used to find accuracy and precision in predicting the classes and their results are also appropriate. The overall results indicate that the MBC was effective in predicating the onset and end of drought events and can utilized for monitoring and management of short-term drought risk.

Key Words: meteorological drought, drought classes, SPI, Markov Bayesian classifier

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* Dept. of Civil and Environmental Engineering, Hanyang University (E-mail: engr_nouman847@yahoo.com)

** Dept. of Civil and Environmental Engineering, Hanyang University (E-mail: smilehyuki@hanyang.ac.kr)

*** Member. Dept. of Civil and Environmental Engineering, Sejong University (E-mail: hkwon@sejong.ac.kr)

**** Member. Corresponding author, Dept. of Civil and Environmental Engineering, Hanyang University (E-mail: twkim72@hanyang.ac.kr)