A Deep Learning Approach for prediction of meteorological drought over the region of Nagaland

Ayilobeni Kikon[1] and B M Dodamani[2]

(1) Research Scholar, Department of Water Resources & Ocean Engineering, National Institute of Technology Karnataka, Surathkal- 575025; Email: ayilobeni@gmail.com

(2) Professor, Department of Water Resources & Ocean Engineering, National Institute of Technology Karnataka, Surathkal- 575025

Meteorological drought is a type of drought which is caused due to the shortage of rainfall. Due to the climate change and human activities, there is a need to understand the various catastrophe causing due to drought and adopt measures to overcome and prevent the drought consequences. In this study, deep learning technique is employed for prediction of meteorological drought in Nagaland, India. Nagaland receives an annual average rainfall of about 1800-2500 mm and monsoon plays a very important role. Monthly precipitation data from 1983-2017 is used to evaluate the meteorological drought index on SPI-12. A deep learning approach such as long short-term memory (LSTM) and multilayer perceptron (MLP) is employed to forecast the drought using 12-month timescale SPI. The results show that LSTM gives a better efficiency while comparing the evaluation metrics with the MLP model in predicting the meteorological drought. Further, a spatial distribution map is generated to understand the drought behaviour which may be beneficial to take proper measures to avoid the prevailing conditions in the study area. Overall, this study also plays a significant role in understanding the rainfall pattern and its distribution for water management and planning for future water use.

Keywords: Drought, Standardized Precipitation Index (SPI), Deep Learning technique, Spatial distribution.