**ABSTRACT**

Meteorological scientists always try to find means to understand the atmosphere o f the Earth, and to develop accurate weather prediction models. Several methods have been used in weather prediction. Recently, machine learning methods are assumed to be accurate techniques and have been widely used as an alternative to classical methods for weather prediction. The rainfall rate is one of the essential phenomena in the weather system, which has a direct influence on the agriculture and biological sectors. This paper aims to develop a multiple linear regression model in order to predict the rate of precipitation (PRCP), i.e., rainfall rate, for Khartoum state. It is based on some weather parameters, such as temperature, wind speed, and dew point. The data used in this research has been provided from the website o f the National Climatic Data Center. A Python code using the Pytorch library has been written to develop the model, which applies Artificial Neural Networks. The efficiency of the model has been measured by comparing the average value of the mean square error of the training data with the test data. The obtained results show that the average of the mean square error has been improved by 85% during test time, when the same amount o f data is used during the training and test phases. However, it drops to 59% when the amount o f data at the test phase exceed the amount of training phase data .