

Evaporation Estimation by Multiple Linear Regression and Artificial Neural Network Based Models in Uttarakhand

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Abstract—Evaporation is the process by which water changes from a liquid to a gas or vapour. Evaporation is the primary pathway that water moves from the liquid state back into the water cycle as atmospheric water vapour. It is used to estimate the evapotranspiration and water resources management. Evaporation is calculated from the direct measurement and indirect measurement. In the present study the Multiple Linear Regression (MLR) and Artificial Neural Network (ANN) models were developed for estimating evaporation. The data set consisted of four years of daily records from 2010 to 2013. The daily data consist of temperature, relative humidity, wind speed, sunshine hour and evaporation. The daily data of temperature, relative humidity, wind speed, sunshine hour were used as input and the evaporation was used as the output. For estimation of evaporation 70% data was used for training and 30% for testing of MLR and ANN models. ANN was used for designing of models based on activation function; Tanh Axon and learning rule; Levenberg Marquardt with 1000 number of epochs, three hidden layers (1, 2, 3) with 1, 2, 3...8 neuron in each hidden layers. The performance of MLR and ANN models was compared on the basis of statistical functions such as RMSE, R2, and CE. The results indicate that the ANN performed superior to the MLR. In which the values of RMSE, R2 and CE were 0.425, 0.912 and 90.22% respectively for best ANN network. It was concluded that the ANN model can be successfully employed for the estimate on of daily evaporation at Hawalbagh, Almora.