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The use of artificial neural networks for forecasting the monthly mean soil temperatures in Adana, Turkey

Mehmet BİLGİLİ
Department of Electrical and Energy Divisions, Adana Vocational High School, Çukurova University, 01160 Adana - TURKEY

Abstract: The objective of this paper was to develop an artificial neural network (ANN) model in order to predict monthly mean soil temperature for the present month by using various previous monthly mean meteorological variables. For this purpose, the measured soil temperature and other meteorological data between the years of 2000 and 2007 at Adana meteorological station were used. The soil temperatures were measured at depths of 5, 10, 20, 50, and 100 cm below the ground level by the Turkish State Meteorological Service (TSMS). A 3-layer feed-forward artificial neural network structure was constructed and a back-propagation algorithm was used for the training of ANNs. The models consisting of the combination of the input variables were constructed and the best fit input structure was investigated. The performances of ANN models in training and testing procedures were compared with the measured soil temperature values to identify the best fit forecasting model. The results show that the ANN approach is a reliable model for prediction of monthly mean soil temperature.

Key words: Artificial neural network, meteorological variables, prediction, soil temperature