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ARTIFICIAL NEURAL NETWORKS BUILT FOR THE RAINFALL ESTIMATION USING A CONCATENATED DATABASE

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Abstract

The paper presents a comparative analysis between several expert systems built for rainfall estimation from reflectivity of radar observations and ALADIN model parameters. The systems were built using Artificial Neural Networks (ANNs) and are dedicated to the estimation of the rainfall rate. The main advantage of ANNs is in cases where intrinsic nonlinearities in the dynamics prevent the development of exactly solvable models. In meteorology, all of these criteria are present in the sense that the dynamics are inherently nonlinear, and prediction is one of the main goals.

Two types of expert systems were built: *pure* ANN systems which use as inputs reflectivity data and ALADIN model parameters, and *hybrid* ANN systems which use as inputs a concatenated database obtained by the original data i.e. reflectivity data and ALADIN model parameters. The radar data were recorded by the WSR-98 D S-band Doppler radar located in Barnova, in the north-east of Romania. The validation results of all expert systems are analyzed.

Key words: ALADIN model, artificial neural network, radar data, rainfall estimation

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