



## **Improving Rainfall Estimation by the Optimization of Input Data using PC-ANN Systems**

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A pure artificial neural network (ANN) and several artificial neural networks coupled with principal component analysis (PC-ANN) have been developed in order to estimate the rainfall rate. The ANN system has as input variables reflectivity data and ALADIN model parameters, i.e. potential temperature, vertical component of the wind, specific humidity, air temperature, precipitable water, relative vorticity and moisture divergence flux. The radar data were obtained with the WSR-98 D S-band Doppler radar located in Barnova, north-east Romania. In the case of PC-ANN systems, the original data (reflectivity data and ALADIN model parameters) have been compressed with the principal component analysis method (PCA), the scores of the principal components (PCs) being the inputs of these systems. Our goal was to find the optimum number of PCs for the input layer, therefore we have built several hybrid PC-ANN systems with different number of input variables: 2PCs, 3PCs, 4PCs, 5PCs, 6PCs and 7PCs. We are presenting a comparison of the results of the validation obtained with the best hybrid expert PC-ANN system and with the pure ANN system, taking into account that the nature of the input variables for these systems is different.