9.22 A K-NN METHOD FOR NOWCASTING RAINFALL INTENSITIES AT FINE TEMPORAL AND SPATIAL SCALES

B.SHEHU[1], U. HABERLANDT[1]

[1] Institute of hydrology and water resources, Hannover Germany
boshehu90@gmail.com

The short term forecast of rainfall intensities for fine temporal and spatial resolutions, has always been challenging due to the unpredictable nature of rainfall. Commonly at such scales, radar data are employed to track and extrapolate rainfall storms in the future. Studies have shown that for short lead times (up to 30 min) linear extrapolation of rainfall storms produces reliable results, however for higher lead times (up to 2 hours) the error of linear motion increases considerably. Therefore, the aim of this study, is to include the non-linear motion and transformation of rainfall storms, by developing a K-NN method based on historical radar data that will predict rainfall intensities for lead times from 5min up to 2 hours.

For this purpose, several storms are selected from the period 2006-2012 from the Hannover radar station, in order to train and validate the forecast method (by split sampling). Based on the training set, several predictors have been extracted and tested for their importance by different methods (linear correlation, sobol indices and partial information correlation). The best predictor set with the respective weights is used to find the optimal number of neighbors, which is then used to test the method performance on the validation set. In order to reveal the advantage of including non-linear transformations, a linear extrapolation forecast method (HyRaTrac) was employed as well and tested for the validation set. Special attention is given to the quality of the radar input by comparing raw radar data versus merged radar with station data (80 stations included). The performance is assessed by computing the relative error of forecasted field from the observed radar field, for three types of events: stratiform, convective and mixed.

The results of this study emphasize the importance of including non-linear transformation for forecasting rainfall intensities at lead times higher than 15 min for different types of events. Moreover, the impact of merged radar data on the forecast itself for very short lead times (up to 15 min) is discussed.