



Bias adjustment and comparison of radar rainfall estimates with rain gauge measurements

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Heavy rainfall events have produced significant damages and casualties in different regions of Romania in the last decades. Some of the areas most at risk of flooding are those within river catchments. Atmospheric precipitation shows a large variation both in space and time, while numerous applications, such as flood forecast, require robust information, capable to describe accurately the precipitation conditions over an area. Quantitative precipitation estimates (QPE) based on weather radar observations are used increasingly more for water management, for monitoring of severe weather events, and in numerical weather prediction models. Combining the rainfall amount measured by ground sensors with radar estimates one can expect more reliable precipitation information. This study aims to compare the radar rainfall estimations with the rain gauge measurements, in order to improve the quantitative precipitation estimation over a given region. Data used to calculate the radar rainfall accumulations is the base reflectivity. The differences between radar-derived and gauge-measured precipitation amounts are evaluated. Spatial distinctions and areas with good radar accuracy for QPE have been emphasized during the investigations. Bias adjustment of short-term radar-based precipitation accumulations is done over a river basin, which serves as test area, in Eastern Romania. In addition, a long-term verification of the bias-adjusted composites over a seven year period using rain gauge data is presented. The adjustment method cannot correct for a range-dependent bias and therefore it is recommended to also use other methods in this regard (e.g., vertical profile of reflectivity adjustment). The output validation aimed to predict the rain gauge amounts using the radar information and the resulted adjustment parameters. The validation demonstrates that the radar data are reliable within approximately 150 km radius, and the comparison with rain gauge measurements can foster consistently the QPE accuracy.