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# Rainrate estimation and accuracy assessment in complex orography from C band single polarization weather radar

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Rainfall estimation errors by weather radars, are usually categorized into two main groups: systematic and random errors. Systematic errors include biases and range dependent effects. The main source of bias errors include drifts in radar calibration constant and systematic variations in the relationship between radar reflectivity and rain-rate. For range-dependent errors, they are caused mainly by the scan geometry of weather radars, the variations in the reflectivity profile, the attenuation by rain and partial beam filling. On the other hand, random errors could originate from the variability of rainfall within the resolution cell and radar hardware system noise. The presence of complex orography introduces amplification effects for some of these errors.
In this work an analysis of systematic errors from the single polarizarion radar of the Abruzzo region in the center of Italy is dealt with. To pursue this aim, a large set of data covering a two year period from 2008 to 2009 and consisting of radar scans and gauge measurements, have been collected and carefully processed. Efforts to mitigate systematic errors of radar rain estimation are mainly based on the modelling of the ratio between gauge observed and radar derived rain as a function of spatial coordinates. On the other hand, the assessment of the accuracy associated to the radar rainfall estimations is achieved by the definition of the spatio-temporal correlation function of the rain estimation error and biases as a function of the orography and seasonal effects.