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Integral Radar Volume Descriptors as a potential validation tool for modelled precipitation dynamics and microphysics

S. Trömel and **C. Simmer**

Meteorological Institute, University Bonn, Germany (silke.troemel@uni-bonn.de)

We hypothesize that an improved Quantitative Areal Precipitation Estimation (QPE) can be achieved by more extensively exploiting the spatial and temporal variability of the radar signals produced by the complete precipitation generating system, e.g. by a convective cell during its life span. This concept will not provide instantaneous rain rates but we might be able to provide more reliable estimates of rainfall integrated over time or space, which in turn can be used to constrain estimates based on local Z-R-relations. We search for so-called Integral Radar Volume Descriptors (IRVD), which can be derived from the three dimensional radar volume data and are supposed to contain relevant information on the underlying precipitation process. Doneaud et al. (1981) already provided a first rough but insufficient rainfall estimate for hydological demands from radar data without invoking a Z-R-relationship. Thus we extend the concept by adding further descriptors, e.g. the horizontal expected value of enclosed reflectivities at the ground, the mean brightband fraction and its trend or the orographic rainfall amplifier in order to enhance the accuracy of the estimates.