

Quality aspect related to radar-based hail detection

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Different factors can influence a hail climatology based only on ground reports. For example, the geographical distribution of reports can be strongly influenced by population density. Besides, a substantial bias towards severe hail can be found in the information provided by insurance companies. Radar observations supply an alternative way for detecting hail with high resolution in space and time. Of course, radar data are affected by various sources of errors. Therefore, the assessment of the quality should be the first step in any statistical analysis based on these measurements. Contamination by clutter and scanning geometry effects are addressed in the present study.

Volume reflectivity data from a single-polarization C-band radar have been archived in Belgium since 2003. This 3D dataset allows us to apply two hail detection algorithms making use of the vertical profiles of reflectivity for the estimation of the occurrence and severity of hail. The hail detection algorithms are used on the uncorrected data and on the data processed by a new non-meteorological echoes mitigation procedure developed at RMI.

The results of the hail detection algorithms, i.e. the Probability of Hail (POH), the Probability of Severe Hail (POSH) and the Maximum Expected Size of Hail (MESH) are verified against a set of ground reports. Range dependence related to scanning geometry is examined in order to identify an optimal range interval. Differences in hail detection based on uncorrected and corrected radar data are analyzed from a statistical point of view. Possible improvement of the attenuation estimation using hail detection is also investigated.