



Radar detection of hail in Czechia using single- and/or dual-polarization data

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Comparative analysis of radar-based hail detection and hailstone size classification is presented. It uses C-band polarimetric radar data from Czech territory for 5 stormy days in May and June 2016. Altogether 27 hail events were selected from hail reports of the European Severe Weather Database (ESWD). Also 21 heavy rain events without hail were found in ESWD during the studied stormy days for comparison. Hail detection methods were applied to the both sets of events.

The hail detection results compared in this work were obtained by using a criterion, which is based on single-polarization radar data, and by the technique, which uses dual-polarization radar data. The both methods successfully detect large hail events in a similar way and show a strong agreement. The hail detection, as applied to heavy rain events, indicate a weak enhancement of the number of false detected hail pixels in the use of hydrometeor classification on the basis of the dual-polarization data. We also examined the performance of hail size estimation from radar data using both single- and dual-polarization methods. Hail size reports on the ground are related to the radar signatures. Both approaches recognize events with large hail but cannot select the events, which report maximum hail size (diameter above 4 cm).

Finally the potential hail detection improvement using dual-polarization radar data is discussed.