The verification of radar hail detection algorithms using >50'000 crowd-sourced hail reports in Switzerland

Hélène Barras (1,2,3), Pascal Noti (4), Alessandro Hering (5), Urs Germann (5), Olivia Martius (1,2,3)

(1) Oeschger Centre for Climate Change Research, University of Bern, Switzerland, (2) Institute of Geography, University of Bern, Switzerland, (3) Mobiliar Lab for Natural Risks, University of Bern, Switzerland, (4) Pädagogische Hochschule Bern, Bern, Switzerland, (5) Federal Office of Climatology and Meteorology MeteoSwiss, Locarno-Monti, Switzerland

The radar hail detection algorithms POH (probability of hail) and MESHS (maximum expected severe hail size) have been widely used in Switzerland and other countries to nowcast and analyze the presence and size of hail. However a comprehensive validation of the radar-based hail size estimates in Switzerland is so far missing. Since May 2015, the MeteoSwiss Weather App has received >50'000 crowd-sourced hail reports from the Swiss Population; an unprecedented number of reports of the presence and approximate size of hail. These reports have to be filtered for plausibility using a neighborhood method and the maximum reflectivity fields of the radar. This reduces the number of reports to a few thousands. We used the remaining reports to verify POH and MESHS. First results show a correlation between the reported hail size and the radar-based size estimates but also significant variability of the radar-based MESHS values for each reported hail-size class. Detailed case studies show the potential for improving these algorithms and determining details on the necessary convective environment that is conducive to hail. Furthermore, crowed-sourced hail reports represent a way of sensitizing the Swiss Population towards natural hazards and gives them the opportunity to actively contribute to their own protection and well-being. This work presents the strengths and weaknesses of the crowd-sourced reports, a neighborhood verification of POH and MESHS and a recent case study on severe hail in Switzerland's complex topography.