Operational hail nowcasting and automatic warnings at MeteoSwiss

Alessandro Hering
MeteoSwiss, Locarno-Monti, Switzerland

Nisi, Luca (MeteoSwiss, Locarno-Monti, Switzerland; Oeschger Centre, University of Bern, Switzerland)
Trefalt, Simona (MeteoSwiss, Locarno-Monti, Switzerland; Oeschger Centre, University of Bern, Switzerland)
Germann, Urs (MeteoSwiss, Locarno-Monti, Switzerland)

E-mail: Alessandro.Hering@meteoswiss.ch

In case of severe thunderstorms MeteoSwiss alerts authorities and population by means of flash-news warnings with a lead-time of some tens of minutes. These warnings are based on the operational, multi-sensor nowcasting systems TRT and COALITION. Convective, high-impacting summer storms can produce local flash-floods, wind gusts, lightning and intense hail, causing severe damage in the Alpine and pre-Alpine region, and the Swiss plateau. To assess the hail potential of individual thunderstorm cells, two specific grid-based products are computed operationally with a resolution of 1x1 km2, and a frequency of 5 min: the Probability Of Hail (POH) of any size, and the Maximum Expected Severe Hail Size (MESHS). These products are based on the Echo Tops at 45 and 50 dBZ, as measured by the Swiss Dual-polarisation Doppler radar network, and the freezing level, determined from the regional, high-resolution, non-hydrostatic NWP model COSMO-2. Potential damage to agriculture, cars, buildings and infrastructure in general, can be estimated with sufficient accuracy. In order to verify the quality of these hail products, another project compares them with an independent data set of insurance claims. To also exploit this information for specific warnings, an extrapolation algorithm was developed, using latest cell motion vectors from TRT. Automatic short-term, small-scale hail alerts for specific targets (e.g. airports, stations, buildings,...) and for the population, are automatically generated and transmitted using SMS and e-mail. The paper will focus on the latest operational hail products and show first preliminary results from the prototype of a fully automatic hail alert system. An outlook on the potential of polarimetric radar products in complex orography and future developments using precursors of hail formation is also presented.