



A hail risk map for Europe based on overshooting top detections and atmospheric conditions associated to hail reports

Heinz Jürgen Punge (1,*), Michael Kunz (1,*), and Kristopher M Bedka (2)

(1) Institute for Meteorology and Climate Research, Karlsruhe Institute of Technology, Karlsruhe, Germany (heinz.punge@kit.edu), (2) NASA Langley Research Center, Hampton, VA, USA, (*) Willis Research Network, London, UK

Severe hailstorms have caused widespread damage in many parts of Europe in the past. Besides orographic features, their frequency and intensity depend on the climatic properties of the atmosphere and are thus susceptible to change in an altered climate.

In a first step, a continental scale climatology of hail risk is needed as a reference. We propose a hail hazard map based on the detection of cold overshooting cloud tops (OTs) from the MSG operational weather satellites, in combination with a hail-specific filter derived from the ERA-INTERIM reanalysis. This filter has been designed based on the atmospheric properties in the vicinity of hail reports registered in the European Severe Weather Database (ESWD). Selected properties include freezing level height, tropopause height, equivalent potential temperature, total column water and 2m dew point temperature, evaluated on the nearest time step and interpolated from the reanalysis grid to the location of the hail report.

The major hail risk areas from most national scale climatologies are retained.

The largest hail risk in Europe is found in Northern Italy, followed by Styria in Austria and Catalonia in Spain. Pronounced hail risk is also found in large parts of Eastern Europe, around the Alps, the Czech Republic, Southern Germany, Southern and Eastern France, in the Iberic and Apennine mountain ranges.