



Creating a comprehensive quality-controlled dataset of severe weather occurrence in Europe

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Ground-truth quality-controlled data on severe weather occurrence is required for meaningful research on severe weather hazards. Such data are collected by observation networks of several authorities in Europe, most prominently the National Hydrometeorological Institutes (NHMS). However, some events challenge the capabilities of such conventional networks by their isolated and short-lived nature. These rare and very localized but extreme events include thunderstorm wind gusts, large hail and tornadoes and are poorly resolved by synoptic observations. Moreover, their detection by remote-sensing techniques such as radar and satellites is in development and has proven to be difficult.

Using the fact that all across across Europe there are many people with a special personal or professional interest in such events, who are typically organized in associations, allows pursuing a different strategy. Data delivered to the European Severe Weather Database is recorded and quality controlled by ESSL and a large number of partners including the Hydrometeorological Institutes of Germany, Finland, Austria, Italy and Bulgaria. Additionally, nine associations of storm spotters and centres of expertise in these and other countries are involved. The two categories of organizations (NHMSes/other) each have different privileges in the quality control procedure, which involves assigning a quality level of QC0+ (plausibility checked), QC1 (confirmed by reliable sources) or QC2 (verified) to each of the reports.

Within the EWENT project funded by the EU 7th framework programme, the RegioExakt project funded by the German Ministry of Education and Research, and with support from the German Weather Service (DWD), several enhancements of the ESWD have been and will be carried out. Completed enhancements include the creation of an interface that allows partner organizations to upload data automatically, in the case of our German partner "Skywarn Germany" in near-real time. Moreover, the database's web-interface has been translated into 14 European languages. At the time of writing, a nowcast-mode to the web interface, which renders the ESWD a convenient tool for meteorologists in forecast centres, is being developed. In the near future, within the EWENT project, an extension of the data set with several other isolated but extreme events including avalanches, landslides, heavy snowfall and extremely powerful lightning flashes, is foreseen.

The resulting ESWD dataset, that grows at a rate of 4000-5000 events per year, is used for wide range of purposes including the validation of remote-sensing techniques, forecast verification studies, projections of the future severe storm climate, and risk assessments. Its users include scientists working for EUMETSAT, NASA, NSSL, DLR, and several reinsurance companies.