



## **The Role of Crowdsourcing in the Retrieval of Severe Weather Information in the Past, Present and Future**

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Extracting information on the impact of damaging weather events is a challenge for meteorologists, but it pays off twofold: A real-time knowledge of actual severe weather events helps the operational forecaster to issue and update targeted and timely warnings, which allow immediate protective measures in the expected track of the phenomenon. On climatological timescales, knowledge of severe weather events and their temporal trends are crucial for a strategic planning to enhance preparedness and to mitigate their impact on human property and lives.

A turning point in the storage of severe weather observations was marked by the increasing use of telegraphy in the late 19th century: Information started spreading quickly enough to enable its prompt and multiple publications in newspapers. This new redundancy started making the damage reports reliable enough for a reconstruction of historic severe weather events, which becomes possible as present-day efforts of historians to preserve and digitize these records are increasing. Hence these data allow a more direct and impact-related assessment of severe weather hazards and their climatological changes than standard methods of statistical or dynamical downscaling.

Another change in the flow of “ground truth” information is in progress now. Recent automatization of weather station networks has reduced routinely available human weather observations. In parallel, the omnipresence of smartphones and their connection to the internet are opening an unprecedented possibility to make crowd-generated severe storm information available within seconds via text notes, pictures or video clips. Another direct way to verify weather-related damages inheres in records of the interventions of fire brigades and other emergency services; while it is common sense that these services need weather information to be prepared, the potential of a closure of this feedback loop and its exploitation for updated severe weather warnings is still lying largely idle.

Weather services shall embrace this treasure hunt and extract the hidden jewelry among this haystack of crowd-provided information! The feasibility of a comprehensive reconstruction of both historic and recent severe weather events was investigated at Austria’s national weather service (ZAMG). A comparison of the spatio-temporal structures of severe weather reports in central Europe in a selected year in the early 20th century and in 2016 exhibits stunning similarities, indicating how commutable past and present retrieval mechanisms are. Further emphasis of this presentation is set on our current efforts to involve emergency services and the general public into an automatized feedback loop. Thoughts on possible future evolutions are expressed as well.