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Impact-based evaluation of European severe weather reports

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The European Severe Weather Database (ESWD) is operated by the European Severe Storm Laboratory (ESSL). The number of events contained in the database currently comprises more than 82 900 individual reports and this number is growing in part because of strongly rising interest in severe weather in Europe and foundations of volunteer observation networks (e.g. Skywarn organisations and other similar associations).

The ESWD contains severe weather events that often impact people, man-made structures or infrastructure. Often, the number of injured or killed persons as well as phrases describing the type of structural damage are included as meta-information with the database reports. Examples are phrases such as "houses damaged", "trees down", "roads blocked", and occasionally more detailed descriptions. In this study, we peruse this data to learn which type of damage was caused by which severe weather phenomenon by means of a statistical analysis illustrated by specific cases.

The statistics show that the number of fatalities in Europe because of severe weather is highest for floods, followed by lightning, then severe wind gusts, then tornadoes and finally hail. Sometimes, the attribution of consequences to severe weather is not straightforward. For example, are those who died in an air crash after it was it by lightning victims of the lightning? Is someone who was killed by stepping on a high-voltage power line that was damaged by hail, a victim of the large hail?

From a financial point of view, the order of importance of weather phenomena is very different. For instance, large hail can create enormous financial losses, but rarely kills people. Using the meta-data, we look and discuss how often particular modes of damage are mentioned per category, in order to better understand direct and indirect ways that particular severe weather phenomena impact society.