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What we know and don't know about the societal and economic impact of severe weather events in Europe

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Each year, severe convective storms—those producing large hail, flash floods, severe wind gusts, tornadoes, and cloud-to-ground lightning—are associated with hundreds of injuries and fatalities and damages estimated at tens of millions of euros in Europe. Although a relatively large number of studies have analysed the spatial and temporal distribution of severe weather events in Europe, very few studies have focused on the societal and economic of these events.

First, we present an overview of recent studies analysing the impact of severe convective storms in Europe, with an emphasis on those analysing the impact of tornadoes. Using a pan-European severe weather dataset (i.e. the European Severe Weather Database developed and maintained by the European Severe Storms Laboratory), we will show that the threat of tornadoes is currently underestimated in Europe.

Second, to understand the current and future impact of severe convective storms, we construct a series of "worst case scenarios" based on the strongest tornado outbreak in the recent history of Europe (i.e. the 24–25 June 1967 tornado outbreak over France, Belgium, and the Netherlands). We will show that the impact of tornadoes, and by extension of severe convective storms, will increase due to the potential increase in exposure (i.e. population increase, city growth) and risk (i.e. increase in the frequency of environments associated with severe convective storms due to the climate change).

These results show that we need to 1) increase the awareness of severe convective storms in Europe (in particular, on tornadoes), 2) develop disaster management policies that will include all types of severe weather events, and 3) develop mitigation activities and information campaigns about the risks associated severe weather events in Europe. A series of strategies, based on the experience for the United States, are proposed (e.g., campaigns to increase awareness on severe weather, development of safety resources, seasonal forecasting of severe weather events) in order to reduce the impact of severe convective storms in Europe.