



Long-lived convective windstorms of 2017 and their impacts across Europe

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Long-lived convective windstorms, derechoes, pose considerable societal and economic threat. While severe convective wind gusts are known to frequently occur only over small areas, swaths of damaging winds in the wake of long-lived convective systems can exceed hundreds of km in length and cover multiple countries.

In 2017 alone, using the European Severe Weather Database, we have identified 12 such events between May and September, resulting in 43 fatalities and hundreds of injuries. The number of fatalities and injuries for 2017 is actually higher than for the synoptic-scale, non-convective windstorms occurring in the same year. The impacts of the convective windstorms may, compared to their larger-scale non-convective counterparts, be exacerbated as they tend to occur during the vegetation season with trees more susceptible to severe wind gusts.

Out of 12 events, only one featured a windstorm that remained within the boundaries of a single country. This fact underlines the importance to study such phenomena on an international, pan-European, scale and also reveals potential challenges for an operational setting as events cross the areas of responsibility of different national meteorological institutes.

In this work, we present the long-lived convective windstorms of 2017 across Europe and their societal and economic impacts. The individual cases are shown to discuss the location of the windstorms, their extent, duration, associated convective type and the antecedent meteorological setting. While the formation of these long-lived convective windstorms is typically associated with high CAPE and strong vertical wind shear, we show that the two most societally impactful cases actually occurred in rather low CAPE environment. In such cases, it may be difficult to anticipate the extent of the windstorm beforehand.

In the end, the number of the long-lived convective windstorms and associated injuries and fatalities are compared to the previous convective seasons across Europe in order to provide a long term context of the investigated convective season.