EGU21-8288
https://doi.org/10.5194/egusphere-egu21-8288
EGU General Assembly 2021

Lessons learned from working with windstorm-related impact data

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Strong wind related to extratropical cyclones causes severe socioeconomic impacts every year in Europe. Especially in highly forested countries, such as Finland, the civil protection, insurance companies and energy sector are strongly affected by windstorms. Falling trees cause damage to the properties and transmission lines, interrupt the traffic and in the worst case can even cause fatalities. With better preparedness measures, such as highly developed early warning systems (EWSs), windstorm impacts can be reduced significantly.

For better preparedness and mitigation of storm impacts, it is essential to understand the windstorm and environmental features which contribute to the damages. Wind speed and gusts alone do not always explain why the windstorm is or is not causing disturbances in the society. To increase the understanding of the processes that lead to windstorm impacts, it is crucial to use additional data alongside the traditional meteorological data sources. There is high potential in combining wind impact data (e.g. electricity interruption records or emergency calls) with meteorological parameters to develop tools, for instance as a part of EWSs for crisis decision making. Such tools can help the civil protection or energy companies to prepare for the windstorm with sufficient human resources and other precautionary measures, which ultimately reduces impacts and increases the resilience of the society. Additionally, impact database can benefit the forecasters in their daily work with weather warnings or researchers with easier access to impact data.

Impact database development has been done for instance on a national scale in SILVA project (2020-2021, Finnish National Emergency Supply Agency and Finnish Meteorological Institute) and on a pan-European scale in LODE project (2018-2021, the European Commission – DG ECHO). In this work we aim to share the lessons we learned in the impact data collection and processing, and the possibilities to connect the socioeconomic impacts with windstorms. We highlight especially how the quality and comprehensiveness of the impact data are the key factors in the development of wind impact tools. For example, to be able to identify significant trends in windstorm impacts, a sufficient temporal coverage and data homogeneity of the datasets are essential. The centralisation of the data collection is an additional important aspect: a centralised impact database maintained by one research organisation can be a solution to store and combine different types of impact data and connect it with the relevant meteorological or environmental data (e.g. forest or land use data).