



Dynamical structure and risk assessment of 20th Century Windstorms

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Windstorms play an important role in weather variability over western Europe. Strong winds associated with fronts and sting jets can lead to several social and economic damages. However, in addition to wind intensity, the displacement speed of the storm, its area and position are also important factors in determining loss.

In this study we focus on windstorms associated with the highest damages of the 20th century, and we analyse whether the dynamical structure of the storm is related to its impact.

First, we apply an extra-tropical storm tracking algorithm to the ECMWF ERA-20C reanalysis that covers the whole twentieth century and for the whole Northern Hemisphere.

Secondly, using the same data, we compute the 3-hourly Loss and Meteorological index for 18 different European countries as in Pinto et al. (2012) with a 25km grid resolution.

Thirdly, we develop a *High-Loss Tracking Method* that matches information from the Loss Index results and the trajectories tracked to systematically associate damages over a particular country to a particular storm. Such a combination provides information on the typical life cycle of storms that create strong damages over a particular country. Finally, only storms hitting France are considered. More than 1500 storms are detected over the whole period and their evolution is analyzed by performing various composites depending on their position relative to the jet stream and their region of impact.