



## **High resolution dynamical downscaling of historical and potential extreme European winter storms**

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Extreme European winter storms can cause severe impacts and damages, including the loss of life. A reliable prediction as well as occurrence assessment of European winter storms on high temporal and spatial resolutions is therefore an important task.

Using an objective storm severity index (SSI; Leckebusch et al., 2008) a specific sub-set of the most extreme recent historical European winter storms has been identified from the European Centre for Medium-Range Weather Forecasts (ECMWF) reanalysis datasets ERA40 (1958-2002) and ERA-INTERIM (1989-2010). Furthermore, the most extreme potential winter storm events as predicted by the ECMWF Ensemble prediction System (EPS) have been identified with the SSI method.

For the selected events a dynamical atmospheric modeling chain consisting of the operational global and regional numerical weather prediction models (GME and COSMO-EU) of the German Weather Service (DWD) is applied using several lead times to the storm event. In COSMO-EU (7km horizontal resolution) different diagnostic schemes for the estimation of wind gusts are applied. The resulting high resolution wind and gust fields are validated against station observations where possible. The analysis shows the dependence of the simulated wind and gust fields on lead time. Furthermore, clear systematic differences in the different diagnostic schemes used for gust estimation are investigated. Finally, systematic differences in the simulation results between historical and potential events are explored.