

EGU23-13929, updated on 25 Apr 2024

<https://doi.org/10.5194/egusphere-egu23-13929>

EGU General Assembly 2023

© Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



European windstorm risk at the regional scale under recent and future climate conditions

Inovasita Alifdini, Julia Moemken, and Joaquim G. Pinto

Karlsruhe Institute of Technology , Institute of Meteorology and Climate Research (IMK) , Department Troposphere Research (IMK-TRO), Karlsruhe, Germany (inovasita.alifdini@kit.edu)

European windstorms are among the natural hazards with the highest economic losses. We investigate the impact of European windstorms under recent and future climate conditions at high spatial resolution. With this aim, we use hourly surface wind data at 30 km resolution from ERA5 reanalysis for 1959-2021, and 3-hourly surface wind data at 12.5 km resolution from 60 different global-to-regional climate model (GCM-RCM) chains from EURO-CORDEX (EUR-11). The windstorm activity is compared in 30-year periods from the historical events (1976-2005) to the future events (under RCP8.5 scenario) at global warming levels (GWL) of +2°C and +3°C. We apply different indices (meteorological index and loss index) to quantify the severity of windstorms and to estimate the corresponding impacts. For the historical period, storm Wiebke in 1990 (storm names as used by the German Weather Service DWD) caused the highest loss for Central Europe, followed by storm Lothar in 1999. The United Kingdom and Germany are countries in Central Europe that have the highest loss index (more vulnerable to the European windstorms). The results from the EURO-CORDEX ensemble show only small changes in windstorm activity between the historical period and the different GWLs, but display decadal variability.