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Windstorm projections over European emerged lands

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With climate change many parts of Europe will likely experience an increase in weather-related hazards as droughts, floods, and severe precipitation events. Projections on windstorms, however, do not agree on a common tendency over Europe. In general, wind metrics tend to show very small changes over land, while overseas the changes are larger. This is partly due to the coarse spatial resolution of simulations driven by Global Climate Models (from 0.5° to 2.5°), which are unable to capture local wind patterns. We computed a set of wind speed parameters using daily maximum wind speed with spatial resolution of 0.11° from an ensemble of 15 Regional Climate Model simulations from the CORDEX (Coordinated Regional Downscaling Experiment) project over the period 1981-2100 for RCP4.5 and the RCP8.5. We calculated the following metrics: annual and seasonal average, long-term percentiles, number of calm, moderate, windy and stormy days according to the Beaufort Scale, and maximum wind speed return levels corresponding to return periods from 5 to 1000 years. The results are presented at grid-point and macro-regional scales (central-western, eastern, northern, and southern Europe). We focused on the changes between 1981-2010 and periods corresponding to warming levels of 1.°C, 2°C, and 3°C compared to pre-industrial times, as well as with the end of the century (2071-2100). In general, the projected changes in wind extremes over Europe are rarely robust, with the exception of Eastern Europe where the decrease of extreme winds are slightly larger. On the other hand, there is a robust increase of calm days over large parts Europe, in particular over Central and Western Europe.