README file for "Pan-European data sets of windstorm probability of occurrence in present and future climate"

Version

1.0, 24 March 2016

Description

The 5-, 10-, 20-, and 50-year return levels of winter half-year (October – March) daily maximum 10m wind speeds were estimated for the present day climate (1970-2000) by using a multi-model ensemble of 29 CORDEX regional model simulations. Furthermore, it is estimated how the exceedance probability of the recent climate return levels changes in different future scenarios (RCP4.5 and RCP8.5) and different future time periods (2020-2050 and 2070-2100). This is done for each ensemble member and each grid point. The provided data sets are multi-model ensemble mean fields on a 0.44° rotated grid (EUR-44) covering Europe and parts of the North Atlantic.

As an example, figure 1 shows the 50-year return level of wind speeds (left) and the change of exceedance probability in the future climate in RCP8.5 (right). A more detailed description and analysis is provided in Groenemeijer et al. (2016).

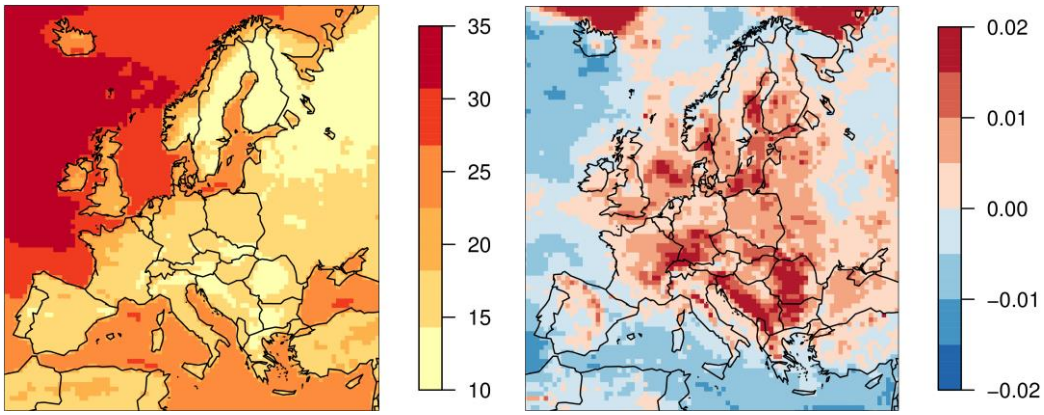

Figure 1: (left) Multi-model mean 50-year return level of winter halfyear daily maximum 10m windspeed in m/s of present day climate (1970-2000). (right) Change of exceedance probability of the present day 50-year return level in the future climate (RCP8.5, 2070-2100).

Authors

Nico Becker

Institute of Meteorology, Freie Universität Berlin, Germany

Contacts

nico.becker@met.fu-berlin.de

List of files

- **5-year return period**
  - wind_speed_return_level_5yr_historical_1970-2000.nc contains the ensemble mean 5-year return level of 10m wind speeds in the present day climate (1970-2000), which has an exceedance probability of 0.2 at all grid points.
  - wind_speed_probability_change_5yr_RCP45_2020-2050.nc contains the change of probability of exceedance of the present day 5-year return level of 10m wind speeds in the early period (2020-2050) of the RCP4.5 scenario.
  - wind_speed_probability_change_5yr_RCP45_2070-2100.nc contains the change of probability of exceedance of the present day 5-year return level of 10m wind speeds in the late period (2070-2100) of the RCP4.5 scenario.
  - wind_speed_probability_change_5yr_RCP85_2020-2050.nc contains the change of probability of exceedance of the present day 5-year return level of 10m wind speeds in the early period (2020-2050) of the RCP8.5 scenario.
  - wind_speed_probability_change_5yr_RCP85_2070-2100.nc contains the change of probability of exceedance of the present day 5-year return level of 10m wind speeds in the late period (2050-2100) of the RCP8.5 scenario.
- **10-year return period**
  - wind_speed_return_level_10yr_historical_1970-2000.nc contains the ensemble mean 10-year return level of 10m wind speeds in the present day climate (1970-2000)), which has an exceedance probability of 0.1 at all grid points.
  - wind_speed_probability_change_10yr_RCP45_2020-2050.nc contains the change of probability of exceedance of the present day 10-year return level of 10m wind speeds in the early period (2020-2050) of the RCP4.5 scenario.
  - wind_speed_probability_change_10yr_RCP45_2070-2100.nc contains the change of probability of exceedance of the present day 10-year return level of 10m wind speeds in the late period (2070-2100) of the RCP4.5 scenario.
  - wind_speed_probability_change_10yr_RCP85_2020-2050.nc contains the change of probability of exceedance of the present day 10-year return level of 10m wind speeds in the early period (2020-2050) of the RCP8.5 scenario.
  - wind_speed_probability_change_10yr_RCP85_2070-2100.nc contains the change of probability of exceedance of the present day 10-year return level of 10m wind speeds in the late period (2070-2100) of the RCP8.5 scenario.

- **20-year return period**
  - wind_speed_return_level_20yr_historical_1970-2000.nc contains the ensemble mean 20-year return level of 10m wind speeds in the present day climate (1970-2000)), which has an exceedance probability of 0.05 at all grid points.
  - wind_speed_probability_change_20yr_RCP45_2020-2050.nc contains the change of probability of exceedance of the present day 20-year return level of 10m wind speeds in the early period (2020-2050) of the RCP4.5 scenario.
  - wind_speed_probability_change_20yr_RCP45_2070-2100.nc contains the change of probability of exceedance of the present day 20-year return level of 10m wind speeds in the late period (2070-2100) of the RCP4.5 scenario.
  - wind_speed_probability_change_20yr_RCP85_2020-2050.nc contains the change of probability of exceedance of the present day 20-year return level of 10m wind speeds in the early period (2020-2050) of the RCP8.5 scenario.
  - wind_speed_probability_change_20yr_RCP85_2070-2100.nc contains the change of probability of exceedance of the present day 20-year return level of 10m wind speeds in the late period (2070-2100) of the RCP8.5 scenario.
- **50-year return period**
  - wind_speed_return_level_50yr_historical_1970-2000.nc contains the ensemble mean 50-year return level of 10m wind speeds in the present day climate (1970-2000)), which has an exceedance probability of 0.02 at all grid points.
  - wind_speed_probability_change_50yr_RCP45_2020-2050.nc contains the change of probability of exceedance of the present day 50-year return level of 10m wind speeds in the early period (2020-2050) of the RCP4.5 scenario.
  - wind_speed_probability_change_50yr_RCP45_2070-2100.nc contains the change of probability of exceedance of the present day 50-year return level of 10m wind speeds in the late period (2070-2100) of the RCP4.5 scenario.
  - wind_speed_probability_change_50yr_RCP85_2020-2050.nc contains the change of probability of exceedance of the present day 50-year return level of 10m wind speeds in the early period (2020-2050) of the RCP8.5 scenario.
  - wind_speed_probability_change_50yr_RCP85_2070-2100.nc contains the change of probability of exceedance of the present day 50-year return level of 10m wind speeds in the late period (2070-2100) of the RCP8.5 scenario.

Disclaimer

Data available for download as a result of this project were made using large-scale datasets and are intended for providing a European-wide overview of present and future probability of occurrence of extreme weather hazards. Extreme caution should be made when drawing local-scale conclusions from the maps. Therefore, the data are provided for research purposes only. No warranty is given as to their suitability for user applications. No liability is accepted by the authors for any errors or omissions in the data or associated information and/or documentation.

Citation

Groenemeijer, P., Púčik, T., Becker, N., Nissen, K., Ulbrich, U., Paprotny, D., Morales Nápoles, O., Vajda, A., Jokinen, P., Lehtonen, I., Kämäräinen, M., Venäläinen, A. (2016) Present and future probability of meteorological hazards in Europe, RAIN project report D2.5.

RAIN project, http://rain-project.eu/

Acknowledgements

The data in this collected were prepared within project “Risk Analysis of Infrastructure Networks in response to extreme weather” (RAIN). This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no 608166.