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Iberian mean and extreme precipitation climate: WRF-Cordex regional simulations

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The precipitation distribution in the Iberian Peninsula has a high spatial variability, with a high North-south disparity, as well as large inter and intra-annual fluctuations. In recent years the development of Regional Climate models with increasing complexity in cloud and precipitation subgrid-scale parameterisations allow for a more accurate assessment of precipitation on large temporal time scales.

The Weather Research and Forecast (WRF-ARW) model, was used for simulations of precipitation over Europe and Iberian Peninsula. A first simulation was carried out for the European domain of the Cordex project, corresponding to a 50km resolution. A second high regional resolution simulation was achieved by using two nests centred on the Iberian Peninsula with 27km and 9km resolution and two-way nesting. Era-Interim was adopted as initial and boundary conditions in all the simulations. These results were compared with hourly observations from 300 INAG (Portuguese water management authority) stations and daily data form PT02 and Spain02 (Portuguese and Spanish Meteorological 20km gridded dataset).

The higher resolution simulation indicates a significantly improved representation of Iberian precipitation fields, at all timescales, with emphasis on the representation of variability and of extreme weather statistics. Results compare well with recent studies with other models and/or for other regions.