



## Onshore wind energy potential over Iberia: present and future projections

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Onshore grid-connected wind power generation has been explored for more than three decades in the Iberian Peninsula. Further, increasing attention has been devoted to renewable energy sources in a climate change context. While advantages of wind energy are widely recognized, its distribution is not spatially homogeneous and not uniform throughout the year. Hence, understanding these spatial-temporal distributions is critical in power system planning. The present study aims at assessing the potential power output estimated from 10 m wind components simulated by a regional climate model (CCLM), driven by ERA40 reanalysis. Datasets are available on a grid with a high spatial resolution (approximately 20 km) and over a 40-yr period (1961–2000). Furthermore, several target sites, located in areas with high installed wind generation capacity, are selected for local-to-regional scale assessments. The results show that potential wind power is higher over northern Iberia, mostly in Cantabria and Galicia, while Andalucía and Cataluña record the lowest values. With respect to the intra-annual variability, summer is by far the season with the lowest potential energy outputs. Furthermore, the inter-annual variability reveals an overall downward long-term trend over the 40-yr period, particularly in the winter time series. A CCLM transient experiment, forced by the SRES A1B emission scenario, is also discussed for a future period (2041-2070), after a model validation/calibration process (bias corrections). Significant changes in the wind power potential are projected for the future throughout Iberia, but their magnitude largely depends on the locations.

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