



High resolution forecasts of wind in rough orography and in coastal conditions

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The increase of the share of wind energy in total electrical power requires the development of reliable forecasts of wind power at different time scales, from minutes to days, on a regional and national basis. That development is multidisciplinary, involving meteorological and engineering components. In the present stage, though, it is thought that for time scales beyond 3 hours, the largest improvements are expected from the meteorological side, if meteorological forecasts are able to deal with mesoscale flow. In this paper three case studies of mesoscale modeling are analyzed and compared against wind observations in sites selected for their high potential for wind energy. Two cases deal with flow in the Islands of Madeira and San Jorge (Azores), characterized by rough orography, where measurements were made at the top of elevated plateaus. In these two cases, the large scale flow is obtained from ECMWF analysis and the mesoscale flow is computed, for one summer and one winter month, with two mesoscale models at resolutions between 6 and 0.5 km. In the third case, one full year of simulation in Continental Portugal is performed at resolutions between 27 and 3km, using boundary conditions from the NCEP/NCAR reanalysis and the MM5 model. Results indicate the interest of high horizontal resolution for wind forecasts in complex terrain but also some difficulties in the representation of boundary layer effects in conditions of large thermal forcing.