

P35 Mesoscale impacts of wind farms: study of the wind farm scheme of the WRF-ARW model.

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The growth of the wind energy industry during the last twenty years is asking for new specifications in order to decrease the uncertainty in the wind resource estimation. In this sense, adding the wind turbine effects in the modeling chain can be an interesting tool for reviewing operative wind farms or for including the effects of nearby wind farms in new projects. The widely used model Weather Research and Forecasting (WRF) includes a wind farm parameterization which represents the interaction of the atmosphere with wind turbines for mesoscale purposes by imposing a momentum sink and a source of turbulence. In this study, the physical reliability of this scheme is discussed. The analysis includes a set of 1 km simulations run in the Sotavento-Galicia (Northwestern Iberian Peninsula) wind farm for two case studies: a cold front and high pressures regime, both with strong winds. The results show a reduction in wind speed reaching around -0.8 m s^{-1} within the wind farm area in both cases, being the impact of the wakes observed for more than 25 km downwind. Moreover, a significant increment of the Turbulent Kinetic Energy (TKE) is observed within the wind plant area reaching values of $+2.4 \text{ m}^2 \text{ s}^{-2}$ noticeable deficits downstream.