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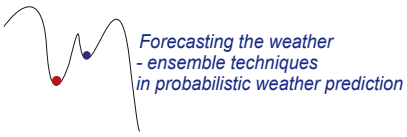

The influence of the new ECMWF Ensemble Prediction System resolution on wind power forecast accuracy and uncertainty estimation

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The importance of wind power forecasting (WPF) is nowadays commonly recognized because it represents a useful tool to reduce problems of grid integration and to facilitate energy trading. If on one side the prediction accuracy is fundamental to these scopes, on the other it has become also clear that a reliable estimation of their uncertainty could be a useful information too. In fact the prediction accuracy is unfortunately not constant and can depend on the location of a particular wind farm, on the forecast time and on the atmospheric situation. Previous studies indicated that the ECMWF Ensemble Prediction System (EPS) can be used as indicator of a three-hourly, three days ahead, wind power forecast's accuracy. In particular it has been noticed that to extract usable information from data the Ensemble members needed to be statistically calibrated, since the rank histograms for the three-day period showed an overconfident model: in other words we observed that the measurements fell quite always outside the bounds of the probability distribution, with the result that the first and the last intervals were the most populated (U-shaped distribution of the rank histogram). This situation was improved by a recalibration procedure that allowed obtaining a more uniform distribution among the 51 intervals, making the ensemble spread large enough to include the observations. After that it was observed that the EPS power spread seemed to have enough correlation with the error calculated on the deterministic forecast in order to be used as an accuracy predictor.
In this paper we show the results of a new application of the EPS, whose horizontal resolution was increased from T399/T255 (60 km) to T639/T319 (32 km) on January 2010, on the same site of previous studies: a complex terrain area located in Southern Italy. Using more recent data, from October 22, first we focus our attention on the influence of the new EPS configuration on the performances of the deterministic WPF obtainable from the ensemble mean. We also compare these performances with those obtainable by using high resolution meteorological models like RAMS. Then we analyse how both prediction accuracy and related uncertainty information are enhanced by using the new EPS resolution.