## Abstract

# Wind power forecasting with the analog ensemble

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The analog ensemble (AnEn; Delle Monache et al. 2013) technique has been extensively tested for the probabilistic prediction of renewable energy (Mahoney et al. 2012, Alessandrini et al. 2015a,b), weather parameters (Delle Monache et al. 2011, Nagarajan et al. 2015), tropical cyclone intensity, and air quality (Djalalova et al. 2015, Delle Monache et al. 2017). We will present an update on the application of AnEn for the prediction of wind power. The AnEn is based on a historical set of deterministic predictions and observations of the quantity to be predicted. For each forecast lead-time and location, the ensemble prediction of a given variable is constituted by a set of measurements of the past (i.e., one-hour averages of wind power). These measurements are those concurrent to past deterministic predictions for the same lead-time and location, chosen based on their similarity to the current forecast. One of the advantages of applying AnEn to wind power predictions is that a wind-to-power conversion curve specific for each wind farm or turbine is not necessary as such conversion is built-in the AnEn approach.

The following salient features of the AnEn will be discussed, including objective verification of both deterministic and probabilistic predictions with different data sets:

- The analog ensemble reduces biases and random errors of the deterministic prediction that is used to generate it.
- The analog ensemble provides sharp and reliable probabilistic predictions.
- The analog ensemble real-time computational cost is a fraction of the cost of an ensemble generated with traditional methods based on several runs of dynamical models.

## References

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