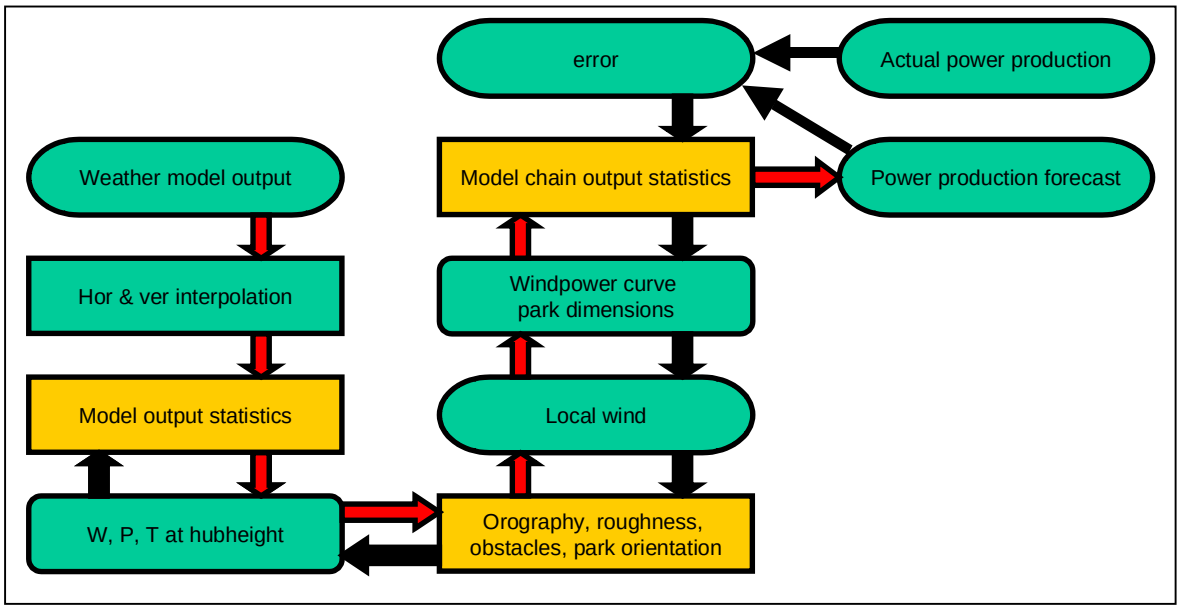
Aeolis forecasting services

Scirocco

Aeolis Forecasting Services provides short term wind power production forecasts for wind farms based upon the advanced wind power production predictor Scirocco. During the first months Scirocco adapts to local geographical circumstances and wind farm characteristics. The systematic errors of the weather model used (this can be any suitable weather model) will be recognized and corrected. When historical production is available it is possible to calibrate Scirocco prior to operational deployment.



The Scirocco power production forecast results from a number of consecutive steps, arranged in a model chain. Some of the steps involve the application of known physics and mathematical procedures. To cope with a number of unknown variables and less understood processes three different adjustment schemes have been introduced in the model chain, represented by the yellow rectangular boxes. These adjustment schemes will be calibrated by means of error back propagation through the entire model chain. The difference between the forecasted and actual wind power production defines an error that will be fed back into the model chain and used to adjust all of the parameters in the adjustment schemes that have contributed to the error.

Scirocco can be powered by several different numerical weather models (NWM) like ECMWF, NCEP and nested high resolution models. All NWM`s have typical characteristic errors depending on the season, time of day and forecast horizon. Scirocco will use the error in the wind power production forecast to adjust the direct model output of the NWM for these systematic errors. The adjustment scheme `Model Output Statistics` will perform this task.

The local wind is calculated from the resulting adjusted weather parameters on the surrounding grid points using a combined adjustment scheme for orography and for local roughness (including obstacles and park orientation). Starting from a flat undisturbed terrain Scirocco will use the error in the wind power production forecast to correct both adjustment schemes separately, by means of error back propagation.

The power production can be calculated from the local wind using the power curve and the park dimensions. To cope with turbine and park characteristics a last modification is being made using the model chain output statistics module.

Starting from an ideal configuration Scirocco will provide a straight forward power forecast from the numerical weather model output. The forecast error will be fed back in the model chain and adjustments will be made to reduce the error. In this way Scirocco adjusts to the local circumstances and systematical errors of the numerical weather model used.

The forecast horizon depends on the numerical weather model used. With ECMWF it is possible to generate a forecast until 15 days in advance. One should consider that the accuracy of the forecast will drop with the forecast horizon.

In order to operate the model for any object (single turbine or wind farm) the following information is needed:

1) Geographical position site (latitude, longitude)
2) Altitude site above sea level in meters
3) Type of turbine
4) Power curve
5) Number of turbines
6) Hub height in meters
7) Historical data of the power production
   Preferably Scada data, otherwise
   Aggregated power production on park level, otherwise
   Meteo mast data

The Scirocco wind power forecasts are offered as a service. After receiving the necessary information we will calibrate the models and use the models with the most recent numerical weather model output to provide you with the best operational wind power forecasts possible.

For more information please contact

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