EMS Annual Meeting Abstracts
Vol. 8, EMS2011-240, 2011
11th EMS / 10th ECAM

Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Using numerical weather forecasts to predict the solar power generation in La Reunion Island

V. Leboucher (1) and M. Garo (2)

(1) EDF R&D, 6 quai Watier, 78400 Chatou, France (viviane.leboucher@edf.fr), (2) Bertin Technologies, 10 Avenue Ampère 78180 Montigny-le-Bretonneux (garo@bertin.fr)

Within the context of large increase of intermittent energy in many countries, one of the major challenges for integration into the electric system is to provide reliable forecasts from very short term (a few minutes to a few hours) to short term (a few hours to a few days). EDF R&D has been working for a few years on methods to forecast the wind power generation and more recently the solar power generation [1] [2] [3].
In the present study, we focus on the short term solar power forecast in La Reunion Island where the photovoltaic installed capacity has reached 80 MW at the end of 2010 for a peak demand around 400 MW. This island is located at 21°S in the Indian Ocean. It is characterized by a complex topography with a highest point at 3,070 m. We consider 14 to 26 sites of solar power data over two years period (May 2008 - April 2010) which are distributed all around the island. Three areas are distinguished : south, west and north-east areas. A statistical model based on historical hourly solar power generation and numerical weather forecasts from the European Center for Medium-Range Weather Forecasts with 25 and 16 km spatial resolution is developed. The performances are analyzed in terms of forecasting errors according to the different spatial scales (local, area and whole island) and compared to those obtained by a reference model based on historical means. Results underline the weak smoothing effect on the island scale and the need of a high resolution weather model integrating an advanced representation of the local cloud formation.

[1] « PV Production forecast in La Reunion Island », L. Dubus, V. Leboucher and M. Garo, EMS 2010.

[2] « Relation between photovoltaic power generation and synoptic weather regimes in La Reunion », J. Najac, B. He and C. Chaussin, submitted to EMS 2011.

[3] « Very short term photovoltaic power generation forecast over La Reunion island : definition of a reference method », S. Dubost, M. Fortin and V. Leboucher, submitted to EMS 2011.