Measuring the benefits of climate forecasts in predicting PV power production

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Surface solar radiation is an important variable to model and predict solar power output. Having accurate forecast may be of potential use for planning and operational tasks, both at short- and long-time scales.

This study examines the predictability of seasonal surface solar radiation comparing ECMWF System4 Seasonal operational forecasts the SARAH Satellite Dataset on the period 1984-2007. This work tries to answer the following question: how useful are climate forecasts in predicting seasonal PV production?

The "information layer" provided by climate information is overlapped with 1) the information about the land cover (CLC2006) to consider the potential amount of land available for PV panels and 2) the information about the solar power installed capacity for European region in order to define the areas where an improved forecast could have a bigger impact.

All the information layers are summarised by using a simple scalar index (Index of Opportunity) computed for all the European regions for the four seasons. The results are very interesting, in fact the potential benefits of climate forecasts are not (only) related to their statistical skills (e.g. probabilistic scores) but also to the actual and potential installed capacity of solar power. Here, we show that to assess the usefulness of climate forecasts in the energy sector we should use all the relevant information layers, combining them according to the "needs" of the potential users.