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Ensemble Forecasts and Predictability: A look at COSMO-DE-EPS performance for global radiation

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The uncertainty associated to a forecast is crucial information for an optimal use of prediction systems. Probabilistic forecasts are products which convey such information and that can be taken at face value if they demonstrate to be reliable. The generation of reliable probabilistic products is therefore a key challenge for forecast providers. In particular, weather forecasts relevant for the renewed energy sector would ensure to have those two basic characteristics: probabilistic and reliable.

At Deutscher Wetterdienst, COSMO-DE-EPS, a regional ensemble prediction system, is operational with a 20-member setup accounting for variations in the model physics, initial and boundary conditions. The ensemble spread, the difference between members, provides a quantitative measure of the predictability level of future weather events. The usefulness of probabilistic products derived from the ensemble system depends on the ability of the ensemble spread to capture the actual forecast uncertainty.

The performance of the EPS is here investigated focusing on global radiation, the main weather variable affecting photovoltaic energy production. Conditional and unconditional biases in the ensemble spread are explored by means of standard and advanced statistical methods. The identification of systematic deficiencies will allow applying efficient “ensemble bias corrections”, a step towards delivering skilful and reliable probabilistic products to the energy sector.