

Ensemble weather forecasts and renewable energy applications

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COSMO-DE-EPS is the ensemble prediction system (EPS) based on the high resolution COSMO-DE model that is run operationally at the German weather service, Offenbach, Germany. The ensemble weather forecasts aim today to support the German energetic transition which requires dealing with the intermittency of weather dependent energy sources. Focusing on solar irradiance, the main weather variable affecting photovoltaic production, the use of the ensemble forecasts is addressed.

First, the assessment of the forecasts is performed from the developer's and the user's perspectives. The ensemble approach shows to provide additional information with respect to a single deterministic forecast, which translates into an improvement of the forecast potential value. Second, a calibration technique based on quantile regression is applied in order to correct for systematic deficiencies. Finally, a dynamic ensemble copula method is proposed aiming at providing to the users calibrated consistent scenarios for complex decision-making.