



Combining WRF wind estimates and MSG CMV for improving short term solar radiation forecast reliability

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Short term (6 hours ahead) solar radiation forecasts are mandatory for Photovoltaic (PV) and Solar Thermal Electricity (STE) Solar Power integration and plant management. Cloud Motion Vector (CMV) based on MSG images are commonly used for this purpose. Nevertheless, reliability of these forecasts reduces considerably with the forecast horizon. In this work, we evaluate an alternative approach based on the use of wind forecasts derived from WRF numerical weather prediction model. Notably, MSG cloud index images, obtained at the beginning of the forecasting period, are advected based on the WRF wind estimates at the cloud levels. Then, solar radiation forecasts are derived based on corresponding cloud index. Forecasts based on this methodology were compared with CMV-based ones. Evaluation was conducted for a set of stations located in Andalusia (southern Spain). Results showed, that, overall, the WRF forecasts reliability outperform the satellite ones on at third forecasting hour, approximately. Nevertheless, for stations located nearby mountain ranges or under particular circulation conditions, WRF forecasts were more reliable beyond the first forecasting hour. Finally, the improvement in the forecasts reliability obtained by combining both methodologies was tested. Considerable improvements were obtained for most part of the forecasting horizon.