



Comparison of hourly solar radiation from ground-based station, remote sensing sensors and weather forecast models: A preliminary study, in a coastal site of South Italy (Lamezia Terme).

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The solar radiation is a very complex parameter to cope with due to its random and nonlinear characteristics depending on changeable weather conditions and complex orography. Therefore it is a critical input parameter to address many climatic, meteorological, and solar energy issues.

In this preliminary study we made an intercomparison between the hourly solar MSG SEVIRI (Meteosat Second Generation Spinning Enhanced Visible and Infrared) data product DSSF(Down-welling Surface Short-wave Flux) developed by LSA SAF(Land Surface Analysis Satellite Application Facility), a pyranometer sensor (CNR 4 Net Radiometer - Kipp&Zonen) and two weather forecast models.

The solar radiation datasets were obtained from a pyranometer sensor situated in Weather Station of CNR ISAC Lamezia Terme(38,88 LAT 16,24 LON), a satellite based product DSSF with spatial resolution of 3km and outputs of two weather forecast models.

Models adopted are WRF(Weather Research and Forecasting) and Rams(Regional Atmospheric Modeling System)running operatively with a 3Km horizontal resolution. Both DSSF and model outputs are extracted at Latitude and Longitude previously defined.

The solar radiation performance and accuracy are evaluated for datasets segmented into two atmospheric conditions clear and cloudy sky, and both conditions, additionally, for a quantitative analysis the exact acquisition times of satellite measurements was taken into account.

The RMSE and BIAS for hourly, daily and monthly - averaged solar radiation are estimated including clear and sky conditions and snow or ice cover.

Comparison between DSSF product, Solar Radiation ground based pyranometer measurements and output of two weather forecast models, made over the period June2013-December2013, showed a good agreement in this coastal site and we demonstrated that the forecast models generally overestimate solar radiation respect the ground based sensor and DSSF product.

As results in general the RMSE monthly-averaged are calculated for datasets DFFs vs ground-based station and vs weather forecast models are respectively about 75W/m² and 100W/m².