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# Modeling of Solar Resource from VIS Images of Meteosat First Generation over India

M. Cony (1), L. Singal (2), L. Martin (1), and J. Polo (3)

(1) Irsolav, Engineering - Process Simulation, Tres Cantos, Spain (mac_cientifico@yahoo.es), (2) ACIRA SOLAR, New Delhi, India (lavleen@acirasolar.com), (3) Department Renewable Energy, CIEMAT, Madrid, Spain

The commencement of India's ambitious program to install a power generation capacity of 20 GW from solar PV and CSP technologies by 2022 requires detailed study of the solar resource over India especially in view of the non-availability of accurate and qualified data. This is further compounded by the presence of aerosols due to anthropogenic emissions and dynamic presence of water vapour in the atmosphere, particularly affecting direct normal irradiation when no measured DNI historical data is available.
The use of satellite images as an input for deriving solar irradiance time series is accepted as a reliable methodology with good accuracy. There are several models aimed at this objective and the use of Heliosat-2 and Heliosat-3 methods, based on the first and second generation of Meteosat satellites is widespread in Europe.
This approach with a modified model was proposed with the inclusion of additional independent variables to the cloud index, such as the movements of the cloud index distribution and the air mass; and daily turbidity values between others variables.
This paper is aimed at describing the work with Heliosat-3 based on MFG images and characteristics. A comparison with 51 ground data for 2011 was performed and the results were similar to studies in Europe, that is, less than 10% RMSE in global horizontal and direct normal irradiance.
Further, the data was compared with other methodologies used, particularly NASA averages from years 1985 – 2005 and NREL data for years 2002 – 2007.

1. DATA
India sites (51 C-WET)

2. RESULTS
The DNI data using adopted modifications of the Heliostat models was found to be the closest to data from 51 ground stations. Data from satellite modeling was closest to measured data emphasized the large loading of aerosols when measuring DNI. GHI data exhibited insignificant impact from aerosols.

3. COMMENTS AND CONCLUSIONS
The results emphasize the importance of the knowledge of aerosol loading especially in countries with high anthropogenic emissions and strong presence of atmospheric dust. It also highlights the inclusion of several parameters specific to the atmospheric conditions prevailing in the country for assessing the solar resource with better accuracies.

4. REFERENCES