

Performances of several databases of solar radiation in Morocco

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Several satellite-derived databases of the surface solar irradiance (SSI) are available. There are mandatory tools to evaluate solar resources in electric production. Users of such databases need to know their performances. The latter is usually known by comparing the satellite estimates against in-situ measurements. Several authors have reported that performances of a given database differ from one site to another depending on the geographical region, topography, orography, climate, viewing angle from the satellite... As a consequence, quality assessment must be performed for a large number of sites and the present communication contributes to that. The aim is to explore the possible changes in quality in Morocco: Ben Guerir, Erfoud, Missour, Tantan and Zagora.

Ground measurements of hourly global irradiation were collected by IRESEN, the national research institute for solar energy and new energies in Morocco. Instruments are rotating shadowband irradiometers or combination of pyranometers, shaded pyranometers and pyrhemometers. Measurements were quality-checked using recognized procedures. There are compared to three well-known databases: CAMS Radiation service, HelioClim-3 version 4 and HelioClim-3 version 5. The CAMS Radiation service combines products of the Copernicus Atmosphere Monitoring Service (CAMS) on gaseous content and aerosols in the atmosphere together with cloud optical properties deduced every 15 min from Meteosat imagery to supply estimates of the SSI. Part of this service is the McClear service that provides estimate of the SSI that should be observed in cloud-free conditions. The second database is HelioClim-3 v4 that is derived from Meteosat images using the Heliosat-2 method and the ESRA clear sky model, based on the Linke turbidity factor. HelioClim-3 v5 is the third database and differs from v4 by the partial use of McClear and CAMS products.

It was found that as a whole, the three databases perform fairly well, demonstrating the reliability of each database in Morocco. These results are discussed against those published for sites in other climate areas.

This work adds evidence on the reliability of these databases already find for Europe, Brazil, Egypt, Oman and UAE.