



Surface Solar Radiation climate data sets derived from Geostationary and Polar-orbiting Satellites

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The incoming surface solar radiation has been defined as an essential climate variable by GCOS. It is useful to monitor as part of the earth's energy balance, and thus gain insights on the state and variability of the climate system. In addition, data sets of the surface solar radiation have received increased attention over the recent years as an important source of information for the planning of solar energy applications.

The EUMETSAT Satellite Application Facility on Climate Monitoring (CM SAF, www.cmsaf.eu) is deriving surface solar radiation from geostationary and polar-orbiting satellite instruments. While CM SAF is focusing on the generation of high-quality long-term climate data records, also operationally data is provided in short time latency within 8 weeks. CM SAF has released two climate data records of the surface solar radiation: One based on geostationary Meteosat satellite covering 1983 to 2005 (doi:10.5676/EUM_SAF_CM/RAD_MVIRI/V001) and one global data set based on measurements of the polar-orbiting AVHRR instruments covering 1982 to 2009 (doi: 10.5676/EUM_SAF_CM/CLARA_AVHRR/V001).

The geostationary observations allow the determination of the surface radiation at high spatial (0.03 x 0.03 deg) and temporal (hourly, daily, monthly) resolutions. Besides global radiation, also the direct beam component is provided, which is required for the estimation of the energy generated by solar thermal plants. Using observations from polar-orbiting satellites allows to derive a global data set at a moderate spatial (0.25 x 0.25 deg) and temporal (daily, monthly) resolution. Based on comparisons with surface observations the accuracy of CM SAF surface solar radiation data is better than 10 W/m² on a monthly basis and 25 W/m² on a daily basis.

Both data sets are well documented (incl. validation using surface observations) and available at no cost without restrictions at www.cmsaf.eu. Here, we present an overview of the data sets including validation results and application examples of the satellite-based surface solar radiation data generated and distributed by the CM SAF.