

DATA SET DESCRIPTION

Gridded monthly sums of incoming direct radiation on the horizontal plain for Germany based on ground and satellite measurements

Version V003

Cite data set as: DWD Climate Data Center (CDC): Gridded monthly sums of incoming direct radiation on the horizontal plain for Germany based on ground and satellite measurements, Version V003, current year.

INTENT OF THE DATASET

This document describes the freely available data of the DWD Climate Data Center (CDC). The gridded data of shortwave incoming radiation are generated from quality proofed ground measurements at DWD-stations and from satellite derived values of radiation.

POINT OF CONTACT

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DATA DESCRIPTION

Spatial coverage	Germany
Temporal coverage	01.01.2016 - last month
Spatial resolution	1 km x 1 km
Temporal resolution	monthly
Projection	Gauß-Krüger-projection in the 3. meridial zone, Ellipsoid Bessel, date Potsdam (central point Rauenberg), [http://spatialreference.org/ref/epsg/31467/ ; http://spatialreference.org/ref/epsg/31467/]. In order to define the projection in geographical information systems (GIS), you might use the data file [https://opendata.dwd.de/climate_environment/CDC/help/gk3.prj ; https://opendata.dwd.de/climate_environment/CDC/help/gk3.prj]. The following link offers help to load the data file into ESRI ArcGIS https://opendata.dwd.de/climate_environment/CDC/pub/CDC/help/Hilfe_Gauss-Krueger-Raster2GIS.pdf .
Format(s)	The data file consists of two sections. In section "header" meta data is assigned to key words. The second section starts with the term "ASCII-Raster-Format" , here information is given about the format Esri ASCII-Raster-Format (http://resources.esri.com/help/9.3/ArcGISDesktop/com/Gp_ToolRef/Spatial_Analyst_Tools/esri_ascii_raster_format.htm). Each grid cell with its value belongs to a matrix (grid field) of 654 columns (NCOLS) and 866 rows (NROWS). The spatial position of the grid field is fixed by the coordinates (XLLCORNER und YLLCORNER) of the lower left corner of the lower left cell. The data rows are arranged from north to south. The data within a data row is arranged from west to east. One value corresponds to a grid cell with a size of 1000 m x 1000 m (CELLSIZE). Grid cells without data are characterized by -999 (NODATA_VALUE). The data is separated by space. By deleting the first 22 lines the data file can used in ArcGIS directly.
Parameters	monthly sums of direct radiation (kWh/m ²)

Uncertainties

All given grid values were computed by a uniform method. The method was developed within an EU research project, including an estimation of uncertainty. Further studies done by DWD showed a mean uncertainty of $\pm 5\%$ in summer and up to $\pm 15\%$ in winter.

DATA ORIGIN

Merging of ground measurements and satellite derived radiation data. Ground measurements are quality proved measurements at DWD-stations. Satellite input data operational CM-SAF products, since 2018 new version www.cmsaf.eu

VALIDATION AND UNCERTAINTY ESTIMATE

All given grid values were computed by a uniform method, so the resulting time series can be interpreted consistently.

CONSIDERATIONS FOR APPLICATIONS

Values of direct radiation are valid for a surrounding, in which the elevation angle of natural obstacles is below 5° . In case, the elevation angle of obstacles is greater than 5° especially in the east or the west, the values of direct radiation may be less.

ADDITIONAL INFORMATION

Minimum 10 years must be passed to calculate multi monthly grid means.

REFERENCES

The European Solar Radiation Atlas, Vol. 1+2, Ecole des Mines de Paris, 2000.

Czeplak, G. et al.: An assessment of a statistical method to estimate solar irradiance at the earth's surface from geostationary satellite data. Renewable Energy, 1, 6-6, pp. 737-743, 1991.

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REVISION HISTORY

The data are extended at approximately the 15. of each month, to contain the data of the month before. This document is maintained by DWD unit KU1HA, last edited on 19.12.2018.