

DATA SET DESCRIPTION

Daily station observations of sunshine duration in hours for Germany

Version v19.3 & recent

Cite data set as: DWD Climate Data Center (CDC): Daily station observations of sunshine duration in hours for Germany, version v19.3, last accessed: <date>.

INTENT OF THE DATASET

This data are from DWD stations operated for climatological and climate related applications (partner stations not included). Comprehensive station metadata (station relocation, instrument change, time zones, change of algorithms) are included. The most recent data have not completed the full quality control as applied to the versioned period.

POINT OF CONTACT

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DATA DESCRIPTION

Spatial coverage	Germany		
Temporal coverage	1892-01-01 until - 2016-11-12		
Temporal resolution	daily		
Units	GEOM	Die Geometrie des Spatial Data Objektes (SDO)	OGC WKT
	STATION_ID	ID des Spatial Data Objektes (SDO), so wie es beim DWD definiert ist, z.B. StationsId, ..	
	STATION_NAME	Name des Spatial Data Objektes (SDO), so wie es beim DWD definiert ist	
	ZEITSTEMPEL	Referenz Datum/Zeit des Wertes (!= Messzeit), in der Regel der Startzeitpunkt des Referenzintervalls.	YYYY-MM-DD hh:mi:ss(.ff6)
	ZEITINTERVALL WERT	Länge des Referenzintervalls Tägliche Stationsmessungen der Sonnenscheindauer in Stunden	ISO_8601#Zeitspannen lat. hora; eng. hour
	EINHEIT QUALITAET_BYTE	Einheit in der die Werte vorliegen QUALITAET_BYTE (QB) zeigt an, ob der Wert beanstandet und/oder korrigiert wurde (siehe Qualitaet).	lat. hora; eng. hour -999,0..7
	QUALITAET_NIVEAU	QUALITAET_NIVEAU (QN) beschreibt das Verfahren der Qualitätsprüfung und bezieht sich auf einen vollständigen Satz von	1..10

Parametern zu einem bestimmten
Termin. (siehe Qualitaet).

Uncertainties

The stations are nowadays selected and operated according to WMO guidelines. Though these guidelines aim at minimizing possible local effects, still some applications of certain parameters may require the consideration of local and regional effects. Note that when going back to historical times, such guidelines might not have been in place. Depending on the application, local, regional and influences changing with time should be considered, which can be location- and parameter specific. Sources of long-term uncertainty are (1) changes in station height when station was re-located, information on this is within the station's Metadata; (2) changes in the observation times and (3) changes in the averaging interval. Details on (2) and (3) can be found in the stationwise metadata. Uncertainties are also expected from (4) changes in instrumentation, see instrument metadata; and possibly also from (5) varying quality control procedures (Behrendt et al., 2011). Further, uncertainties are known to come from (6) errors during data transfer or errors in the software, (7) change of observing personnel, and (8) others, see Freydank, 2014.

Quality information

The QUALITAETS_BYTE (QB) denotes whether the value was objected to and/or corrected. The QUALITAETS_NIVEAU (QN) shows the quality control procedure applied for a data report (of several parameters) for a certain reporting time. Explanation for QB:
QB=0 denotes not flagged;
QB=1 had no objections (either checked and not objected, or not checked and not objected, this can be interpreted only when considering QN);
QB=2 corrected;
QB=3 confirmed with objection rejected;
QB=4 added or calculated;
QB=5 objected;
QB=6 only formally checked;
QB=7 formal objection;
QB=-999 quality flag does not exist.
Explanation for QN:
QN=1 only formal control;
QN=2 controlled with individually defined criteria;
QN=3 automatic control and correction;
QN=5 historic, subjective procedures;
QN=7 second control done, before correction;
QN=8 quality control outside ROUTINE;
QN=9 not all parameters corrected;
QN=10 quality control finished, all corrections finished.
Data before and including 1980 can reach as best quality check level QN=5. Data after 1980 can reach QN=10 as best quality check level.

DATA ORIGIN

These climate data are from the station networks of Deutschen Wetterdienst which are regularly updated with recent data, and with recovered historical data. From 1997 onwards, the data are operationally collected in the central MIRAKEL data base and archived, see Behrendt et al., 2011, and Kaspar et al., 2013. For details on current measurement and observation procedures see VuB 3 Beobachterhandbuch (DWD, 2014a), VuB 3 Technikerhandbuch (DWD, 2014b) and VuB 2 Wetterschlüsselhandbuch (DWD, 2013). Note that when going back to historical times, guidelines on observation procedure, instruments and observation times were issued by the authority in charge (see, e.g., Freydank, 2014), and might be incompletely recorded in the metadata.

As explained in Kaspar et al., 2013 in the early years numerous meteorological agencies were active in the area of today's Germany. After establishment of the International Meteorological Organization (IMO) in 1873, the various standards were gradually harmonized, resulting in a single standard 1936. After 1945, the standards in East and West Germany developed differently, and were harmonized again after re-unification in 1990. Between the end of the nineties and 2009 many stations were changed from manual to automated.

VALIDATION AND UNCERTAINTY ESTIMATE

Considerations of quality assurance are explained in Kaspar et al., 2013: several steps of quality control, including and manual inspection and automatic tests for completeness, temporal and internal consistency, and against statistical thresholds based on the software QualiMet (see Spengler, 2002). The automatic quality control aims to identify and to correct random and gross errors. No systematic corrections are applied. The values collected electronically from 2003 onward are checked with QualiMet. Some doubtful values remain, especially in data prior to 1979. The digitized paper records are quality controlled. The data given here were not subjected to homogenization procedures.

CONSIDERATIONS FOR APPLICATIONS

For studies of long-term change, the metadata in Metadaten_Parameter*, Metadaten_Geraete* and Metadaten_Geographie* have to be considered. With the change to SYNOP at the end of the nineties, the metadata were collected electronically. These metadata are provided for each station within the *.zip. For the time span before, relevant station metadata are extracted from the paper records and digitized by DWD. These metadata are also included, note this is work in progress. For detailed studies, you can apply for access to the paper archive. For statistical analysis, consider the formula (which may be changing over time, and for each station individually) used to calculate the daily means (see Metadaten_Parameter*). Only from 1936 onwards standardized formulas were applied. From 1900-1935 the regulations of the respective small German states were applied, and before 1900 such regulations were station specific (and not all regulations are electronically recorded yet).

ADDITIONAL INFORMATION

For the most recent data the quality control is not completed yet. There are still issues to be discovered in the historical data. We welcome any hints to improve the data basis (see contact).

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REVISION HISTORY

This document is maintained by the Climate Data Centre of the DWD, last edited at 2019-07-25.