

DATA SET DESCRIPTION

Hourly station observations of cloud coverage in eighths for Germany

Version v19.3 & recent

Cite data set as: DWD Climate Data Center (CDC): Hourly station observations of cloud coverage in eighths 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	1949-01-01 until - yesterday		
Temporal resolution	hourly		
Format(s)	<p>The total cloud cover is given as 1/8. A value of -1 denotes "not determined"!</p> <hr/> <p>According to the SYNOP convention, the hour hh refers to the measurement time at hh - 10min (e.g., UTC11 is related to the observation of UTC10:50).</p> <hr/>		
Units	GUID	CDC system wide unique identifier of the observation record	String (PRODUCT_CODE.NUMBER)
	SDO_GUID	CDC system wide unique identifier of the spatial data object (SDO)	Number
	STATION_ID	ID of the spatial data object (SDO), as it is defined in the domain of the DWD	String
	STATION_NAME	name of the spatial data object (SDO), as it is defined in the domain of the DWD	String
	ZEITSTEMPEL	reference datetime for the value (!= measurement time) usually denoting the begin of the reference interval	datetime (YYYY-MM-DD hh:mi:ss)
	ZEITINTERVALL	length of the reference interval	String (ISO_8601#time_intervals)
	WERT	Hourly station observations of cloud coverage in eighths	Number

EINHEIT	Unit of measure of the value	String
QUALITAET_BYTE	QUALITAET_BYTE (QB) denotes whether the value was objected to and/or corrected (see quality flag)	Number
QUALITAET_NIVEAU	QUALITAET_NIVEAU (QN) describes the procedure of quality control and refers to a complete set of parameters at a specific date.(see quality flag)	Number

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.

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.

The QUALITAETS_NIVEAU (QN) shows the quality control procedure applied for a data report (of several parameters) for a certain reporting time.

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 der 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 automatic tests for completeness, temporal and internal consistency, and against statistical thresholds based on the software QualiMet (see Spengler, 2002) and manual inspection had been applied.

Data are provided "as observed", no homogenization has been carried out. The history of instrumental design, observation practice, and possibly changing representativity has to be considered for the individual stations when interpreting changes in the statistical properties of the time series. It is strongly suggested to investigate the records of the station history which are provided together with the data. Note that in the 1990s many stations had the transition from manual to automated stations, entailing possible changes in certain statistical properties.

CONSIDERATIONS FOR APPLICATIONS

Cloud cover was observed in 1/10 before the seventies, but had been converted to the common 1/8 here. When investigating long term changes or trends, consider changes in station location, changes in instrumentation, measurement procedures and observation intervals - see the various metadata information provided Metadaten_Parameter*, Metadaten_Geraete* und Metadaten_Geographie*. Starting in the nineties, the metadata are electronically recorded and provided together with the station measurements. For the time before, efforts are continuing to digitize the most relevant metadata based on the paper records however, many gaps are still remaining. For detailed studies, DWD can grant access to the station records.

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).

REFERENCES

Spengler, R.: The new Quality Control- and Monitoring System of the Deutscher Wetterdienst. Proceedings of the WMO Technical Conference on Meteorological and Environmental Instruments and Methods of Observation, Bratislava, 2002.

Kaspar, F., et al.: Monitoring of climate change in Germany – data, products and services of Germany's National Climate Data Centre. Adv. Sci. Res., 10, doi:10.5194/asr-10-99-2013, 99–106, 2013.

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Behrendt, J., et al.: Beschreibung der Datenbasis des NKDZ. Version 3.5, Offenbach, 15.02.2011.

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REVISION HISTORY

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