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Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DATASET DESCRIPTION

Hourly station observations of visibility for Germany

Version: v24.03

Publication date: 2024-03-29

Cite data set as:	Hourly station observations of visibility for Germany, Version v24.03
Dataset-ID:	urn:x-wmo:md:de.dwd.cdc::obsgermany-climate-hourly-visibility
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/observations_germany/climate/hourly/visibility/historical/
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/observations_germany/climate/hourly/visibility/recent/
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/observations_germany/climate/hourly/visibility/recent/VV_Stundenwerte_Beschreibung_Stationen.txt
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/observations_germany/climate/hourly/visibility/timeseries_overview

ABSTRACT

These data originate from the stations of the DWD and legally as well as qualitatively equal partner network stations. Extensive station metadata, such as station relocations, instrument changes, reference time changes, algorithm changes or operator information are included.

The dataset is divided into a versioned part with completed quality check, in the directory ./historical/.
And a part for which the quality check has not yet been completed, in the directory ./recent/.

The folder ./timeseries_overview/ contains information about long time series.

POINT OF CONTACT

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DATASET DESCRIPTION

Parameter	visibility range
Unit(s)	metre
Statistical processing	hourly value, time series
Temporal coverage	1949-01-01 -- ...
Spatial coverage	stations in Germany
Projection	WGS 84 (EPSG:4326)
Format description	In the folder recent/ for each station a zip-archive is provided. The zip-archive contains the data and meta information about the station, instruments and algorithms. The naming schema of the zip-archives is: *_{product_code}_{station_id}_{begin_date}_{end_date}_hist.zip

Format description

In the folder recent/ for each station a zip-archive is provided.
The zip-archive contains the data and meta information about the station, instruments and algorithms.

The naming schema of the zip-archives is: *_{product_code}_{station_id}_akt.zip

Format description

The file Datei VV_Stundenwerte_Beschreibung_Stationen.txt contains information on the recent geographical position and the temporal data coverage per station.

Format description

In the folder ./timeseries_overview, information on long time series is available. The files provided (TimeSeries_[DataType]_[Interval]_GE_[XXXYears]_[Parameter].html or ***.txt) contain a sorted overview of stations for which time series of >=100, >=50 and >=30 years are available. Information on the proportion of missing values is also provided.

Content description
Stations_id := Identifier of the station;
Start := Start date of the time series;
End := End date of the time series;
Number_years := Number of years of measurement operation;
Missing_Years := Number of missing years of measurement operation;
Missing_values := number of missing values ;
max(Missing_period)>=25 := More than 25 years missing in the time series: Indication of start date and end date;
Station name := Station name of the current location ;
Federal state := Name of the federal state

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application schema

csv dialect description

delimiter	line terminator	header	quote char
;	\\r\\n	true	\"

csv content description

column name	description	uom	type	format
STATIONS_ID	Station ID		VARCHAR2	
MESS_DATUM	reference data		NUMBER	YYYYMMDDHH24
QN_8	quality level	numerical code	NUMBER	990
V_VV_I	[\visibility index, noting how the measurement is taken\,\P=by human person\,\I=by an instrument\,\missing value=-999\]	alpha-numerical-code	VARCHAR2	
V_VV	[\visibility range\,\missing value=-999\]	m	NUMBER	99999990

Quality Information

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

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.

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.

The QUALITAETS_BYTE (QB) denotes whether the value was objected to and/or corrected.

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.

DATA ORIGIN

The data are taken from the station measuring networks of Deutscher Wetterdienst as well as its predecessor organisations.
The dataset is regularly updated with recent as well as with recovered historical data.
From 1997 onwards, the data have been imported operationally into the central specialist database and archived, see Behrendt et al., 2011, and Kaspar et al., 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 of the stations.
As explained in Kaspar et al., 2013 in the early years numerous meteorological agencies were active in the area of todays 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.

RESOURCE MAINTENANCE

[Data maintenance]: In the directory recent/ the data files are updated daily. On a rolling basis, the data of the last 500 days - up to yesterday - are exchanged.
Quality control has not yet been completed for these data, so there may always be changes in the values.

In the directory historical/ the data files are updated annually.
Quality control has been completed for this data, so that the values for the version are constant.
During the annual version change, both corrections and historical additions are incorporated.

VALIDATION AND UNCERTAINTY ESTIMATE

The quality check and uncertainty assessment is explained in Kaspar et al., 2013. Different stages of quality control are run through depending on the age of the data. In addition to manual quality control, automatic tests check completeness, temporal and spatial consistency, and compare against statistical thresholds (QualiMet software, Spengler, 2002).

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 zip-files in Metadaten_Geographie*.
Uncertainties are also expected from (2) changes in instrumentation, see Metadaten_Geraete* and possibly also from (3) varying quality control procedures (Behrendt et al., 2011).
Further, uncertainties are known to come from (4) errors during data transfer or errors in the software, (5) change of observing personnel, and (6) others, see Freydank, 2014.

Previously, manually determined visibility range were based on prominent points in the environment. With automatic measurements, the range of values depends on the instrument. Due to these observation methods, the frequency distribution of visibility is station-dependent and not necessarily constant over time.

CONSIDERATIONS FOR APPLICATIONS

When using the "historical/" and "recent/" directories together, the temporal overlap must be taken into account and that the type of quality control differs.

When investigating long term changes or trends, consider the information in section Uncertainties.

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).

LITERATURE

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

DWD Vorschriften und Betriebsunterlagen Nr. 2 (VuB 2), Wetterschlüsselhandbuch Band D, Nov 2013.

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REVISION HISTORY

This document is maintained by Deutscher Wetterdienst, CDC - Betrieb, last edited at 2024-05-06.