

## DATA SET DESCRIPTION

### *Daily station observations of mean temperature at 2 m above ground in °C for Germany*

#### Version v19.3 & recent

**Cite data set as:** DWD Climate Data Center (CDC): Daily station observations of mean temperature at 2 m above ground in °C 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

|                            |                              |   |                           |
|----------------------------|------------------------------|---|---------------------------|
| <b>Spatial coverage</b>    | Germany                      |   |                           |
| <b>Temporal coverage</b>   | 1781-01-01 until - yesterday |   |                           |
| <b>Temporal resolution</b> | daily                        |   |                           |
| <b>Units</b>               | 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                | Länge des Referenzintervalls  | ISO_8601#Zeitspannen      |
|                            | WERT                         | Tägliche Stationsmessungen der mittleren Lufttemperatur auf 2 m Höhe in °C                            | °C                        |
|                            | EINHEIT                      | Einheit in der die Werte vorliegen  | °C                        |
|                            | QUALITAET_BYTE               | QUALITAET_BYTE (QB) zeigt an, ob der Wert beanstandet und/oder korrigiert wurde (siehe Qualitaet).    | -999,0..7                 |
|                            | QUALITAET_NIVEAU             | QUALITAET_NIVEAU (QN) beschreibt das Verfahren der Qualitätsprüfung und bezieht sich                  | 1..10                     |

auf einen vollständigen Satz von  
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

Quality control of data in this directory "recent" is not completed yet. Several steps of operational automatic quality control are applied (see Kaspar et al., 2013). Procedures completed depend on age of data. Automatic tests include tests for completeness, temporal and internal consistency, and against statistical thresholds based on the software QualiMet (see Spengler, 2002).

## CONSIDERATIONS FOR APPLICATIONS

Versioned data, which cover the historical time series up to the end of the previous year, are stored in the directory 'historical/'. When data from both directories 'historical' and 'recent' are used together, the difference in the quality control procedure should be considered. For the long term stability, refer to the relevant aspects of uncertainty discussed in the data set descriptions within the directories 'historical/'.

## **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.