

DATA SET DESCRIPTION

Annual grids of number of frost days over Germany

Version v1.0

Cite data set as: DWD Climate Data Center (CDC): Annual grids of number of frost days over Germany, version v1.0.

INTENT OF THE DATASET

This describes the freely available data of the DWD Climate Data Center. Grids are derived from DWD stations and legally and qualitatively equivalent partner stations in Germany run for climatological and climate related applications, considering the height dependencies.

POINT OF CONTACT

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DATA DESCRIPTION

Spatial coverage	Germany
Temporal coverage	01.01.1951 - last year
Spatial resolution	1 km x 1 km
Temporal resolution	annual
Projection	3-degree Gauss-Kruger zone 3, Ellipsoid Bessel, Datum Potsdam (central point Rauenberg), EPSG:31467, see http://spatialreference.org/ref/epsg/31467/ . To define the spatial projection in GIS, the file https://opendata.dwd.de/climate_environment/CDC/help/gk3.prj can be used. Help is given on importing into ESRI ArcGIS in https://opendata.dwd.de/climate_environment/CDC/help/Hilfe_Gauss-Krueger-Raster2GIS.pdf .
Format(s)	The file in ESRI-ascii-grid-format has in the header the coordinates for the lower left grid cell, including the definition of its center [XLLCENTER],[YLLCENTER] or its corner [XLLCORNER],[YLLCORNER]. It contains a table of 654 x 866 numbers. Each row goes from West to East. The first row is the northernmost one (654 values with 4 digits). Missing values are marked with -999.
Parameters	Number of frost days. Definition of frost day: minimum air temperature < 0°C.
Uncertainties	Uncertainties are caused by the interpolation method, and erroneous or missing observations. When comparing grid fields for different years, it should be considered that the measurement network has changed over time.

DATA ORIGIN

The grids are based on the DWD station data [Kaspar et al., 2013]. The gridding method employs height regression and Inverse Distance Weight (IDW), see Müller-Westermeier, 1995: The station density allows for a linear regression between topographic height and climatological parameters within a region, and varies somewhat between the regions in Germany [Maier und Müller-Westermeier, 2010]. Regionally varying regression coefficients were used to transform the station observations to the respective values at the reference height. In case several stations refer to the same grid cell, the mean of the respective values is taken. In a second step, the values at reference height were interpolated horizontally (weighted with the inverse square distance) to produce a grid. Finally, the values at reference height are transformed back to values corresponding to the topographic elevation using again the spatially variable regression function. This is done with the DWD digital topographic height model.

VALIDATION AND UNCERTAINTY ESTIMATE

The given resolution of 1 km x 1 km is the resolution of the employed digital height model. The gridded data miss processes relevant for local climate (like urban heat island or cold air pools) which are not covered by observations of the station network or cannot be reproduced by the gridding method explained above. The actual information density depends on the station network.

REFERENCES

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

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Müller-Westermeier, G., Walter, A., Dittmann, E.: Klimaatlas Bundesrepublik Deutschland, Teil 1-4, Selbstverlag des Deutschen Wetterdienstes, Offenbach am Main, 2005.

Müller-Westermeier, G.: Numerische Verfahren zur Erstellung klimatologischer Karten, Berichte des Deutschen Wetterdienstes 193, Selbstverlag des Deutschen Wetterdienstes, Offenbach am Main, 1995.

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REVISION HISTORY

This document is maintained by DWD division National Climate Monitoring, last edited 18.12.2018.