

DATA SET DESCRIPTION

Grids of the multi-annual mean temperature (2m) over Germany 1961-1990

Version v1.0

Cite data set as: DWD Climate Data Center (CDC): Grids of the multi-annual mean temperature (2m) over Germany 1961-1990, 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	01.01.1961 - 31.12.1990
Spatial resolution	1 km x 1 km
Temporal resolution	30 years, for each calendar month and season, and for the whole year
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)	There are files for each calendar month (*01.asc.gz bis *12.asc.gz), for each season, i.e., spring (March, April, May): *13.asc.gz, summer (June, July, August): *14.asc.gz, autumn (September, October, November): *15.asc.gz, winter (December, January, February): *16.asc.gz, and for the whole year (*17.asc.gz). The winter value contains the December of the previous year. 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	30 year means of the monthly averaged mean daily air temperature in 2 m height above ground, given in 1/10 °C.
Uncertainties	Uncertainties are caused by the interpolation method, and erroneous or missing observations. When comparing grid fields for different periods, it should be considered that the measurement network has changed over time.

DATA ORIGIN

The grids for 1961-1990 are based on homogenized station data [Herzog und Müller-Westermeier, 1998]. The 30 year averages were calculated for or each calendar month of the year before the spatial interpolation. The seasonal grids (spring -13, summer-14, autumn-15, winter-16) and the grid for the whole year (-17) are the sum of the respective grids for the calendar months. The gridding method is based on 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]. The regression coefficients were determined separately for each month, based on the monthly means recorded 1951-1980. Using these interpolated regression coefficients, in a first step, the station values are reduced to the reference height and attributed to the grid cells. In case several stations refer to a grid cell, the mean was taken. In a second step, the values at reference height were interpolated horizontally to cover the grid (weighted with the inverse square distance). Finally, in a third step, the values at reference height are transformed to values corresponding to the topographic elevation using again the spatially variable regression function. This is done with the DWD digital topographic height model. When grid cells contain a station, the value of the latter is simply interpolated vertically to the height of the grid cell.

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. The actual information density depends on the station network.

CONSIDERATIONS FOR APPLICATIONS

These grids are visualized within the German Climate Atlas www.dwd.de/klimaatlas.

REFERENCES

Herzog, J. und Müller-Westermeier, G.: Homogenitätsprüfung und Homogenisierung klimatologischer Meßreihen im Deutschen Wetterdienst, Berichte des Deutschen Wetterdienstes 202, Selbstverlag des Deutschen Wetterdienstes, Offenbach am Main, 1998.

Maier, U. und Müller-Westermeier, G.: Verifikation klimatologischer Rasterfelder, Berichte des Deutschen Wetterdienstes 235, Selbstverlag des Deutschen Wetterdienstes, Offenbach am Main, 2010.

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

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