DATA SET DESCRIPTION

Annual grids of drought index (de Martonne) over Germany

Version v1.0

Cite data set as: DWD Climate Data Center (CDC): Annual grids of drought index (de Martonne) over Germany, version v1.0.

INTENT OF THE DATASET

The grids are derived from DWD stations and legally and qualitatively equivalent partner stations in Germany run for climatological and climate related applications.

POINT OF CONTACT

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DATA DESCRIPTION

Spatial coverage	Germany
Temporal coverage	01.01.1995 - 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/. o 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	Annual mean of drought index after de Martonne, unit: mm/°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 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 seperately for each month, based on the monthly means recorded 1961-1990. Using these interpolated regression coefficients, 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.

VALIDATION AND UNCERTAINTY ESTIMATE

The annual drought index (from de Martonne) dMI is calculated with: dMI = P/(T+10) using the values T (in degree Celsius) from temperature grids and P (in mm) from precipitation grids. For quality considerations refer to the quality of the input data (temperature grids, precipitation grids).

CONSIDERATIONS FOR APPLICATIONS

The grids are visualized from the year 2000 onwards at the DWD website http://www.dwd.de/DE/leistungen/klimakartendeutschland/klimakartendeutschland.html.

ADDITIONAL INFORMATION

The index measures the gradual change from arid to humid, the limit is defined for annual values at dMI=20 (Blüthgen and Weischet, 1980).

REFERENCES

Blüthgen, J. und Weischet, W.: Allgemeine Klimageographie. Walter de Gruyter, Berlin, 1980.

Martonne, E. : L'indice d'aridité, Bull. Ass. Geogr. De France, Vol. IX, 1926.

Müller-Westermeier, G.: Die mittleren klimatologischen Bedingungen in Deutschland (Teil III), Klimastatusbericht 1999, 48-51, Deutscher Wetterdienst, ISBN 3-88148-359-4 / ISSN 1437-7691, www.dwd.de/DE/leistungen/klimastatusbericht/publikationen/ksb1999_pdf/07_1999.pdf

Kaspar, F., G. Müller-Westermeier, E. Penda, H. Mächel, K. Zimmermann, A. Kaiser-Weiss, T. Deutschländer: Monitoring of climate change in Germany – data, products and services of Germany`s National Climate Data Centre. Adv. Sci. Res., 10, 99–106, 2013.

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., 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.

WMO No 49, Technical Regulations, Basic Documents No. 2, Volume I, General Meteorological Standards and Recommended Practices, ISBN 978-92-63-10049-8, 2011 edition, updated in 2012.

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REVISION HISTORY

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