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Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DATASET DESCRIPTION

Raster data set of mean relative humidity in % for Germany - HYRAS- DE-HURS v6-1

Version: v6-1

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Dataset-ID:	urn:wmo:md:de-dwd-cdc:d1a6818d-d1dc-481b-9f59-6148949530ae
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/daily/hyras_de/humidity/
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/monthly/hyras_de/humidity/
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/multi_annual/hyras_de/humidity/

ABSTRACT

HYRAS-DE-HURS is a relative humidity product for Germany in a 1 km x 1 km grid for the period 1951 to the previous day and is based on daily
measured values of relative humidity. The data set can be used, for example, for the analysis of past climate, for bias adjustment of regionalized climate projection data and as input data for hydrological modeling.

POINT OF CONTACT

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DATASET DESCRIPTION

Parameter	relative humidity
Unit(s)	%
Statistical processing	multi-annual daily mean, monthly mean, daily mean
Temporal coverage	1951-01-01 -- ...
Temporal resolution	30 years, 1 month, 1 day
Spatial coverage	Germany
Spatial resolution	1 km x 1 km
Projection	ETRS89 / LAEA Europe (EPSG:3035)
Format description	hurs_hyras_1_*_v6-1_de.nc (daily) : The grids are written to a NetCDF file. The name of the NetCDF file is defined as follows: parameter_productname_resolution(in km)_year_version_region.nc (e.g. hurs_hyras_1_2020_v6-0_de.nc)
Format description	hurs_hyras_1_*_v6-1_de_monmean.nc (monthly) : The grids are written to a NetCDF file. The monthly data is formed as a time average from the daily data. The name of the NetCDF file is formed as follows: parameter_product_name_resolution(in km) _year_version_region_monmean.nc (e.g. hurs_hyras_1_2020_v6-1_de_monmean.nc)

Format description	hurs _hyras_1_*_v6-1_de_*.nc (multiannual) : The grids are written to a NetCDF file. The multi-year averages are formed from monthly averages (according to WMO regulations) of the corresponding time period (individual months or seasons) of the specified reference period. The name of the NetCDF file is formed as follows: Parameter_product_name_resolution(in km)_climate_reference_period_version_region_averaging_period.nc (e.g. hurs_hyras_1_1961-1990_v6-1_de_AUG.nc)

DATA ORIGIN

Temperature (TAS, TASMIN, TASMAX) and relative humidity (HURS) are based on a combination of nonlinear temperature profiles with non-Euclidean residual interpolation (Krähenmann et al., 2019). The creation of the background field is based on a nonlinear regression at each time step (estimation of regional vertical profiles for 13 subregions subdivided based on weather divides, coastal distance and north-south extent). This also allows temperature inversions to be taken into account. Cold pole stations were identified separately for each time step and excluded for the profile determination. For the residual interpolation, a 5-dimensional inverse distance weighting (5D-IDW cf. Eiselt et al., 2017) is applied, which depends on the geographical longitude and latitude, altitude, coastal distance and heat island effect. For the interpolation of the minimum (TASMIN) and maximum (TASMAX) temperature, the deviations between extreme temperature and mean temperature are interpolated (non-linear regression + residual interpolation) as in TAS and then added to the mean temperature field. This ensures the consistency of the temperature fields with each other (TASMIN <= TAS <= TASMAX). For the interpolation of the relative humidity, the temperature station data was first converted into the dew point temperature and then interpolated in the same way as the temperature data and finally calculated back into the relative humidity using the temperature grid data. During the interpolation, it is ensured afterwards that a maximum humidity of 100 % is achieved.

RESOURCE MAINTENANCE

The data is extended every day. It should be noted that at the beginning and middle of each month, the previous month is recalculated with quality-controlled measurements and the data of the current year is overwritten.
To improve quality, station data from neighboring countries is also taken into account where available. This currently applies from 1951-2020.
The DWD reserves the right to update or provide a new version of the data set at its own discretion.

VALIDATION AND UNCERTAINTY ESTIMATE

see Rauthe et al., 2013.

UNCERTAINTIES

Uncertainties may result from the interpolation method used. Incorrect measurements also result in uncertainties in the grid field. For the interpolation of the grids, a different number of stations were used over time, as the measurement network has changed. This must be considered when comparing different years. Please also note the recommendations on uncertainties and interpretation of grid points of station-based grid data https://opendata.dwd.de/climate_environment/CDC/help/Empfehlungen_Gitterdaten_DACH.pdf

LITERATURE

Eiselt K-U, Kaspar F, Mölg T, Krähenmann S, Posada R, Riede J (2017) Evaluation of gridding procedures for air temperature over Southern Africa. Adv Sci Res 14:163–173.

Empfehlungen für Rasterdaten

Krähenmann S, Walter A, Brienen S, Imbery F, Matzarakis A (2018) High-resolution grids of hourly meteorological variables for Germany. Theor Appl Climatol 131:899–926.

Razafimaharo, C., Krähenmann, S., Höpp, Rauthe, M., Deutschländer, T. (2020): New high-resolution gridded dataset of daily mean, minimum, and maximum temperature and relative humidity for Central Europe (HYRAS). Theor Appl Climatol 142, 1531–1553

WMO Guidelines on the Calculation of Climate Normal

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REVISION HISTORY

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