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Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DATASET DESCRIPTION

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

Version v5.0

Cite data set as:	Raster data set of monthly mean relative humidity in % for Germany - HYRAS-DE-HURS, Version v5.0
Dataset-ID:	urn:x-wmo:md:de.dwd.cdc::GRD_DEU_P1M_RH_HYRAS-DE

ABSTRACT

These grids are a product derived from HYRAS-DE-HURS. HYRAS-DE-HURS is a relative humidity product for Germany in a 5 km x 5 km grid for the period 1951-2020 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	mean monthly mean
Temporal coverage	1951-01-01 - 2020-12-31
Temporal resolution	1 month
Spatial coverage	Germany
Spatial resolution	5 km x 5 km
Projection	ETRS89 / LCC Europe (EPSG:3034)
Format description	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_monthlymean.nc (e.g. hurs_hyras_5_2020_v5-0_de_monmean.nc)

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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 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.

LITERATURE

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.

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REVISION HISTORY

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