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DATASET DESCRIPTION

HOSTRADA - High-resolution grids of hourly variables for Germany

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Dataset-ID:	urn:x-wmo:md:de.dwd.cdc::gridsgermany-hourly-hostrada
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/air_temperature_mean
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/cloud_cover
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/dew_point
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/humidity_mixing_ratio
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Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/pressure_sealevel
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Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada /urban_heat_island_intensity
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/wind_direction
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/grids_germany/hourly/hostrada/wind_speed

ABSTRACT

The high-resolution grids of hourly variables (HOSTRADA) for Germany is a climatological reference dataset that serves as the basis for the development and update of current test reference years, making it particularly important for technical climatology. It provides a wide range of meteorological parameters for the land surface of the Federal Republic of Germany from 1995, with a spatial resolution of one square kilometer and a temporal resolution of one hour.

HOSTRADA is based on the interpolation of station data, while also taking satellite and model data into account to calculate a consistent dataset. Special attention has been paid regarding the urban heat island effect in addition to improving temperature distributions in orographically complex regions.

The dataset is expanded monthly and includes the following variables:
- cloud cover
- wind speed and direction (at 10m height)
- near-surface air and dew point temperature (at 2m height)
- relative humidity (at 2m height)
- water vapor mixing ratio (at 2m height)
- air pressure at station height and sea level
- global shortwave radiation
- urban heat island intensity

The data are provided on the EPSG:3034 projection for Germany and represent instantaneous values at start of the hour in UTC (with the exception of radiation, where the sum over the last hour is provided).

POINT OF CONTACT

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DATASET DESCRIPTION

Parameter	air pressure at station level, wind direction, cloud coverage, wind velocity, relative humidity, air temperature at 2 m, msl air pressure, specific humidity, dew point temperature
Temporal coverage	1995-01-01 -- ...
Temporal resolution	1 hour
Spatial coverage	Germany
Spatial resolution	1 km x 1 km
Projection	ETRS89 / LCC Europe (EPSG:3034)
Format description	The grids are provided as a NetCDF file. At the end of a month a new file is added including data for the previous month. The name of the NetCDF file is formed as follows: {parameter abbreviation}_{time resolution}_{process name version}_{variant}_{grid_info}_{time coverage}.nc (variant: BE - best estimate; grid_info: gn - native grid), e.g. tas_1hr_HOSTRADA-v1-0_BE_gn_1995010100-1995013123.nc

DATA ORIGIN

The high-resolution grids are based on the interpolation of hourly station data from the official measuring network of the German Meteorological Service. Since the availability of station data varies greatly depending on the specific variable and some parameters exhibit strong spatial variability, additional predictors are used. Satellite data from CM-SAF (The Satellite Application Facility on Climate Monitoring) and model data from a convection-permitting regional climate simulation (HoKliSim-De) that is based on the regional climate model COSMO-CLM are employed for this purpose. The interpolation method used depends on the parameter under consideration.

RESOURCE MAINTENANCE

The data is updated monthly. It is important to note that at the end of each month, the data for the previous month is generated, resulting in a time lag of approximately one month for the dataset.

VALIDATION AND UNCERTAINTY ESTIMATE

Krähenmann S, Walter A, Imbery F, Brienen S, Matzarakis A (2018): High-resolution grids of hourly meteorological variables for Germany. TAAC. doi:10.1007/s00704-016-2003-7

UNCERTAINTIES

Uncertainties arise from the interpolation method and from erroneous or missing station observational measurements. When comparing data from different years, it should be noted that the underlying station measurement network has changed over time.

CONSIDERATIONS FOR APPLICATIONS

The data represents the spatially averaged value for the specified grid area. It is important to note that while the data is displayed with a horizontal resolution of 1 km, this corresponds to the underlying digital elevation model. The effective resolution depends on the station density and the resolution of the predictors. For example, cloud cover has an effective resolution of approximately 25km². This is influenced by the resolution of satellite data and the limited number of ground observations. This limitation also applies to radiation parameters. The wind parameters have an effective resolution tied to the resolution of the convection-permitting climate model (3 km).

LITERATURE

Krähenmann S, Walter A, Imbery F, Brienen S, Matzarakis A (2018): High-resolution grids of hourly meteorological variables for Germany. TAAC. doi:10.1007/s00704-016-2003-7

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REVISION HISTORY

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