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Deutscher Wetterdienst
Wetter und Klima aus einer Hand

DATASET DESCRIPTION

Calculated recent monthly values for different characteristic elements of soil and crops - recent

Version: v2

Publication date: 2024-01-01

Cite data set as:	Calculated recent monthly values for different characteristic elements of soil and crops - recent, Version v2
Dataset-ID:	urn:wmo:md:de-dwd-cdc:derived_germany-soil-monthly-v2
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/derived_germany/soil/monthly/recent/
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/derived_germany/soil/monthly/recent/derived_germany_soil_monthly_recent_stations_list.txt
Dataset-URL:	https://opendata.dwd.de/climate_environment/CDC/derived_germany/soil/monthly/recent/derived_germany_soil_monthly_recent_stations_map.png

ABSTRACT

Evaporation values, soil moisture and temperature values were calculated for various locations in Germany. The values can be used for many questions relating to water and heat balance and are usually not measured.
The recent data includes data from the current year.

POINT OF CONTACT

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DATASET DESCRIPTION

Parameter	frost depth, potential evaporation, soil temperature, real evaporation, soil moisture
Unit(s)	% nFK, cm, °C, mm
Statistical processing	time series, monthly mean, monthly value, monthly sum
Temporal coverage	1991-01-01 -- unknown
Temporal resolution	1 month
Spatial coverage	Germany
Projection	WGS 84 (EPSG:4326)
Format description	recent : derived_germany_soil_monthly_recent_v2_[station].txt.gz
Format description	station list :
Format description	station map :

DATA ORIGIN

All calculated values for soil moisture and evapotranspiration come from the agro-meteorological model AMBAV. The clayey silt soil used in the model has a wilting point of 13% by volume and a field capacity of 37% by volume and the clayey sand has a wilting point of 3% by volume and a field capacity of 17% by volume. All calculated soil temperatures and the frost penetration depth were calculated using the AMBETI model, which, like AMBAV, was developed at the agro-meteorological research center in Braunschweig. The potential evaporation according to FAO is preferable to that according to Haude because many more influencing factors are taken into account.

VALIDATION AND UNCERTAINTY ESTIMATE

Measurements of soil moisture are complex and expensiv, so only temporal validations at different locations, soil typs and canopies were made in the past and showed good results after calibration. The calculated soil temperatures can be validated against measured values in same depth and show really good results even with snow cover in winter times.
In the current version, an error was corrected where the frost penetration depth was displayed for ZTUMI instead of the active layer thickness.

UNCERTAINTIES

The accuracy of the values depends on the quality of the models as well as on the quality of the model input. Most important are hourly input values from temperature, wind velocity, relative humidity and precipitation (all of which are measured). Global radiation and longwave radiation though is often derived from the observed sunshine duration and cloud cover. From version 2 onwards, the wind speeds recorded manually at the climate stations until 2012 were no longer taken into account because they were very inaccurate and generally too low.

ADDITIONAL INFORMATION

The current version includes the following parameters:
- mean soil temperature of a typical bare soil at a depth of 5 cm (TS05) in °C
- mean soil temperature of a typical bare soil at a depth of 10 cm (TS10) in °C
- mean soil temperature of a typical bare soil at a depth of 20 cm (TS20) in °C
- mean soil temperature of a typical bare soil at a depth of 50 cm (TS50) in °C
- mean soil temperature of a typical bare soil at a depth of 1 m (TS100) in °C
- mean soil temperature at a depth of 5 cm in unvegetated loamy sand (BEKLIMA) (TSLS05) in °C
- mean soil temperature at a depth of 5 cm in unvegetated loamy silt (BEKLIMA) (TSSL05) in °C
- Frost penetration depth at midday on a bare ground (ZFUMI) in cm
- Thawing layer at midday below stock (BEKLIMA) (ZTKMI) in cm
- Thawing layer at midday under bare ground (BEKLIMA) (ZTUMI) in cm
- Soil moisture under grass on loamy silt soil between 0 - 10cm (BFGL01_AG) in %nFK
- Soil moisture under grass on loamy silt soil between 10 - 20cm (BFGL02_AG) in %nFK
- Soil moisture under grass on loamy silt soil between 20 - 30cm (BFGL03_AG) in %nFK
- Soil moisture under grass on loamy silt soil between 30 - 40cm (BFGL04_AG) in %nFK
- Soil moisture under grass on loamy silt soil between 40 - 50cm (BFGL05_AG) in %nFK
- Soil moisture under grass on loamy silt soil between 50 - 60cm (BFGL06_AG) in %nFK
- Soil moisture under grass and sandy soil (0-60 cm) (BFGS_AG) in %nFK
- Soil moisture under grass and loamy silt soil (0-60 cm) (BFGL_AG) in %nFK
- Soil moisture under winter cereals and sandy soil (0-60 cm) (BFWS_AG) in %nFK
- Soil moisture under winter cereals and loamy silt soil (0-60 cm) (BFWL_AG) in %nFK
- Soil moisture under maize and sandy soil (0-60 cm) (BFMS_AG) in %nFK
- Soil moisture under corn and loamy silt soil (0-60 cm) (BFML_AG) in %nFK
- potential evaporation over grass (FAO) (VPGFAO) in mm
- potential evaporation via grass (Haude) VPGH mm
- real evaporation over grass and sandy soil (VRGS_AG) in mm
- real evaporation over grass and loamy silt soil (VRGL_AG) in mm
- real evaporation via winter grain and sandy soil (VRWS_AG) in mm
- real evaporation via winter grain and loamy silt soil (VRWL_AG) in mm
- real evaporation over corn and sandy soil (VRMS_AG) in mm
- real evaporation over corn and loamy silt soil (VRML_AG) in mm

LITERATURE

Braden, H., 2012: Agrarmeteorologische Modelle des Wasser und Energiehaushaltes im Deutschen Wetterdienst, promet 38, 11-19.

Herbst, M., Falge, E., Frühauf, C., 2021 : Regionale Klimamodellierung - Perspektive Landwirtschaft. In: Regionale Klimamodellierung II-Anwendungen. Deutscher Wetterdienst (Hrsg.), promet 104, 55-62.

Löpmeier, F.-J. (1994): Berechnung der Bodenfeuchte und Verdunstung mittels agrarmeteorologischer Modelle. Zeitschrift f. Bewaesserungswirtschaft, 29, 157–167.

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REVISION HISTORY

This document is maintained by Deutscher Wetterdienst, KU31 Agrarmeteorologie, last edited at 2026-05-28.
All calculated values are used in daily advisory work and therefore passed plausibility checks by advisors and customers. Internal balance checks for water and heat are implemented in the models.