

README concerning the dataset fesstval available via DKRZ /pool/data resources

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T I T L E O F T H E D A T A S E T

German Service NWP forecast products for the FESSTVaL period

P A T H T O T H E D A T A S E T

e.g./pool/data/fesstval

O W N E R / P R O D U C E R O F T H E D A T A S E T

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D A T A U S A G E L I C E N S E

Data generated by DWD is provided under the GeoNutzV license ("Verordnung zur Festlegung der Nutzungsbestimmungen für die Bereitstellung von Geodaten des Bundes" – GeoNutzV) https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Strategien_Bilanzen_Gesetze/130309_geonutzv_bgbi_englisch_bf.pdf

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C O N T E N T O F T H E D A T A S E T

This project is a collection of the operational weather prediction system of the German Weather Service during the time period of the sub-mesoscale field experiment (FESSTVaL)

- Numerical weather prediction data of the German Weather Service as simulated with ICON
- Three configurations (global - 'ICON', continental - 'IEU', regional - 'ILAM')
- FESSTVaL period (2021-05-01 to 2021-08-31)
- ICON grid has been truncated to ICON-EU domain.
- 24 hours lead time
- simulation starts at 00 and 12 UTC
- Variables: to be specified

D A T A U S A G E S C E N A R I O S

This data is an essential supplement to the observations of FESSTVaL which are stored at ICDC (<https://www.cen.uni-hamburg.de/en/icdc.html>). It can be used for model evaluation as well as as initial, boundary, and forcing conditions for limited-area or large-eddy simulations. Furthermore it can help to derive a greater picture of large-scale dynamics during FESSTVaL.

Potential users are across institutions. This includes especially HERZ associates at MPI-M, Uni Hamburg, Uni Frankfurt, Uni Cologne and Uni Bonn.

METHODS USED FOR DATA CREATION

Operational forecasts that have been created in the standard routine at DWD. See information below for a general description of the models and their configuration in terms of horizontal resolution.

>>><<< copied from https://www.dwd.de/EN/ourservices/nwp_forecast_data/nwp_forecast_data.html (2022-04-27)
ICON global model

The ICON global model has been in operation at the DWD since 25.01.2015. The grid structure of ICON is based on an icosahedral (triangular) grid of the earth's sphere. The forecast data are also provided in standard packages on an icosahedral (triangular) grid. The forecast data on a triangular grid can be interpolated to a regular (lat/lon) grid by using Climate Data Operators (cdo). The Guideline Transfer CDO is available at Open Data Weather – More information.

ICON's native grid resolution is 13 km. In the vertical, the model defines 90 atmosphere levels up to the maximum height of 75 km. At present, the model runs for forecast data distribution are at 00, 06, 12 and 18 UTC. The forecast horizon is +180 hours for the two model runs at 00 and 12 UTC and +120 hours for the other two runs at 06 and 18 UTC. The time interval for the forecast period up to +78 hours is one hour, all other forecast periods beyond +81 hours are covered by a 3-hourly time interval.

ICON-EU nested higher resolution regional model

The DWD's regional ICON-EU nest within the ICON global model came into operation on 21.07.2015. There is a tightly coupled two-way interaction between the ICON-EU regional model and the global ICON. The native model grid has a horizontal grid spacing of 6.5 km, the output grid a grid spacing of 0.0625 ° (~ 7 km). In the vertical, ICON-EU relies on 60 levels up to a height of 22.5 km.

The ICON-EU forecasts are available up to +120 hours from the four model runs at 00, 06, 12 and 18 UTC and up to +30 hours from the model runs at 03, 09, 15 and 21 UTC. The time interval for the forecast period up to +78 hours is one hour, the forecast periods between +81 and +120 hours are covered by a 3-hourly time interval. As the letters 'EU' suggest, the ICON-EU nest covers the whole of Europe. In the west and east, however, the nest's coverage extends far beyond the European territory, covering the area bounded by the coordinates 23.5°W–62.5°E, 29.5°N–70.5°N.

The forecasts of the ICON-EU regional model are routinely distributed in standard packages per forecast element at the free DWD Open Data Server. For the element packages, the model domain is restricted to 23.5°W–45.0°E, 29.5°N–70.5°N.

ICON-D2 regional model

The DWD's ICON-D2 model is a forecast model which is operated for the very-short range up to +27 hours (+45 hours for the 03 UTC run). Due to its fine mesh size, the ICON-D2 especially provides for

improved forecasts of hazardous weather conditions, e.g. weather situations with high-level moisture convection (super and multi-cell thunderstorms, squall lines, mesoscale convective complexes) and weather events that are influenced by fine-scale topographic effects (ground fog, Föhn winds, intense downslope winds, flash floods). The model area of ICON-D2 covers the whole German territory, Benelux, Switzerland, Austria and parts of the other neighbouring countries at a horizontal resolution of 2.2 km. In the vertical, the model defines 65 atmosphere levels.

The fairly short forecast periods make perfect sense because of the purpose of ICON-D2 (and its small model area). Based on model runs at 00, 06, 09, 12, 15, 18 and 21 UTC, ICON-D2 provides new 27-hour forecasts every 3 hours. The model run at 03 UTC even covers a forecast period of 45 hours.

The ICON-D2 forecast data for each weather element are made available in standard packages at our free DWD Open Data Server, both on a rotated grid and on a regular grid.

ICON-D2 EPS Regional ensemble forecast model

The ensemble forecasting system ICON-D2 EPS is based on the DWD's numerical weather forecast model ICON-D2 and currently includes 20 ensemble members. All ensemble members are calculated at the same horizontal grid spacing as the operational configuration of ICON-D2 (2.2 km). Like ICON-D2, the ICON-D2 EPS ensemble system provides forecasts up to +27 hours for the same model area (up to +45 hours based on the 03 UTC run).

For generating the ensemble members, some of the features of the forecasting system are changed. The method currently used to generate the ensemble members involves varying the

- lateral boundary conditions
- initial state
- soil moisture
- and model physics.

For varying the lateral boundary conditions and the initial state, forecasts from various global models are used.

>>><<< copied from https://www.dwd.de/EN/ourservices/nwp_forecast_data/nwp_forecast_data.html (2022-04-27)

I S S U E S

- Operational settings have changed within the period:

- ICON:

-- 10 May 2021 (Assimilation cycle 9 UTC) Reuse of Chinese Aircraft Measurements with a new Bufr template and use of a new blacklist in the operational data assimilation system of DWD. Additionally, Chinese snow observations are discarded in the snow analysis.

-- 26 May 2021 Code version upgrade (to 2.6.2-nwp3)

- ICON-EU:

-- 26 May 2021 Code version upgrade (to 2.6.2-nwp3)

- ICON-D2:

-- 26 May 2021 Code version upgrade (to 2.6.2-nwp3)

-- 26 May 2021 Configuration/tuning upgrades of ICON-D2

-- 25 August 2021 (Assimilation cycle 6 UTC) Upgrade the

assimilation of radio sondes

VOLUME OF THE DATASET (AND POSSIBLE CHANGES THEREOF)

The current data volume is approximately 16 TB. No changes expected.

TIME HORIZON OF THE DATASET ON / POOL / DATA

The data will be available until further notice. Long-term archiving afterwards is considered.

The storage resources are granted until