

Project: Field Experiment on Submesoscale Spatio-Temporal Variability in Lindenberg

Project acronym for link in /pool/data: fesstval

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Allocation period: 16 May 2022 - 31 December 2023

Allocation Period	Until 31.12.2023
Volume	16 TB
Expected Volume Change	No changes expected
License allows usage on DKRZ resources	Yes: „Data generated by DWD is provided under the GeoNutzV license ("Verordnung zur Festlegung der Nutzungsbestimmungen für die Bereitstellung von Geodaten des Bundes" – GeoNutzV): <a href="https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Strategien_Bilanzen_Gesetze/130309_geonutzv_bgbi_englisch_bf.pdf">https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Strategien_Bilanzen_Gesetze/130309_geonutzv_bgbi_englisch_bf.pdf</a> “

## Project overview

In which context the data was generated? By whom? For what? Is there a license? Usage restrictions?

Short overview, citation to more detailed description if possible. Weblinks? External sources of information in general.

Include the “algorithmic/mathematical” aspects

In this project, we are storing a collection of the operational weather forecasts of the Deutscher Wetterdienst (DWD) for the time period May-August, 2021. During this period, the Field Experiment on Submesoscale Spatio-Temporal Variability in Lindenberg (FESSTVaL) took place in the surroundings of Lindenberg. Hence, this data is an essential supplement to the observations made during FESSTVaL\*. The NWP data is required as initial and boundary conditions for high resolution and LES simulations and will moreover be utilized in evaluation studies.

\* The observation data of FESSTVaL is available via the SAMD archive of ICDC: <https://www.cen.uni-hamburg.de/en/icdc/data/atmosphere/samd-st-datasets/samd-st-fesstval.html>

## Data content

Kind of data, variables, formats, space-time coverage.

Will the number of offered variables and/or time-coverage change in time? Is a flexible approach needed?

The data set covers numerical weather prediction data of the Deutscher Wetterdienst:

- 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: a set of standard atmospheric and surface variables

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

In the following, please find more details about the different setups:

>>><<< copied from [https://www.dwd.de/EN/ourservices/nwp\\_forecast\\_data/nwp\\_forecast\\_data.html](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.*

## ISSUES

- 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 radiosondes

## Range of planned scientific data usage

Enter possible applications and target communities of these data.

Is there a license? Are there usage restrictions?

This data set can be used for model evaluation as well as for 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.

The data is generated by DWD and is provided under the GeoNutzV license ("Verordnung zur Festlegung der Nutzungsbestimmungen für die Bereitstellung von Geodaten des Bundes" – GeoNutzV). More information regarding the license can be found here: [https://www.bmu.de/fileadmin/Daten\\_BMU/Download\\_PDF/Strategien\\_Bilanzen\\_Gesetze/130309\\_geonutzv\\_bgbi\\_englisch\\_bf.pdf](https://www.bmu.de/fileadmin/Daten_BMU/Download_PDF/Strategien_Bilanzen_Gesetze/130309_geonutzv_bgbi_englisch_bf.pdf)

The data may be used without any restrictions if the source (DWD) is acknowledged.

## Data Storage Usage Plan

How long is the data offered? Will there be extensions/updates? Refer to above (Allocation period)

As we here are storing historical operational NWP data, no updates will be made.

In the future, the data is planned to be archived at DKRZ (probably DOKU). To begin with, however, the data is stored under /pool as many studies are ongoing and we need easy access to the data. The data should be stored under /pool approx. until end of 2023. After this time period, we can consider archiving the data instead.