

Project: **1364**

Project title: **UDAG - Updating the data basis for adaptation to climate change in Germany**

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Report period: **2025-05-01 to 2026-04-30**

UDAG is a collaborative project involving BTU, DKRZ, DWD, HEREON and KIT. Its aim is to provide up-to-date regional climate projections for use in the German adaptation strategy. The regional climate projections currently used for this purpose are based on the global climate projections produced by the Coupled Model Intercomparison Project Phase 5 (CMIP5). These global climate projections have been updated in recent years under CMIP6. However, the new Shared Socioeconomic Pathways (SSPs) introduced in CMIP6, as well as the further development of the climate models, require the regional climate projections for Germany to be updated. UDAG will provide quality-checked ensembles of regional climate projections for Europe (at approximately 12 km; EUR-12) and for the 'hydrological D-A-CH region' (i.e. Germany, Austria and Switzerland, including river basins draining into these countries, at approximately 3 km; DACHhydro-3). UDAG is funded by the German Federal Ministry of Research, Technology and Space (BMFTR). The project began in September 2023 and will continue until August 2026.

During the reporting period, all of the planned project simulations with a resolution of 12 km were completed. These simulations used boundary conditions from four global models (EC-Earth3-Veg, MPI-ESM1-2-HR, CNRM-ESM2-1 and MIROC6) and four emission scenarios (SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5). All simulations cover the period 2015–2100. The EC-Earth3-Veg simulations for SSP1-2.6 and SSP3-7.0 could be extended to 2150 due to the availability of input data from the global model.

This data will be published in the ESGF as soon as the new ESGF infrastructure is available. These simulations form part of the EURO-CORDEX ensemble and will be used for scientific studies and climate services in many European countries. They are already part of the data basis for the new DWD reference ensemble, which was introduced to the public at the DWD climate press conference on 31 March 2026. This ensemble forms the basis for DWD climate services and products, as well as the German Climate Adaptation Strategy in the next years and is therefore of the utmost importance.

The planned 3 km simulations were also completed during the reporting period. These simulations represent a further step in the downscaling process of selected 12 km simulations for Germany, Austria and Switzerland, as well as the river catchments that drain into these three countries. This includes simulations for the SSP1-2.6 and SSP3-7.0 scenarios, with boundary conditions from the EC-Earth3-Veg, MPI-ESM1-2-HR and MIROC6 global models (some of these simulations were performed on the DWD HPC system). The simulations at DKRZ were done on GPUs.

The raw model output from most of the simulations has already been archived on tape. This process is ongoing for simulations that have only recently finished. According to DKRZ, UDAG is a showcase project in the field of data archiving. In total, we have archived more than 3 PB of data in the past year and a half.

In parallel, the model output has been standardised (CMOR) according to the EURO-CORDEX standard. This is a requirement for publishing the data in the ESGF within the CORDEX project. Standardisation is also ongoing for simulations that have finished in recent months. The standardised data is transferred to project bb1149 (CCLM2ESGF) for publication in the ESGF.

The archiving and transfer of standardised data to bb1149 was very helpful in keeping the project's storage requirements on /work within reasonable limits. Nevertheless, the simulations produce a huge amount of data that needs to be stored, processed, standardised, prepared for archiving and analysed. Therefore, it was extremely helpful that additional storage was granted at the beginning of the year. It would also be very helpful if we could retain a similar amount of storage for the next allocation period in order to complete the post-processing, standardisation, archiving and analysis of the data beyond the official end of the funding period in August 2026.