Project: 1364

Project title: **UDAG - Updating the data basis for adaptation to climate change in Germany** Principal investigator: **Christian Steger** Report period: **2024-05-01 to 2025-04-30**

UDAG is a joint project of BTU, DKRZ, DWD, HEREON and KIT. The aim of UDAG is to provide up-to-date regional climate projections for use in the German adaptation strategy. The regional climate projections currently used for adaptation 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. The new Shared Socioeconomic Pathways (SSPs) introduced in CMIP6 and the further development of the climate models require an update of the regional climate projections for Germany. UDAG will provide a quality-checked ensemble of regional climate projections for Europe (at about 12 km, EUR-12) and for the 'hydrological D-A-CH region' (i.e. Germany, Austria, Switzerland including the river basins draining into these countries at about 3 km; DACHhydro-3). UDAG is funded by the German Federal Ministry of Education and Research (BMBF). The project started in September 2023 and will run until August 2026.

During the reporting period, we first completed the test simulations for the 12 km EURO-CORDEX configuration (also using resources from the COPAT2 project bb1155). A configuration has been found that gives better simulation results compared to the original model configuration. The production of the regional climate projections started in autumn 2024, starting with the historical simulations. The historical simulations have now been completed and the first scenario simulations (SSP1-2.6 and SSP3-7.0) have been started. The data will gradually be standardised (CMOR) and published in the ESGF.

In parallel with the production of the 12 km simulations, we have been working on improving the configuration for the 3 km simulations. This required extensive test simulations, as ICON-CLM has never been used for regional climate projections at this resolution up to now. These test simulations required much more resources than originally thought. This is one of the reasons why we will be requesting more computing time in the next allocation period than previously planned. However, the resources were well invested and we were able to improve the setup for the 3 km climate simulations compared to the initial setup for numerical weather prediction that we received from the DWD development department.

Furthermore, we tested the option to run ICON-CLM for the DACHhydro-3 domain (3 km resolution) on the GPU partition at DKRZ. The tests were successful and we now plan to produce the 3 km scenario simulations on GPUs. We will therefore apply for the necessary GPU computing time in the next application.

The evaluation run for the 3 km configuration and the historical simulations will soon be started. The scenario simulations will follow as soon as the historical simulations are completed. The data of the 3 km simulations will also be standardized and published via the ESGF.