**Project: 105**
**Project title: ANDIVA (Analyse, Diagnose und Validation)**
**Report for period 01.01.2023 - 31.12.2023**

During the year 2023, the main focus in this project was still on the transition from COSMO-CLM to ICON-CLM and its calibration/configuration for different applications. In this report, we give a short overview of achieved and ongoing research projects.

### Transition COSMO-CLM → ICON-CLM

The ICON code has been successfully compiled and tested on levante @DKRZ utilizing resources in this computing time project. Additionally, the Starter Package for ICON-CLM Experiments (SPICE-Environment) has been setup up successfully. Several short test experiments using ERA-Interim/ERA5 initial and boundary conditions for different domains and resolutions have been performed this year.

KIT contributes to the ICON-CLM model development with partners at DWD, HZG, FU-Berlin and BTU-Cottbus. As member of the working group ICON-model development (MODEV), KIT is a key partner for the development and testing of the ICON-CLM runtime environment.

### Development of a unified CMIP6-converter

KIT develops a converter that produces ready-to-use input files based on available CMIP6 data in the DKRZ data pool (pool/data). The overall aim is to build a flexible converter, that produces caf-files (that can be read by either COSMO-CLM and ICON-CLM) from selected CMIP6 models. The caf-files will be used in the next CORDEX activities by various modelling groups around the world (including BMBF-funded UDAG-project 1369). Caf-files have been created for MPI-ESM-HR (historical/ssp370), MIROC6 (historical/ssp370), and EC-Earth3-Veg (historical/ssp370) and are already available at DKRZ. Further models/scenarios will be considered in the 2024.

### ICON test runs for extreme weather events

Besides the application of the ICON-CLM, we also tested the ICON-model for its capability to represent individual extremes as e.g., the Ahr flood in 2021. Besides the search for the best model setup, different nesting and nudging strategies have been tested to reproduce the event as realistic as possible.
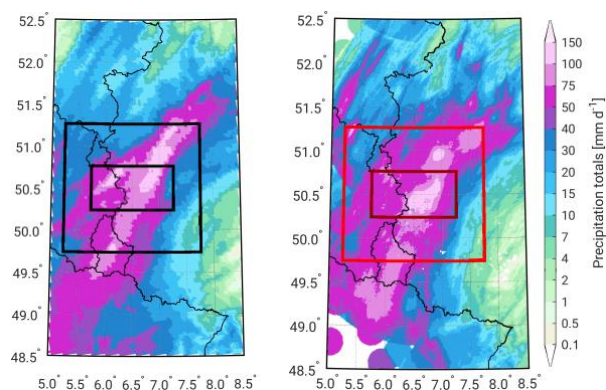


*Figure: Simulated (left, ICON with 3km grid spacing) and observed (RADOLAN) 24h precipitation totals at 15.07.2021 00UTC for the Ahr flood event in 2021. The affecetd area and intensities are captured well by the ICON simulation.*