Project: 105 Project title: ANDIVA (Analyse, Diagnose und Validation) Report for period 01.01.2022 - 31.12.2022

During the year 2022, the main focus in this project was still on the transition from COSMO-CLM to ICON-CLM. 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. First experiments using ERA-Interim/ERA5 initial and boundary conditions have been performed this year. Simulations with ICON-CLM will continue in the new founded HGF SCENIC project, dealing with either heat waves / cold spells or hydrological extremes in a storyline approach (more details on this in new project application for SCENIC for 2023).

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, KIT is a key partner for the development and testing of the ICON-CLM runtime environment and will contribute to namelist parameter sensitivity tests during COPAT2.

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 caffiles (that can be read by either COSMO-CLM and ICON-CLM) from selected CMIP6 models. The caffiles will be used in the next CORDEX activities by various modelling groups around the world. Caffiles 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 2023.

ICON test runs for Ahr-Flood 2021

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 at15.07.2021 00UTC for the Ahr flood event in 2021. The affected area and intensities are captured well by the ICON simulation.