The German contribution to the IPCC/AR5 (CMIP5)

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The Coupled Model Intercomparison Project Phase 5 (CMIP5) is enabling a comprehensive and systematic evaluation and intercomparison of Earth system models (ESM), run in a standardised configuration and responding to standardised forcing. The CMIP5 experiments based on the ESM developed at the Max Planck Institute for Meteorology (MPI-ESM) are performed at the DKRZ using the modeling environment IMDI.

IMDI was developed at DKRZ and is adapted to the specific needs of MPI-ESM and the requirements given by the CMIP5 protocol. IMDI offers many benefits, such as flexibility in model and experiment configuration and the possibility to run single workflow steps simultaneously or serial. Special workflow steps were implemented for CMIP5 experiments, for example online monitoring and automated quality control of output data, in order to enable the parallel performance of multiple experiments producing huge amounts of data.

The global climate-change experiments were divided into three groups: past-climate experiments, simulations over the historical period and future climate projections (near-term and long-term), and diagnostic experiments.

The latter two groups were calculated with two MPI-ESM versions. The main differences are higher vertical resolution in the atmosphere and higher horizontal resolution in the ocean model. A large set of experiments was dedicated to explore the issue of decadal prediction.

The model output was processed according to the CMIP5 data protocol requirements in order to be later accepted by the ESG (Earth System Grid) archive of CMIP5. During this process CMOR software provided by PCMDI (Program for Climate Model Diagnosis and Intercomparison) was used. The data volume contributing to the IPCC AR5 data base amounts to about 60 TB. Our poster describes the workflow starting with the model compilation and ending with the publication of the model results in the ESG. It demonstrates the extent and comprehensiveness of the German CMIP5 effort.