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The Coupled Model Intercomparison Project phase 6 at the Max Planck Institute for Meteorology

M. Bittner (1), K.-H. Wieners (1), J. Jungclaus (1), C. Reick (1), M. Giorgetta (1), S. Legutke (2), M. Esch (1), V. Gayler (1), I. Stemmler (1), P. de Vrese (1), H. Haak (1), and the CMIP6-Team

(1) Max Planck Institute for Meteorology, Hamburg, Germany, (2) Deutsches Klimarechenzentrum, Hamburg, Germany

The coupled model intercomparison project phase 6 (CMIP6) is an international endeavor to better understand past, present and future climate changes. Referring to the Grand Science Challenges of the World Climate Research Program (WCRP), CMIP6 aims to answer three broad questions: (i) How does the Earth system respond to forcing?, (ii) What are the origins and consequences of systematic model biases?, and (iii) How can we assess future climate changes given climate variability, predictability and uncertainties in scenarios?

To tackle these questions, CMIP6 consists of three major elements: First, a handful of common experiments, the DECK (Diagnostic, Evaluation and Characterization of Klima experiments) and the CMIP Historical Simulation (1850 - near-present). Second, common data formats, a federated data storage and documentation to facilitate the distribution of model outputs and the evaluation of the multi model ensemble. Third, a complementary set of CMIP-Endorsed Model Intercomparison Projects (MIPs) aiming at specific questions.

The Max Planck Institute for Meteorology (MPI-M) will participate in CMIP6 with different configurations of the Max Planck Earth System model (MPI-ESM), based on the known ECHAM6/MPIOM (MPI-ESM1.2) circulation models as well as on the new ICON model (MPI-ESM-2). MPI-M is involved in 17 MIPs, where additional experiments are conducted to address specific topics related to the three broad questions mentioned above.

Here, we present an overview of the CMIP6 related activities at the MPI-M. We will introduce the Earth System Models which are used in the CMIP6 simulations and highlight improvements and new features compared to the CMIP5 model version. The different MIPs are shortly presented for an overview of the topics covered at the MPI. Furthermore, we will show first results of the CMIP6 DECK Simulations of the MPI-ESM1.2 in its low (LR) and high resolution (HR) version.