Open call for membership of the Task Team on Climate Model Benchmarking for CMIP7

The goal of CMIP is to better understand past, present, and future climate changes in a multi-model context. An important prerequisite for providing reliable climate information using climate and Earth system models is to understand their capabilities and limitations. It is therefore essential to evaluate the models systematically and comprehensively with the best available observations and reanalysis data. A more routine benchmarking and evaluation of the models was achieved in CMIP6 through the development and application of evaluation tools, which also provided tremendous support for the IPCC Sixth Assessment Report. However, a full integration into the CMIP publication workflow has not yet been achieved, and new challenges stemming from models with higher resolution and enhanced complexity need to be tackled. These challenges are both on the technical side (e.g., memory limits, increasingly unstructured and regional grids), as well as on the scientific side, in particular the need to develop innovative diagnostics, including the support of machine learning-based analysis of CMIP simulations.

The aim for this TT is to provide a systematic, open, and rapid performance assessment of the expected large number of models participating in CMIP7 with a set of informative diagnostics and performance metrics. The goal is to fully integrate the evaluation tools into the CMIP publication workflow, and their diagnostic outputs published alongside the model output on the ESGF, ideally displayed through an easily accessible website. To accomplish this, existing evaluation tools that are based on the latest scientific knowledge will be further developed and then applied to historical and other CMIP7 simulations. We expect to produce an increasingly systematic characterization of the models which, compared with early phases of CMIP, will more quickly and openly identify the strengths and weaknesses of the simulations. This will also reveal whether long-standing model errors remain evident in newer models and will assist modelling groups in improving their models. This framework will be designed to readily incorporate updates, including new observations and a multitude of additional diagnostics and metrics as they become available from the research community and will be developed as fully open-source software with high documentation standards.

Desired experience

- Experience in the development and identification of innovative diagnostics and tools for the evaluation of climate and Earth system models with observations and reanalysis data.
- Experience in analysis of high-resolution simulations and corresponding diagnostics.

- Experience in Earth system model development.
- Experience in presenting evaluation results in an easy-to-understand way.
- Knowledge on software tools that can be used to analyse large volumes of data in parallel to facilitate the evaluation of model simulations.
- Technical communication and moderation skills applicable to the climate science domain, experience in dealing with transdisciplinary projects, working across cultures and time zones, and understanding and achieving diversity goals.

Task Team Objectives

The aim of the Model Benchmarking TT is to provide a systematic and rapid performance assessment of the expected models participating in CMIP7 with a set of new and informative diagnostics and performance metrics, ideally along with the model output and documentation. The TT's main objective is therefore to pave the way for enhancing existing community evaluation tools that facilitate the systematic and rapid performance assessment of models while addressing new challenges such as higher resolution, unstructured grids, and enhanced complexity, and creating a framework in which these tools are applied optimally and their diagnostics output published alongside the CMIP7 model output.

Early TT objectives will be:

1. Ensuring that all necessary information is available for all data that are produced with the different simulations (in collaboration with the Data Request TT).
2. Ensuring that the data can be accessed relatively easily with possible evaluation tools (in collaboration with the Data Access TT).
3. Working on a framework that allows quick simulation access and evaluation.

Coordination with other CMIP TT, WCRP activities and wider stakeholders

- Coordination with the Data Request, Model Documentation and Data Access TTs would improve the guidance for and understanding of the requested variables, the necessary documentation for simulations and how to easily access the data.
- Coordination with the WCRP core project Climate and Cryosphere (CliC), and Climate and Ocean Variability, Predictability and Change (CLIVAR) would improve the integration of knowledge on the cryosphere and oceans in climate model benchmarking.
- Coordination with the WCRP Lighthouse Activity Explaining and Predicting Earth System Change would improve the integration of knowledge of the model design capable of integrating quantitative observation, explanation, early warning, and prediction of Earth system changes on global and regional scales.

Time commitment

Meetings are expected to take place regularly, every 2-3 months, and more frequently as required and at the discretion of the TT Lead. There may be times when there is more or less work depending on the activities undertaken (e.g., a peak period may be associated with a workshop or paper published by the TT). TT members are expected to commit appropriate time to this activity, at around 5-10% FTE. Most meetings will be online, with some out-of-hours work required due to the challenges of time zone coordination. It is envisioned that the timescale of this TT will be 18 months.

Remuneration

These are not paid roles.

How to apply

Applications should be submitted via this form before 18:00 UTC on 19th September 2022.

Contact and further information

The points of contact for this TT are Birgit Hassler (birgit.hassler@dlr.de), DLR, Germany and Forrest Hoffman (hoffmanfm@ornl.gov), ORNL, USA. Please contact the CMIP-IPO (cmip-ipo@esa.int) if you have any questions or require further information.