Understanding natural climate variability, anthropogenic climate change, and their impacts from local to global scales -

Targeted Experiments with initial-condition Large Ensembles

Objectives

Identifying anthropogenic influences on weather and climate amidst the "noise" of internal climate variability is a central challenge for the climate research community. In recent years, several modeling groups have produced single-model initial-condition large ensembles (SMILE) to analyze the interplay of the forced climate change and internal climate variability under current and future climate conditions. These simulations help to improve our understanding of climate variability, including extreme events, and can be employed as test-beds for statistical approaches to separate forced and internal components of climate variability. The majority of Large Ensembles use standard CMIP experiment protocols and exists on the global scale. They are complemented by a limited number of dynamically downscaled regional simulations, and additional Large Ensembles with specific experimental setups (e.g. single forcing experiments). However, to reduce the enormous effort of producing these ensembles we seek to (a) identify new applications that can directly benefit from the already existing datasets (e.g. dynamical downscaling, high-resolution snapshot simulations); (b) design additional simulations with new experimental setups that are necessary to answer open questions that the current generation of Large Ensembles cannot answer (e.g. single forcing experiments, macro/micro initialization, perturbed physics).

This workshop will bring together a diverse group of researchers from various disciplines in climate research to achieve the following goals:

1. Provide an overview of recent research advances achieved through the application of Large Ensembles

2. Identify research challenges and new directions moving forward, including both scientific and methodological questions

3. Identify applications that directly make use of the existing Large Ensemble outputs to produce new experiments

4. Provide a forum for discussion to communicate the needs from modeling groups to run targeted experiments; discuss emerging topics that need joint collaboration; and brainstorm on the design of new experimental setups to add to the existing suite of simulations

Format and Topics

This 1.5 day workshop will be held at the LMU Department of Geography in Munich, Germany. It will focus on the exchange of current advances and new perspectives in the field of Large Ensemble modeling, and will consist of interactive poster sessions, in-depth plenary and breakout discussions, and networking opportunities. We will give each participant the chance to share their current work in a short lightning talk followed by a poster presentation and want to discuss individual perspectives on the strengths and weaknesses of the existing Large Ensemble simulations and how we can contribute with new simulations to answer the open questions of this community.

The SMILE workshop will bring together experts from climate science and related research fields to discuss the following topics:

- Applications that directly make use of the outputs from the existing Large Ensembles (e.g. dynamical downscaling, high-resolution snapshot simulations, impact models)

- Improved comparison of the existing GCM and RCM Large Ensembles

- Additional targeted experiments that directly try to answer questions connected to the existing datasets that are not possible with the current set of simulations (e.g. single forcing, macro/micro initialization, perturbed physics)

- Improved communication and exchange on new experiments, methods, and collaboration

Participation and Abstracts

Scientists with interest in the application of Large Ensemble methods are welcome to participate in the workshop. The workshop will be limited to 40 participants from diverse fields. Applications and abstracts are due by 11 September 2019, with decisions and notifications send out by 16 September 2019.

Outcomes

The outcome of this workshop will be summarized in a short workshop report and will be distributed to the participants and the SMILE mailing list. We would like to incorporate the ideas for promising new targeted experiments in an ideas or perspective article.

Organizing Committee

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