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Evolving The Coupled Model Intercomparison Project (CMIP) To Better Support The Climate Community And Future Climate Assessments

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Over four decades, CMIP has driven massive improvements in the modelled representation of the Earth system, whilst also seeing huge growth in its scope and complexity. In its most recent phase, CMIP6, a broad spectrum of questions continues to be answered across twenty-four individual model intercomparison projects (MIPs). This science improves process understanding and assesses the climate's response to forcing, systematic biases, variability, and predictability in line with WCRP Scientific Objectives. CMIP and its associated data infrastructure have become essential to the Intergovernmental Panel on Climate Change (IPCC) and other international and national climate assessments, increasingly including the downstream mitigation, impacts, and adaptation communities.

However, despite the invaluable science produced from CMIP6 data, many challenges were still faced by the model data providers, the data delivery infrastructure, and users, which need to be addressed moving forwards. A specific challenge in CMIP6 was the burden placed on the modelling centres, in part due to the large number of requested experiments and delays in the preparation of the CMIP6 forcing datasets and climate data request.

The CMIP structure is evolving into a continuous, community-based climate modelling programme to tackle key and timely climate science questions and facilitate delivery of relevant multi-model simulations. This activity will be supported by the design of experimental protocols, an infrastructure that supports data publication and access, and quasi-operational extension of historical forcings. A subset of experiments is proposed to be fast-tracked to deliver climate information for national and international climate assessments and informing policy and decision making. The CMIP governing panels are coordinating community activities to reduce the burden placed on modelling centres, continue to enhance novel and innovative scientific activities, and maximise computational efficiencies, whilst continuing to deliver impactful climate model data.

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