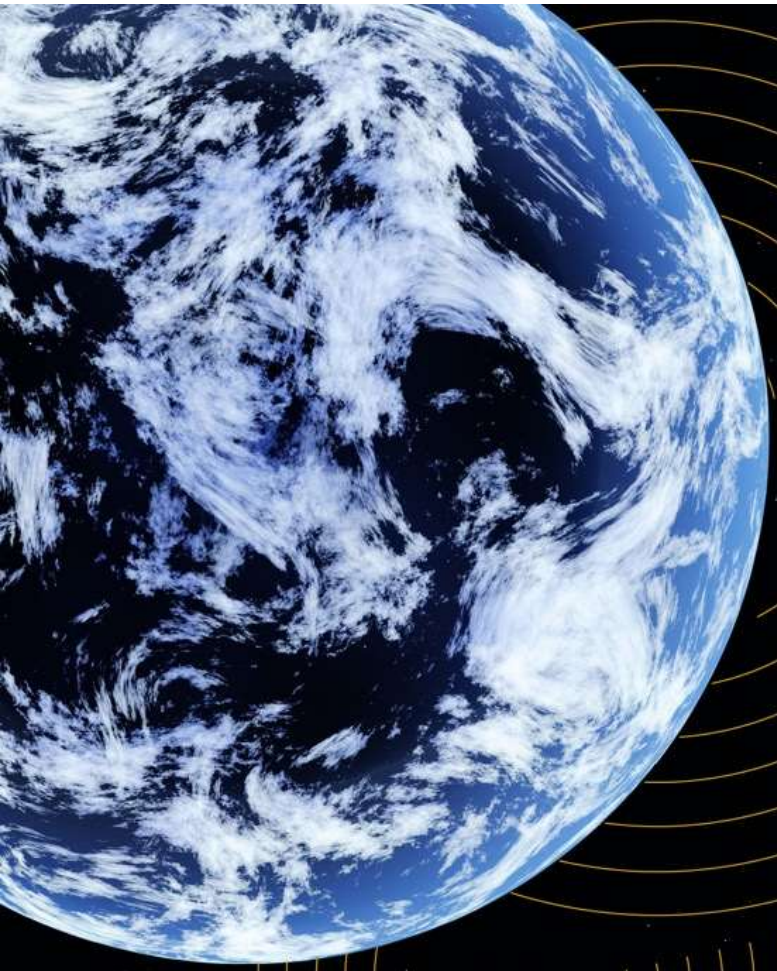

CMIP
Coupled Model Intercomparison Project

Planning for the next phase(s) of CMIP

43rd Session of the WCRP Joint Scientific Committee

Jean-François Lamarque, CMIP Panel Chair
National Center for Atmospheric Research, Boulder, USA
29th June 2022

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Progress and achievements

The primary objective of the Coupled Model Intercomparison Project (CMIP) is to better **understand past, present and future climate changes** arising from natural, unforced variability or in response to changes in forcing in a **multi-model context**.

Started in 1995 -> first set of **common** experiments: comparing the model response to an **idealized** forcing - a constant rate of increase which was accomplished using a CO_2 increase of 1% per year compounded.

Dual role of CMIP: **scientific enterprise** and **support for policymakers**.

CMIP has played a **critical role** in supporting the IPCC Assessment Reports, as data & papers from CMIP simulations have been used extensively in them.

Progress and achievements

Based on the 2018 WCRP review, “A conservative estimate of the national investments in CMIP6 places their value in excess of US$3 bn, based on scientists’ time to develop and run the models and to design the experiments, and the supercomputing costs to deliver the simulations”

Three IPCC climate reports released

August 2021
February 2022
April 2022

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CMIP-IPO established: March 2022

Eleanor O'Rourke
Director

Briony Turner

Programme Manager

Annia Domènech

Science & Communications Officer

esa

Hosted by ESA, Harwell, UK

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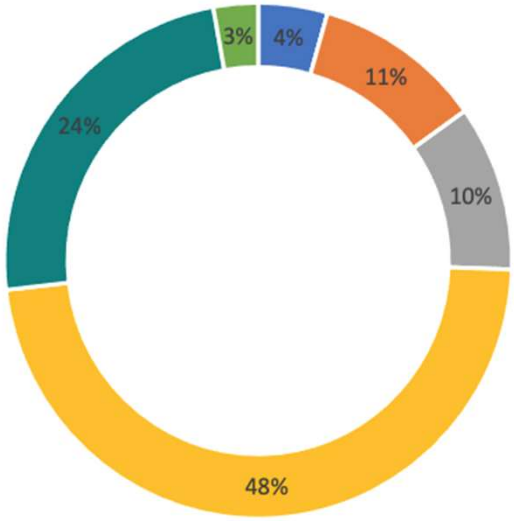
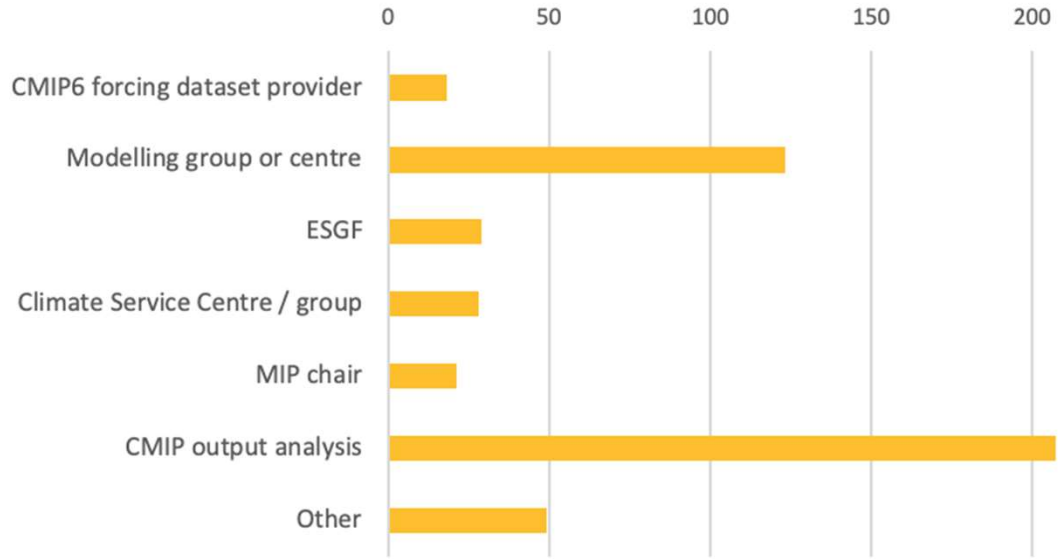
CMIP6 Survey

- Number of models/model versions on ESGF: 114 (44 centers)
- Generated data: >11PB and growing



Fraction of respondents



Respondent role(s)

Figures from Eleanor O'Rourke (CMIP IPO).
Preliminary data, do not cite.

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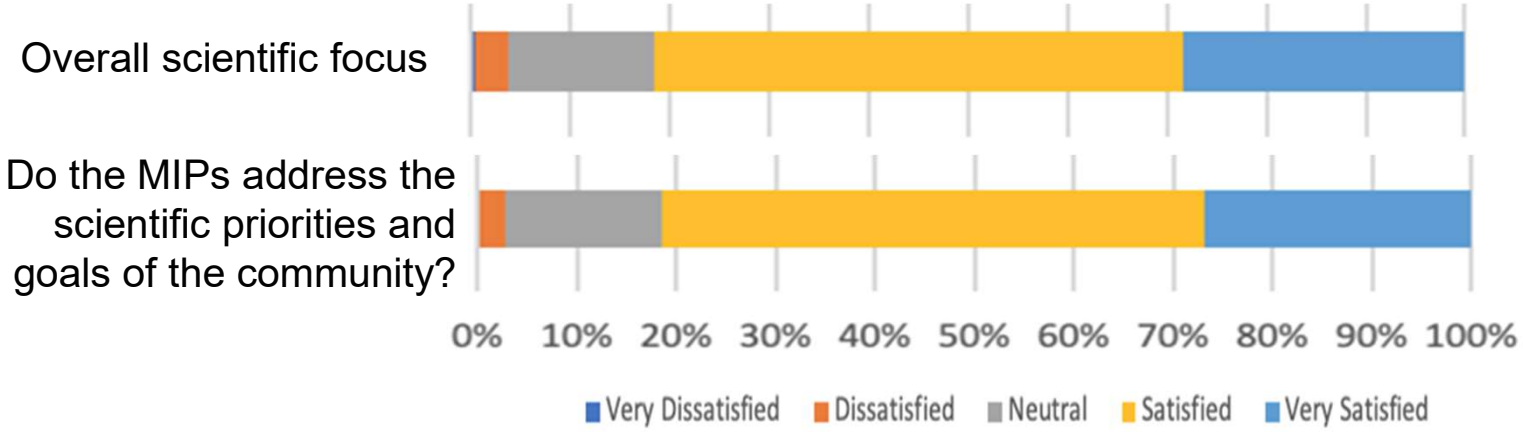
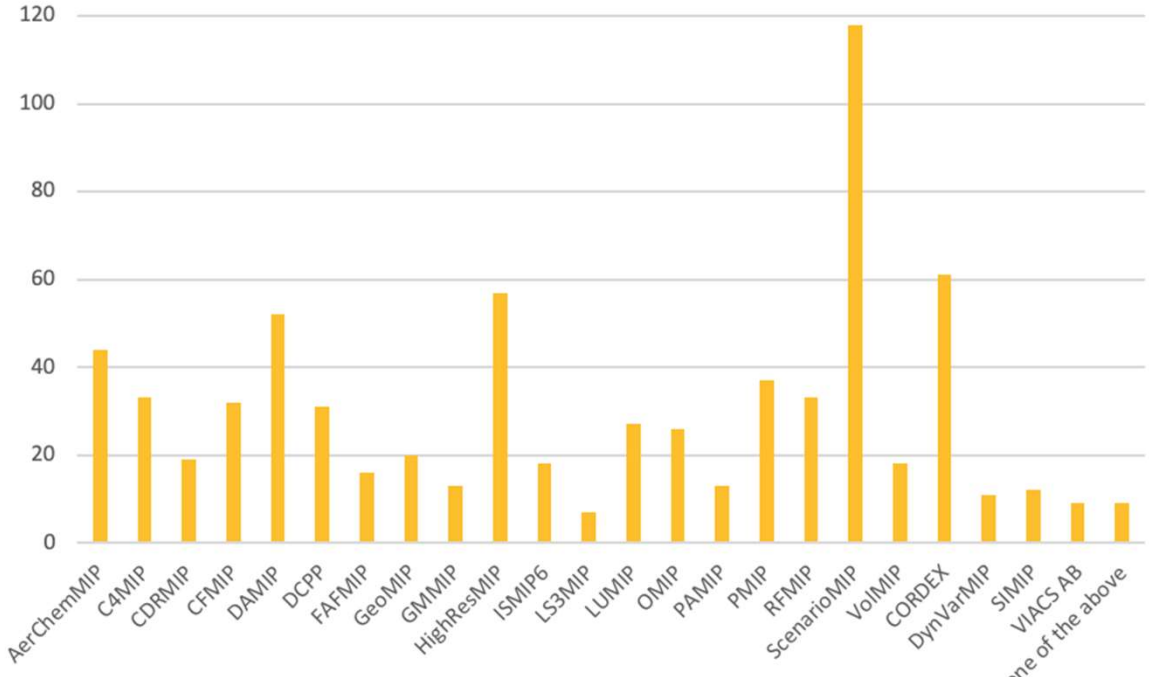
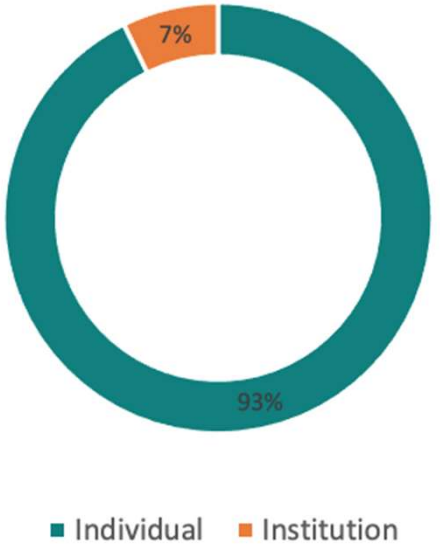
CMIP6 Survey







Figures from Eleanor O'Rourke (CMIP IPO).
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CMIP Survey Headlines

- No big structural change from CMIP6 requested.
- Retain alignment to IPCC in some form.
- Reduce burden on modelling centres.
- Need for greater focus on climate impacts and adaptation relevant experiments (including updated scenarios).
- Need for operationalisation of critical elements (e.g. forcing)
- Build on substantial CMIP6 data infrastructure progress to support improved data access.
- Continuation, and enhancement, of active community input to the experimental design process.
- Nurture the future CMIP community and promote young and global South scientists.

How to define the next phases of CMIP

The next phase(s) of CMIP will only be able to achieve all its objectives (science & societal relevance, carbon footprint and accessibility) if all parties are involved in the planning and definition!

- Can we reduce CMIP7 CO_2 emissions by 50% relative to CMIP6?
- How much of CMIP6 simulations/models can we reuse?
- How many/which MIPs/scenarios do we really need?
- How many ensembles do we really need?
- How many simulations at high resolution?
- Do we need all modelling groups to do everything with their State-of-the-Art model?
- Isn't there a more efficient way to get organised?
- How do we optimize data storage/analysis/access?

Next steps: CMIP7 Task Teams

- Definition of Task Teams (name is POC): list to be expanded/refined
  - Forcings (JF Lamarque/Paul Durack)
  - Ensemble design (Ben Sanderson)
  - Scenarios and impacts (Brian O'Neill)
  - Model benchmarking (Birgit Hassler)
  - Data request (Martin Juckes)
  - Data access and usage (Robert Pincus)
  - Documentation (David Hassell)
  - CMIP Web (Annia Domenech)
- Task teams (each about 5-12 persons, depending on topic) will be assembled through call to the community (diversity, equity, transparency)
- Strong communication between TTs
- Delivery by end of 2023