

45th Session of the WCRP Joint Scientific Committee (JSC)

27-30 May 2024

Report to the WCRP Joint Scientific Committee

Coupled Model Intercomparison Project (CMIP)

1. Highlights for Joint Scientific Committee

CMIP AR7 Fast Track experiment selection

The main focus of the last year has been the development of the CMIP AR7 Fast Track experiments, which will support the IPCC AR7 cycle. The Strategic Ensemble Design Task Team (SED TT) provided a first recommendation in September 2023 after brainstorming within the TT, with their stakeholder group, and with MIPs who were asked to propose experiments for potential inclusion. The CMIP Panel reviewed and refined this recommendation before circulating to modelling centres/groups in a v1 consultation in December 2023 to gather their feedback on proposed experiments and appetite for participation in AR7 Fast Track and wider CMIP7 activities.

The response rate was good with constructive input and suggestions. In January 2024 the results were analysed and discussed within the CMIP Panel, WIP, SED TT. Following further interaction with the proposing MIPs the v2 proposal was developed and released for open community consultation in February 2024. Given the outcomes of the IPCC-60 Plenary in January 2024, a specific follow up v2 survey was circulated to modelling centres/groups to capture not just feedback on the refined experiment selection but to gauge potential readiness and capacity to deliver to an estimated timeline. Again, the response from modelling centres/groups was good; however, the open community consultation only received 42 responses with little participation from other WCRP activities. Consultation analysis summaries can be found [here](#).

The CMIP Panel reviewed the consultation analysis and provided a final recommendation for the AR7 Fast Track experiment selection, together with additions to the DECK, to the WGCM at their meeting in March 2024 in Hamburg. The WGCM endorsed the recommendation. Some further small iterations have been made reflecting clarifications and updates in scenarios development.

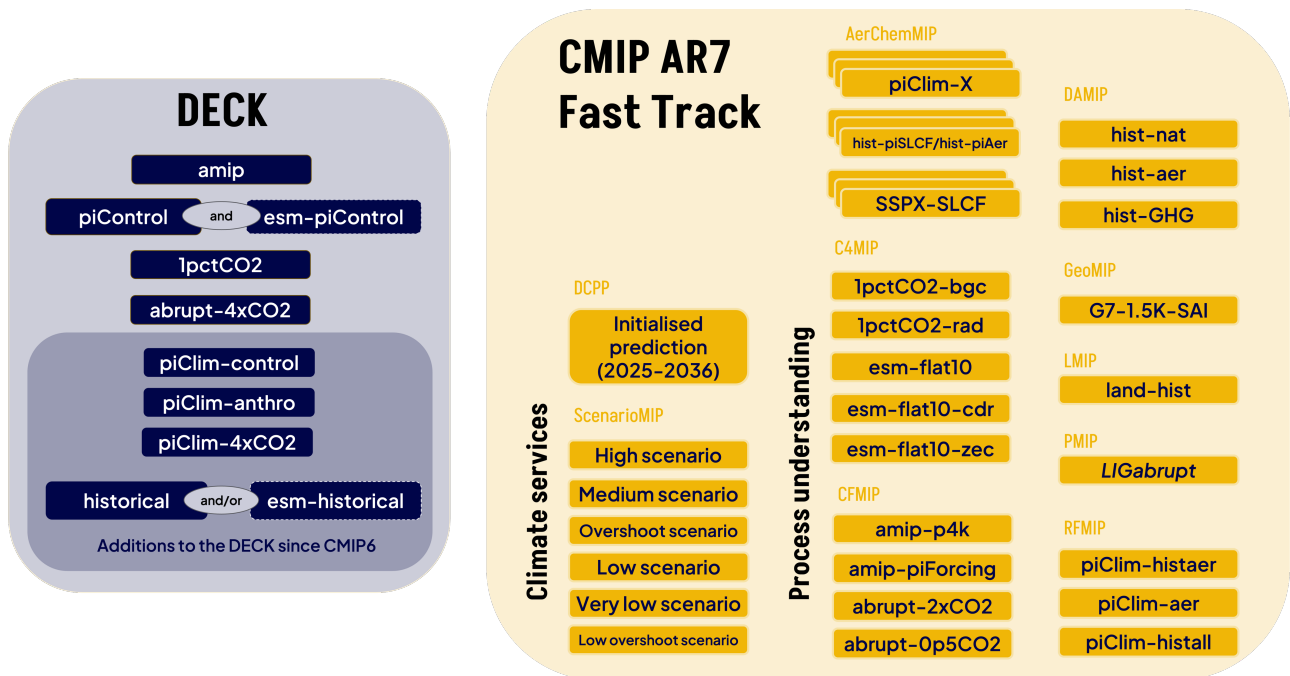


Figure 1: Illustration of the endorsed additions to the DECK and AR7 Fast Track experiment selection.

Activity is now focused on ensuring delivery of the DECK historical forcings and AR7 Fast Track data request, in early 2025. Finalisation of the Fast Track timeline, and hard deadlines, will be linked to the outcome of the IPCC-61 Plenary in July.

Establishment of Fresh Eyes on CMIP

In 2022, the establishment of the CMIP Task Teams allowed a significant expansion in the community contribution to the CMIP7 experimental design and implementation planning. Looking to further develop the diversity of contributions, and develop the future CMIP contributors, the [Fresh Eyes on CMIP](#) was set up during 2023 to integrate the voices of early career researchers, scientists and practitioners in CMIP. There are now 151 Fresh Eyes members from across the globe, organised into eight sub-groups linking to the Task Teams, CMIP Panel and WIP. They are spinning up a number of activities in addition to working in collaboration with Task Teams with the opportunity for mentoring from more senior members of the CMIP governance. Reflecting the huge interest, a [Fresh Eyes Directory](#) has also been set up providing a networking and collaboration opportunity.

2. Planned science initiatives and major events (over next 1- 5 years)

CMIP analysis workshop, ECR hackathon and user engagement event (2026)

The CMIP Panel is planning a CMIP analysis workshop to take place in early 2026 when we expect some early AR7 Fast Track results plus continuing CMIP6 and ongoing MIP analysis to be available. The workshop will build upon the formats of the CMIP5 Analysis Workshops ([Hawaii, 2012](#) and [Dubrovnik, 2015](#)) and [CMIP6 Analysis Workshop \(Barcelona, 2019\)](#) but, reflecting the growing user community, will also encompass user and policy engagement sessions/events and an ECR hackathon led by the Fresh Eyes on CMIP. The involvement of the wider WCRP community will be encouraged. The location of this event is to be decided with carbon impact, promoting global South engagement and potential alignment with relevant events to be considered carefully.

3. Planned Products, high-level assessments or other key outputs/publications

Publication of CMIP7 experimental design and associated papers, and AR7 Fast Track guidance

The CMIP Panel is currently preparing a CMIP commentary and a CMIP7 experimental design paper, which will lead the Geophysical Model Development (GMD) CMIP7 Special Issue. These papers will describe the evolving vision of CMIP into a continuous climate modelling programme supported by design of experimental protocol, infrastructure needs and operational requirements with defined fast track phases to deliver climate information for climate assessments to inform decision making. The experimental design paper will include description of the AR7 Fast Track and the co-creation process involved in its development. It will also describe the science goals of CMIP7. We anticipate further associated papers describing the data request, CMIP7 infrastructure, and papers describing the development and evaluation of forcings and input datasets being developed for the next generation global Earth System Models participating in CMIP7 under their own [GMD Special Issue](#).

The CMIP Panel, supported by the task teams, are also planning to publish guidance to support the implementation of the AR7 Fast Track experiments around: spin up protocols and metrics; emissions-driven model configuration strategy; implementation of emissions-driven scenarios and IAM coupling; and coordination of modelling centre Fast Track contributions to ensure adequate ensembles.

Scoping report – viability and mechanisms for a CMIP sustained mode

The world is changing rapidly and it was clear from the CMIP6 community survey that CMIP has to evolve to remain both relevant to policy and decision makers and, critically, continue to push the boundaries of model development and scientific endeavour. This would require a potential “streaming” of CMIP activities with appropriate structures and funding to deliver a regular and sustained mode of selected CMIP activities. This was discussed extensively at the ESMO meeting in March 2023 with endorsement of the CMIP Panel recommendation to establish a group to scope the definition of “operationalisation” and a viability analysis of potential mechanisms with an initial focus on CMIP. The core scoping group has been formed of CMIP Panel, WIP, WGCM and WGENE Chairs plus WMO climate services representative, and supported by the CMIP IPO, who will engage extensively with all relevant stakeholders and users throughout the scoping report development. The ambition is to publish the report in Q2 2025.

4. Linkages with Core Projects, Lighthouse Activities, Academy etc.

CMIP has been actively engaging with a number of core projects and LHAs over the last year including:

- Regular interaction with MIPs from across core projects and LHAs e.g., ISMIP and GlacierMIP (CLiC), WhatIfMIP and TIPMIP (Safe Landing Climates).
- Interaction with EPESC regarding provision of updated forcing datasets.
- Joint Fresh Eyes on CMIP-RfS data misuse project.
- CORDEX Co-chairs sit as ex-officio members of the CMIP Panel and a CORDEX SAT member sits on the WIP.
- CMIP, CORDEX and RfS Townhall at EGU 2024 - [Information for society: from CMIP to decision makers](#).
- CMIP and CORDEX Analysis and Evaluation Tools learning lab at WCRP OSC in Kigali – [workshop report](#) and [event page](#).
- Strengthening the observational-modelling interface world café at WCRP OSC together with ESMO – feeding into an ongoing [community roadmap activity](#) to focused on developing community ideas to strengthen the observational-modelling interface towards meeting near term and emerging scientific needs. This work will feed into the evolving working group and task team development within ESMO.
- The CMIP IPO has regular interaction with the CORDEX, ESMO and RfS IPOs in addition to the quarterly all IPO meetings and knowledge sharing.

Further engagement is welcomed but participation in CMIP events and consultations could be improved to ensure CP and LHA feedback is contributing to CMIP development. The CMIP IPO will work to target stronger engagement with relevant IPOs to support this.

A synergy, which could be strengthened, is between CMIP and the Digital Earths LHA. Areas of potential common interest include digital technologies that offer benefit across the model multi-verse and model benchmarking methodologies, standards and tools.

Regarding the WCRP Academy, we are planning for Fresh Eyes driven training sessions, hackathons and workshops to be developed and delivered in the coming years that can contribute and will be remaining in regular contact as they develop.

5. Partnerships with entities outside of WCRP

The following partnerships have been developed by CMIP with entities outside WCRP:

- [Earth System Grid Federation \(ESGF\)](#): The ESGF consortium is a coordinated international project that develops shared infrastructure across numerous countries to publish and share local model data. The ESGF is vital to the delivery of open and accessible CMIP output. The CMIP Panel and WIP Chairs now meet every three months with the ESGF Steering Committee in addition to the many technical connections active between WIP and ESGF Executive Committee.
- [IPCC AR7 Working Group Chairs](#): The CMIP Panel Chairs have been engaging regularly with the IPCC WG Chairs as the AR7 timeline, format and content is developed.
- [European Space Agency \(ESA\)](#): As host of the CMIP IPO, ESA Climate Office continues to be highly supportive of CMIP and wider WCRP activities including funding for a number of CMIP forcing datasets, provision of IPO Technical Officer (in addition to required IPO staffing) to support the WIP and CMIP infrastructure more actively, and involvement in ESMO and obs4MIPs steering groups supporting close collaboration across the observation-modelling interface.
- [Copernicus Climate Change Service \(C3S\)](#): Provision of a 0.25 FTE liaison officer to support CMIP IPO activities particularly in regard to model documentation, quality control and assurance, and pathway to regular and sustained forcings.
- [Climate Match Academy](#): Development and review of training materials, chairing of showcase events and representation on steering committee.
- Range of Horizon Europe funded programmes e.g., [ESM2025](#), [OptimESM](#).
- Observation-modelling activities have included collaboration with [GEO](#) and [GCOS](#).

6. Suggestions, issues or challenges, for example:

Issues and challenges

Lack of structural agreement with ESGF

The delivery of CMIP AR7 Fast Track and wider CMIP7 activities is dependent upon the publication and accessibility of the model output on the ESGF, as in previous CMIP phases. The contributions of the ESGF community and associated funders must be recognised particularly the US Department of Energy who fund the ESGF2-US multi-lab consortium, in addition to CEDA, DKRZ and IPSL who are delivering the UK/EU contribution to the internationally federated project (there is work underway to formalize a EU/UK consortium, ENES-RI, a follow on from the previous IS-ENES EU consortium funding model, however, current status is solely from institutional in-kind support, which limits capabilities markedly). However, given the tight timeline of the AR7 Fast Track, the growing demand for CMIP output, and rapid evolution of data technologies and user expectations, the CMIP/WIP Panels have concerns regarding the lack of

a structural agreement with the ESGF consortium and lack of clarity in responsibilities/governance across the WIP and ESGF Executive and Steering Committees. The ESGF Steering Committee also appears to lack funding programme managers from Europe or Asia, which perhaps limits potential further contributions from these global regions.

Recommendation: WCRP to establish a structural agreement with the ESGF community (e.g., Memorandum of Understanding or equivalent) encouraging more robust and globally representative governance. With this in place the CMIP IPO could provide coordination and facilitation support.

Need for a dedicated scenarios activity within WCRP

The interest, both scientifically and especially from policy and political circles, in the development of scenarios has increased significantly over recent CMIP phases and IPCC cycles. An IPCC Scenarios Workshop in April 2023 raised calls for more open and transparent governance of scenario development within ScenarioMIP. Currently ScenarioMIP is self-governed, like all other MIPs, and not necessarily aligned with WCRP or CMIP governance procedures. The ScenarioMIP leadership has made efforts including development of a ScenarioMIP Advisory Group (72 members) and [open, public consultation of the CMIP7 ScenarioMIP proposal](#) to increase transparency and the scenarios will be presented to the JSC for endorsement. However, given their increased profile and importance to climate policy assessments we feel greater visibility within WCRP may be beneficial to ensure timely delivery, adequate structural support, and establishing a closer connection with the Integrated Assessment Modelling community.

Recommendation: The JSC consider whether to develop a dedicated scenarios activity within one of the core projects, LHAs or under CMIP.

Questions for the JSC

Will the JSC give consideration to the development of Conflicts of Interest guidance to be implemented across WCRP activities – this is of growing importance and relevance given the increasing commercial nature of climate information provision.

Request

Could the JSC encourage wide usage/engagement of CMIP across the WCRP family? As one of the underpinning WCRP modelling projects, CMIP is keen to ensure that it is supporting the scientific goals of the core projects and LHAs.