

Update report for the WCRP Joint Scientific Committee

CMIP and WIP

1. Key highlights since the last JSC meeting (May 2025)

1.1 Preparation and initiation of first CMIP7 simulations

The focus of CMIP Panel, WIP, Task Teams and IPO over the last year has been ensuring all the necessary components are in place to support the initiation of [CMIP7 Assessment Fast Track](#) and wider CMIP7 simulations. This has included:

1.1.1 Finalisation and publication of the CMIP7 experimental design

The extended CMIP Panel worked hard to finalise and publish the CMIP7 experimental design and protocols paper in Geoscientific Model Development ([Dunne et al., 2025](#)). This included:

- Description of emergent scientific opportunities motivating CMIP7.
- Description of the revised set of Diagnostic, Evaluation and Characterization of Klima (DECK) experiments to include historical, effective radiative forcing, and focus on CO₂-emissions-driven experiments.
- Description of Assessment Fast Track (AFT) – a collection of experiments drawn from community MIPs to support research towards national and international climate assessments (including the Intergovernmental Panel on Climate Change (IPCC) Seventh Assessment Report (AR7)) and climate services goals covering prediction and projection, characterization, attribution and process understanding.
- Additional foci included sustained support for community MIPs, periodic updating of historical forcings, and diagnostics requests.

1.1.2 Finalization of CMIP7 Projection Scenarios

In February 2025 the JSC formally endorsed the CMIP7 scenarios developed by ScenarioMIP and documented in [van Vuuren et al \(2025\) preprint](#). Following community and reviewer feedback, further iterations were made to the scenarios, including two name changes (Very Low Low Overshoot became Very Low and Very Low High Overshoot became Low to Negative) and an additional scenario was added (High Low). The final paper (van Vuuren et al., 2026) has recently been published in the GMD CMIP7 Special Issue as a highlight paper.

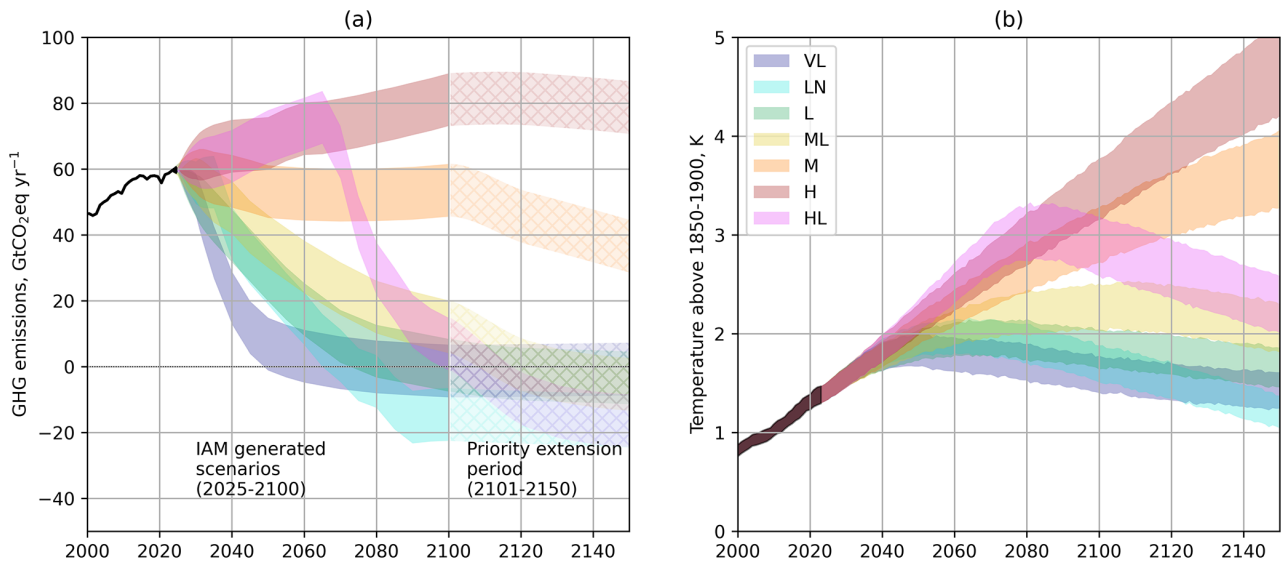


Figure 1: Proposed scenarios for CMIP7 ScenarioMIP, showing (a) GHG emissions pathways as a function of time for each of the proposed scenarios (based on GWP-100) and (b) the associated global average temperature outcomes using the probabilistic FaIR ensemble used in IPCC AR6 (Smith, 2025; Smith et al., 2024). (from van Vuuren et al, 2026)

1.1.3 Delivery of historical and scenario forcing datasets

Climate forcings are key in defining exogenous drivers of climate change and variability – an integral part of defining the historical, future scenarios, and idealised model experiments. Up-to-date, accurate, and well-documented forcing datasets are needed to build confidence in model simulations, attribution of historical changes, and projections of future climate change. The [CMIP Forcings Task Team](#) was established to deliver the CMIP7 DECK historical forcings and, together with colleagues from the Integrated Assessment Modelling (IAM) community, the future scenario forcings.

- All CMIP7 DECK historical forcing datasets are now available and being used in production simulations.
- CMIP Panel Chairs met with ScenarioMIP, ISIMIP, ISMIP7 and CORDEX to gather preferences for the scenarios that should be first in the running order to support earlier delivery to these downstream activities – High (H) and Very Low (VL) were selected with Medium (M) and High Low (HL) following.
- All scenario forcings datasets for H and VL at a minimum are now available – land use, ozone and nitrogen deposition can only be delivered for two scenarios at a time.
- There is an [active Github](#) where dataset details are discussed and issues can be raised.

All CMIP7 forcing datasets can be [accessed here](#).

1.1.4 CMIP7 guidance and modelling centre interaction

Throughout the last year there has been regular interaction with the CMIP modelling centres providing the latest updates on forcing availability, the data request, Rapid Evaluation Framework (REF) and infrastructure development. Two surveys were completed (June and November 2025) to gather feedback on modelling centre readiness and plans for simulations and key aspects of the CMIP7 components and implementation. An archive of emails to modelling centres can be found [here](#).

To further support modelling centres and infrastructure providers, new [CMIP7 guidance webpages](#) have been established. The key pages have now been completed, initially focused on providing guidance for modellers and infrastructure providers, with more content targeted at CMIP data users to be developed over the next months as CMIP7 data becomes available.

1.1.5 CMIP7 Infrastructure development and ESGF-NG

Over the last year, the WIP and their task teams have been designing and implementing the key components of the CMIP7 infrastructure. This will support the publication of the CMIP7 AFT and wider CMIP7 data as it emerges. In a dedicated CMIP 2026 side session, "[Accessing and using CMIP data](#)", the WIP co-chairs and TT members outlined the key steps for modelling centres producing and publishing the data, what users need to know, and key infrastructure changes from CMIP6. These changes include:

- [Essential Model Documentation \(EMD\)](#) – all CMIP7 models will be required to provide an EMD description offering greater consistency and utility for users.
- [CMIP7 Data Request](#) – with a Core request of 131 highest priority variables provided for all experiments and further variables organised into Opportunities (and described in five Data Request thematic papers in the GMD Special Issue on CMIP7 scientific objectives).
- [Branded variables](#) – a new systematic approach to naming variables in CMIP7 that is intended to make it easier for data users to find the variables they want.
- [Quality Control](#) – a more systematic approach to quality assurance / quality control (QA/QC) of CMIP published datasets to improve data usability for downstream tools and applications.

In 2019 a major redesign of the Earth System Grid Federation (ESGF) was initiated, and the new ESGF-Next Generation (ESGF-NG) will be launched and ready for CMIP data publication in May 2026. Key changes include improvements to data discovery and access, data publishing, and computing capabilities reflecting feedback from users and technical advances. Given geopolitical concerns, CMIP and WIP chairs with ESGF community and WMO secretariat have been looking at ways to increase the resilience of ESGF and diversify funding streams.

1.2 IPCC Interaction

The CMIP leadership have been in regular contact with the IPCC WG chairs and TSUs over the last year including:

- Update meeting with all WG chairs in October 2025.
- Briefings provided ahead of IPCC-63 Plenary in October 2025, All-WG LAM1 in November 2025 and WGI LAM2 in April 2026.
- Focused update meeting with WGI chairs in March 2026.
- WGI Chapter 8 CLA, Natassa Romanou presented on "What do IPCC AR7 WGI (II & III) need?" at the opening plenary of CMIP 2026.

1.3 Rapid Evaluation Framework (REF)

The CMIP7 Assessment Fast Track ready [Rapid Evaluation Framework](#) was successfully launched on 9th March 2026 at the CMIP Community Workshop 2026. It was warmly welcomed by members of the community, including representatives from the IPCC.

The Framework is available both online, ensuring open access for all, and in a containerised version, available for deployment locally at modelling centres. It is currently based on CMIP6 outputs as no

CMIP7 data has been published but successful testing deployment has been completed on both ESGF indexing nodes. The dedicated REF dashboard can be accessed [here](#) and a tour of the dashboard [here](#).

The REF is designed to provide outputs available online in netCDF format as well as via an online dashboard and incorporates an application programming interface (API) for executing metrics generated from community evaluation packages, across the globe.

Once CMIP7 data is published, the REF will provide the community directly with key data that they then utilise to produce figures to meet analysis and synthesis requirements. The target audience for this release is IPCC AR7 WGI authors, chapter scientists and data focal points, and dedicated training sessions for this group are being planned for May 2026.

To support the launch and use of the REF, the joint CMIP-RfS Responsible Data Use Task Team developed the [Best Practice for Using the CMIP Rapid Evaluation Framework Output](#). The guidance addresses how to account for model uncertainty, reference data uncertainty, and internal variability, and helps users identify the most relevant metrics and diagnostics for their purposes.

1.4 Fresh Eyes on CMIP

[Fresh Eyes on CMIP](#) is a working group integrating the voices of early career researchers, scientists and practitioners in CMIP. There a number of active projects covering a wide range of topics ([see project list here](#)) with papers starting to emerge including “[CMIP6 data usage: Lessons learned from more than 200 million downloads](#)” (Lavoie et al., 2026), and “[Developing Guidelines for Working with Multi-Model Ensembles in CMIP](#)” (Katzenberger et al., 2025).

The Fresh Eyes Steering Group welcomed a new co-lead, Aditya Sengupta (University of Melbourne) in early 2026. Julia Mindlin (University of Leipzig) stepped down as co-lead in April 2026 and an open call to replace her will be launched in the coming months.

1.5 CMIP Community Workshop 2026

In March 2026, CMIP welcomed their community in Kyoto and online at the [CMIP Community Workshop 2026](#).

The workshop was a success, with highly positive feedback received from across the community. We welcomed over 430 in-person attendees and another 200 joining virtually across the week. Workshop delegates represented 61 countries, ensuring the workshop reflected the diverse, international nature of CMIP. Alongside our in-person activities, the online workshop access was well received, with seamless session live-streaming, presenters able to give their talk remotely, and two dedicated virtual poster sessions.

The largest continental contingent came from Asia, meaning we successfully advanced one of our goals for the workshop – to highlight and strengthen the contributions to CMIP from outside Europe and the US. Additionally, 36% of delegates identified as early career scientists. Their presence was positively felt across the workshop, especially during the Early Career Researcher Workshop on the Wednesday. Overall, the workshop has helped to amplify the role of ECRs and ensured the next generation will be able to lead CMIP in the future.

An in-workshop survey, together with interactive final plenary highlighted the benefit of CMIP 2026 with 85% reporting a change in perspective on the upcoming challenges facing the CMIP community.

The biggest challenges identified were timelines and pressure to deliver (particularly in frame of the IPCC AR7 timeline) together with concerns around funding and resources. How to scale the CMIP infrastructure as resolutions and ensembles increase, and how to understand, constrain and communicate uncertainty, particularly to policy makers were also highlighted by participants.

1.6 Publications

In the last year the CMIP Panel, WIP, task teams, Fresh Eyes and Community MIPs (protocol papers) have been responsible for nearly 30 peer reviewed publications. There are two Geophysical Model Development (GMD) Special Issues established for CMIP7:

- [CMIP7 scientific objectives, experimental design, and organization](#) (20 papers) including:
 - Highlight paper [“An evolving Coupled Model Intercomparison Project phase 7 \(CMIP7\) and Fast Track in support of future climate assessment”](#) (Dunne et al., 2025)
 - Highlight paper [“The Scenario Model Intercomparison Project for CMIP7 \(ScenarioMIP-CMIP7\)”](#) (van Vuuren et al., 2026)
 - [“Rapid Evaluation Framework for the CMIP7 Assessment Fast Track”](#) (Hoffman et al., 2025)
 - [“CMIP7 Data Request: co-created guidance for the production of CMIP7 data \[v1.2.2.3\]”](#) (Mackallah et al., 2026)
 - Five CMIP7 Data Request thematic papers ([Atmosphere](#), [Earth System](#), [Impacts and Adaptation](#), [Land and Land Ice](#), [Ocean and Sea Ice](#))
 - [“CMIP6 data usage: Lessons learned from more than 200 million downloads”](#) (Lavoie et al., 2026)
 - MIP protocol papers including [HighResMIP2 paper](#) as this offers a route to bridge from CMIP to Digital Earth.
- [Coupled Model Intercomparison Project Phase 7 \(CMIP7\) forcings and inputs – development, documentation, and evaluation \(GMD/ESSD inter-journal SI\)](#) (5 papers)

Two further papers relevant to the developing CMIP sustained mode were published:

- [“Climate models need more frequent releases of input data — here’s how to do it”](#) (Naik et al., 2025)
- [“Towards provision of regularly updated climate data from the Coupled Model Intercomparison Project”](#) (Hewitt et al., 2025)

A number of other papers have also emerged from the Model Benchmarking Task Team:

- [“Systematic Benchmarking of Climate Models: Methodologies, Applications, and New Directions”](#) (Hassler et al., 2025)
- [“Observational Data for Next Generation Climate Model Evaluation: Requirements, Considerations, and Best Practices”](#) (Beadling et al., 2026)

1.7 Fundraising initiatives

Significant areas of successful fundraising include:

1. The **Rapid Evaluation Framework** was been made possible by dedicated resources from European Space Agency (ESA) and US Department of Energy and the expertise, and in-kind support, of the following software packages and organisations: Climate Resource, eScience Center, ESMValTool, ILAMB, IOMB, PMP and CMEC.

2. **CMIP 2026**, with significant funding from ESA as hosts of the CMIP IPO, local hosts the Advanced Institute for Marine Ecosystem Change (AIMEC) and MEXT-Program for The Advanced Studies of Climate Change Projection (SENTAN), and a number of other sponsors particularly facilitating ECR and global south participation. Full sponsor information [here](#).
3. **Copernicus Climate Change Services (C3S) tender** to work towards a sustained, operational framework for maintaining, extending, and publishing historical climate forcing datasets.

There are also the significant in-kind contributions made by the CMIP modelling centres, leveraging national and project funding to deliver the CMIP data. A further boost to the European contribution has been confirmed with two new large scale Horizon Europe projects expected to start in mid-2026:

- FUTURA will primarily support European efforts to integrate CMIP and CORDEX with scenario production and impacts assessment and utilizing emulators leading to a climate pathways system (total project at EUR 30 million over four years).
- ENES-RISe will contribute to the production and distribution of ESM simulations, via a number of services on ESMs, ESM infrastructure tools, HPC adaptation and computational performance optimization, and data distribution and standards. This represents a major contribution to the ESGF effort (total project at EUR 5 million over three years).

The WCRP secretariat have been working with WMO colleagues to develop a proposal with potential partners and funders, including [FAGI](#), [ICAIN](#), MeteoSwiss, and the Swiss HPC and Data Centre etc, around a possible proposal for a Swiss-hosted ESGF node for CMIP and CORDEX data.

The CMIP Panel and WIP chairs, supported by the IPO, are proactive in providing the CMIP community with support letters for funding bids at national and regional levels, with specific proposed contributions to CMIP and/or the CMIP data infrastructure (e.g., national funding to support ESGF nodes). Further, the leadership and IPO engage with, and provide input to, funders and programme managers regarding emerging science questions, issues around capacity and gaps that may impact CMIP data delivery.

2. Future plans and priorities

2.1 Enabling publication and delivery of CMIP7 Assessment Fast Track data

The following areas will be progressed to support CMIP7 data publication and delivery:

- Ensuring operation of data delivery pipeline from modelling groups through to ESGF and considering simplification of current processes and systems to enhance robustness (e.g. single reference source Controlled Vocabularies (CV) info).
- Construction and integration of a Citation service to support DOI reference to published data for CMIP7, CMIP6Plus and CMIP6 and other projects. This will be similar to the existing, unsupported service at DKRZ, but will have a narrower scope.
- Continuing to enhance documentation for data providers (modelling groups) and data users.
- Ensure high quality control standards for CMIP7 data to support robust development of downstream tools and applications.
- Outreach to MIPs and modelling groups around the process for working beyond the CMIP7 AFT, to allow other MIPs to start and expand both through new experiments and new data requests.

2.2 Facilitating CMIP AFT community analysis and REF evolution

During a dedicated side session, final plenary, and in-workshop survey the question of how the CMIP leadership could facilitate CMIP7 AFT analysis was posed. The overall feeling was that the analysis will be bottom up and driven by the MIPs and other community activities (including within WCRP core projects and lighthouse activities). However, there was strong support for lightweight CMIP coordination and facilitation.

When asked what form of coordination was preferred, respondents most strongly supported a community forum to share tools, ideas and code. Workshop support for MIP led activities and working groups were also highlighted. The CMIP 2026 “Let’s CMIP together: analysing CMIP data through hackathon and sprints” shared experiences on organising hackathons and explored potential hackathon topics and formats that may support and accelerate CMIP7 AFT analysis progress. CMIP plans to engage with Digital Earths to learn from their highly successful Global Hackathon in May 2025.

The REF will be an important tool supporting AFT analysis and has been very warmly welcomed by the community including IPCC AR7 WGI who have requested dedicated training sessions for their chapter data focal points, chapter scientists and authors. These will be developed and delivered in May 2026, ahead of the WGI First Order Draft deadline in July 2026, funded by the CMIP IPO. An opportunity for members of the FEoC community to also participate in this training to become REF experts will ensure this investment serves the wider community and builds capacity. Additional metrics and diagnostics requested by the IPCC community may be integrated pending the availability of financial and human resource.

To support the further development and community expansion of the REF, beyond the scope of the CMIP Model Benchmarking Task Team, it is proposed that a Climate-REF Panel will be established under ESMO. The responsibilities of this proposed REF Panel will include:

- Facilitating community agreement on priority activities and coordination of community efforts to deliver these.
- Approval of new diagnostics, reference datasets and new packages into the publicly available, community supported REF.
- Facilitating dedicated resources for any associated package and code development for REF deployment through proactive engagement with funders and partners.

The new body will report to the ESMO SSG but defer to CMIP Panel for any CMIP related diagnostics or other CMIP-related REF matters. An open call for applications to the REF Panel will be launched by mid-2026.

2.3 CMIP sustained mode strategic development and first stage implementation

It is clear that climate information is needed more regularly than the phases of CMIP can provide and therefore the vision for a sustained mode CMIP has been developed to meet this need and is outlined in [Hewitt et al, 2025](#).

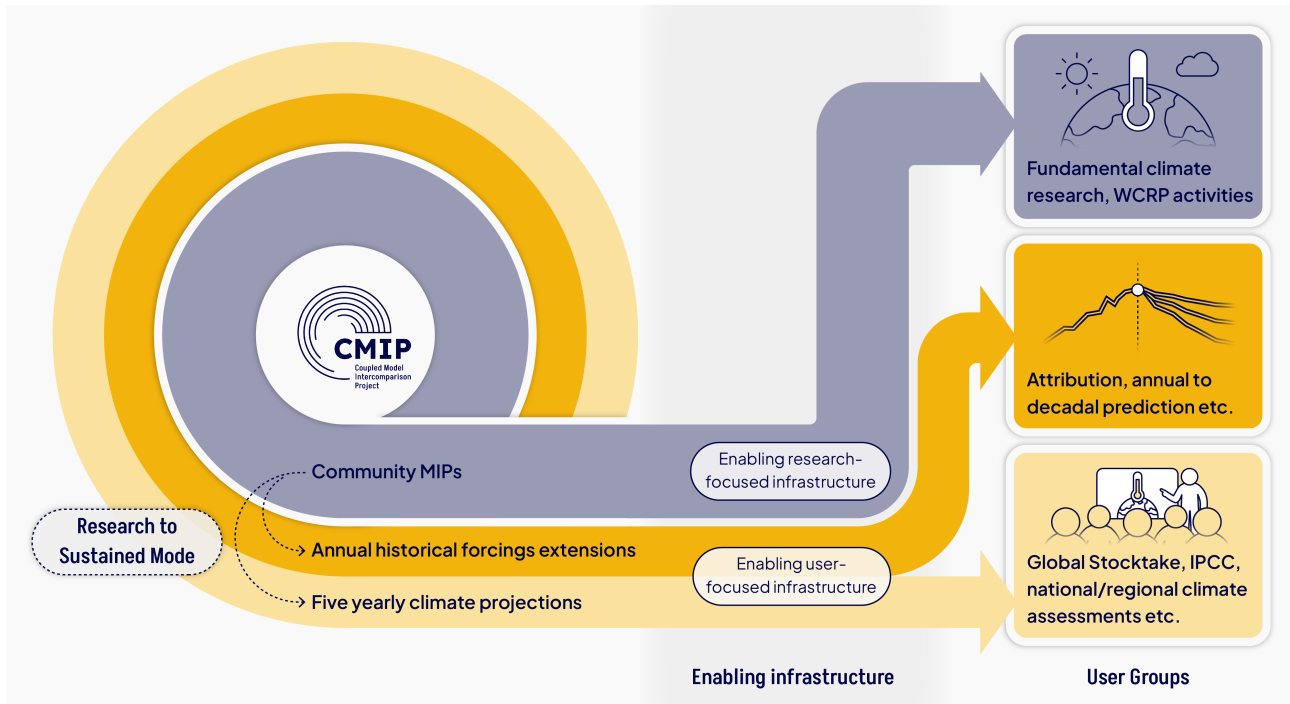


Figure 2: Reimagining of CMIP structure linking to observations, forcings, and modelling landscapes. (from Hewitt et al, 2025)

Figure 2 illustrates the proposed streaming of CMIP activities according to user need and required delivery timeline. Community MIPs remain at the heart of CMIP, and their research outcomes will drive the compact sustained mode streams, which will be required to adhere to more stringent delivery timelines. Feedback from the community over the last year, including during CMIP 2026, has indicated support for the sustained mode concept as long as the research focused element of CMIP is not sidelined and there is some concern of diversion of resources.

Annual extensions of historical forcings have been identified by the CMIP Panel, and supported strongly by community feedback, as the first priority for the sustained mode. Up-to-date, accurate, and well-documented forcing datasets are required to build confidence in model simulations, attribution of historical changes, and projections of future climate change. CMIP is a primary user but the forcings are also required by a broad user base (Naik et al, 2025), including other WCRP activities e.g., DCPD and EPESC. The CMIP Panel is working with the WMO secretariat to put forward a resolution to the WMO Infrastructure Commission (INFCOM) to support the need for annual extensions of forcing data.

A Copernicus Climate Change Services (C3S) tender has been launched to deliver a prototype service for annual historical forcing extensions for priority datasets, with expected start date in late 2026. In parallel, and closely connected, there is a need for a group to:

- Support the scientific rigour of these annual updates,
- Develop new or improved methodologies providing recommendations for dataset updates on a longer timeframe.
- Coordinate providers, modelling centres and other user groups to ensure robust dataset testing and proactive user needs identification.
- Manage open and transparent assessment and endorsement of dataset providers.
- Address evolving forcing dataset needs and coordinating community development.
- Provide recommendations and unbiased scientific insight to funders.

- Facilitate development of a forcings evaluation tool (a forcings REF) to ensure temporal consistency, detect unintended discontinuities and support timely uptake of the data.

The CMIP Forcings Task Team is currently developing their recommendations for the structure and scope of this future Forcings group, and potential interim Delivery Group to support the prototype historical extensions within the timeframe of AR7. These recommendations will be provided to the CMIP Panel for consideration by June 2026.

Over the rest of 2026, the CMIP Panel will be focusing on further developing the concept of five yearly climate projections cycle aligned with the Global Stocktake. This will include in-depth community and user consultation building on feedback received so far. The CMIP Panel will also work closely with the WIP and ESGF, facilitated by the IPO, to develop a strategic plan to ensure sustainable infrastructure/s is in place to support open and equitable access and can meet the rapidly evolving needs of both service and research users.

2.4 New activities

The following activities will be initiated during the next year:

- Activities to support and facilitate CMIP7 AFT analysis e.g., community forum, hackathons.
- Rapid Evaluation Framework Panel (under ESMO) as described above.
- Forcings Panel (and other relevant structure as agreed), potentially incorporating development of forcings evaluation tool dependent on securing funding.
- WIP focused working groups to provide ongoing support to critical aspects of data delivery infrastructure e.g., implementing a community variable register based on branded variables.
- Continuing to work closely with ESGF community to support increased infrastructure sustainability, facilitating greater contributions from across the globe, and ensuring more equitable access.

Although the prospective REF Panel and likely the prospective Forcings Panel will sit directly under ESMO governance, it is expected that the CMIP IPO will provide support rather than ESMO IPO, due to their resource limitations and the existing knowledge of the CMIP IPO team.

2.5 Resource mobilisation

For all new activities, and the many ongoing CMIP and WIP activities, there will continue to be proactive management of in-kind contributions, identification of potential future funding and strategic engagement with funders across the globe. The CMIP and WIP leadership, together with CMIP IPO, will also actively support wider WCRP resource mobilisation including activities at London Climate Action Week in June 2026.

3. Suggestions, Issues or Challenges

3.1 Issues

As previously identified in reports to [JSC-45](#) and [JSC-46](#) the CMIP Panel and WIP have concerns, which remain outstanding, around:

1. Governance, sustainability and lack of formal agreement between WCRP/CMIP and the ESGF.

2. Need for a more structured relationship with the Integrated Assessment Modelling Consortium (IAMC), the governing body for the IAM community.

3.2 Challenges

3.2.1 Rapidly evolving needs for CMIP infrastructure

Further to the issue around formalisation of the WCRP/CMIP and ESGF relationship there is the ongoing and growing concern around the sustainability of the data infrastructure delivering CMIP (and CORDEX) data, and whether it can further support sustained mode delivery structures and associated user groups adequately. With the pace of technical development and rising user expectations it is becoming increasingly challenging to deliver with in-kind and research project-based contributions.

Question: Is a different infrastructure required to deliver sustained mode data and products and what collaborations should be investigated?

3.2.2 Inclusion and capacity building

With higher resolution, larger ensembles and a sustained mode, there is potential that the gap will grow between the Global North and Global South. During CMIP 2026, there was a call to create pathways for Global South leadership in CMIP.

Question: How can the WCRP community highlight and act against increasing inequity?

3.2.3 Moving from research to delivery structure and governance for sustained mode

For those activities proposed for the sustained mode there is a need for a more delivery focused structure, management and governance. A culmination of voluntary efforts, each with their own drivers, is not suited to timely and user focused delivery. In-kind contributions can play a part but within clearly defined activity scopes with detailed description of commitment and expectations. This is a departure from the working culture of WCRP activities and are more akin to WMO delivery mechanisms.

Question: Are changes required within WCRP structure and governance required to accommodate sustained mode? If so, what is needed and how can it be implemented?

4. Any other points or issues you wish to include

To support resource efficiency, clear definition of roles and responsibilities between the WCRP secretariat and IPOs, together with more cross IPO working, could reduce duplication of effort and reduce travel, software and training costs.