

CMIP: latest news and CMIP7 status

Eleanor O'Rourke – Director, CMIP International Project Office
On behalf of the CMIP Panel, WGCM-ESMO Infrastructure Panel, CMIP/WIP Task Teams and IPO

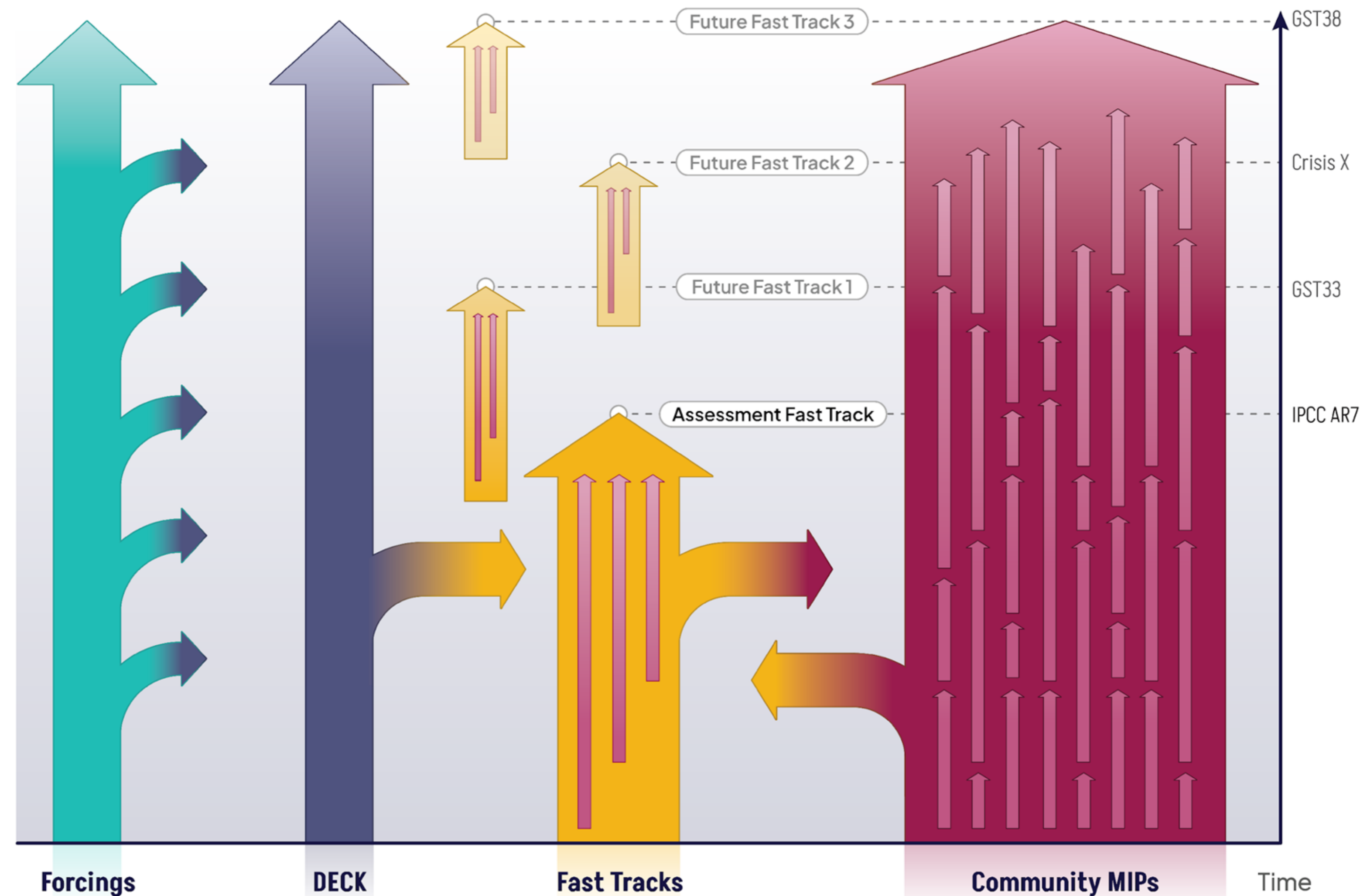


An evolving experimental design

A more continuous approach with small targeted “Fast Track” experiment sets. The first will respond to the needs of IPCC AR7 among other national and international policy assessments, the CMIP7 Assessment Fast Track.

.CMIP infrastructure, standards and tools support ongoing science (Community MIPs) and assessment activities.

This design reflects extensive feedback from the modelling centres and wider user community.



CMIP7 Assessment Fast Track: the experiments

Prediction & Projection

DCPP

dcppB-forecast-cmip6

ScenarioMIP

- (esm-)scen7-h
- (esm-)scen7-hl
- (esm-)scen7-m
- (esm-)scen7-ml
- (esm-)scen7-l
- (esm-)scen7-ln
- (esm-)scen7-vl

Highest priority scenario extensions, as defined in van Vuuren et al., 2025

Process Understanding

Attribution

AerChemMIP

- (esm-)scen7-h-Aer
- (esm-)scen7-h-AQ
- (esm-)scen7-vl-Aer
- (esm-)scen7-vl-AQ
- hist-piAer
- hist-piAQ
- piClim-CH4
- piClim-N2O
- piClim-NOx
- piClim-ODS
- piClim-SO2

GeoMIP

g7-1p5K-sai

PMIP

abrupt-127k

DAMIP

- hist-nat
- hist-aer
- hist-GHG

LMIP

land-hist

Characterisation

C4MIP

- 1pctCO2-bgc
- 1pctCO2-rad
- esm-flat10
- esm-flat10-cdr
- esm-flat10-zec

CFMIP

- amip-p4k
- amip-piForcing
- abrupt-2xCO2
- abrupt-0p5CO2

RFMIP

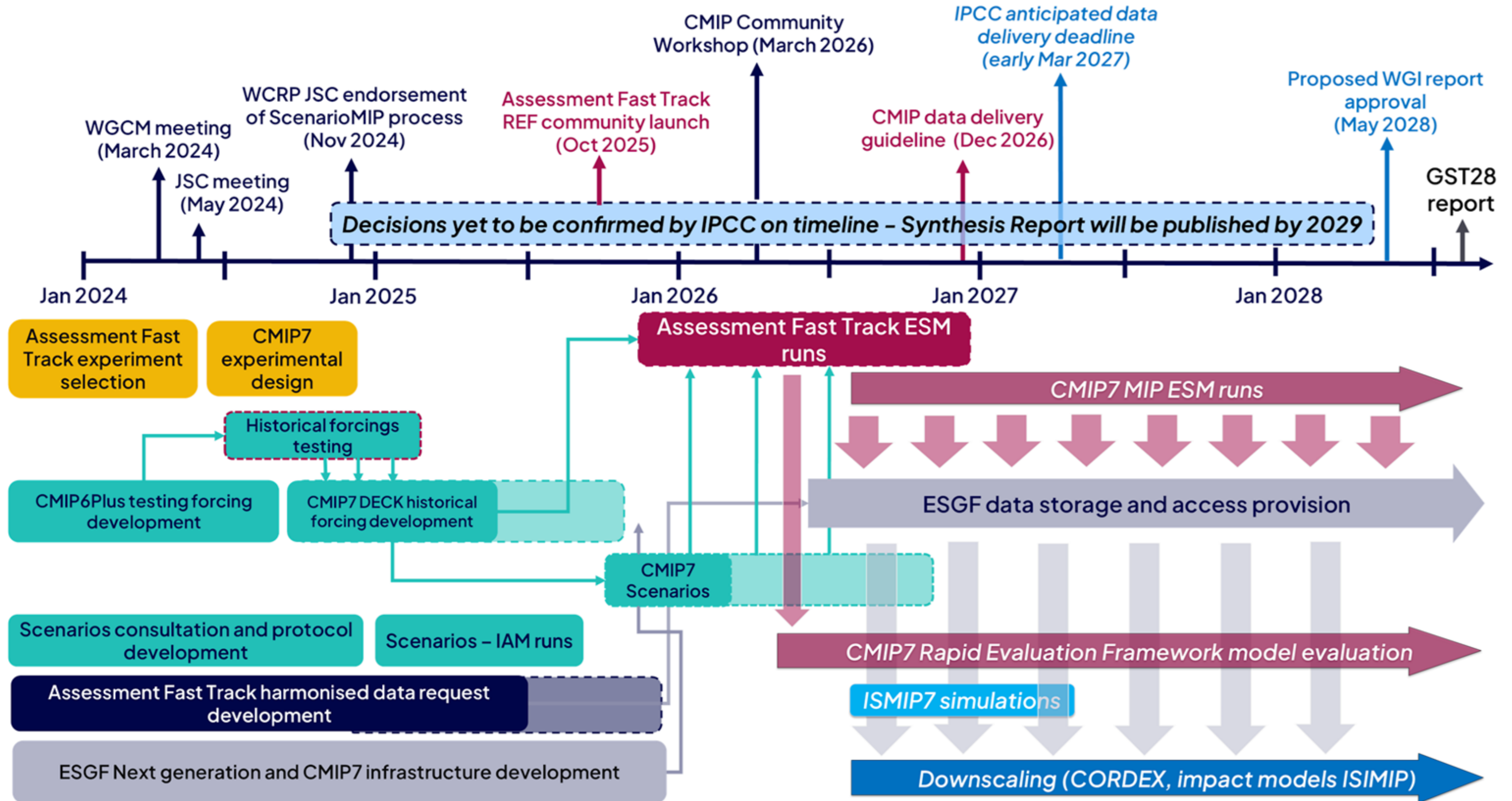
- piClim-histaer
- piClim-aer
- piClim-histall

Scientific questions

- Patterns of sea surface change
- Changing weather
- Water-carbon-climate nexus
- Tipping Points

Assessment Fast Track

CMIP7 Assessment Fast Track timeline



To access the CMIP7 forcings data and information go to




Historical forcings

BAMS
Meeting Summary

Earth System Forcing for CMIP7 and Beyond
Paul J. Durack^{1,2}, Vaishali Naik,² Zebedee Nicholls,^{4,5} Eleanor O'Rourke,¹ Briony Turner,¹ Carlo Buontempo,^{6,7} Anca Brookshaw,^{8,9} Christopher Goddard,¹⁰ Claire MacIntosh,¹ Helene Hewitt,¹ and John Dunne⁸

KEYWORDS:
Atmosphere;
Ocean;
Climate records;
Climate models;
Climate variability;
Trends

Comment



A wildfire being tackled in Ribadavia, northwest Spain, earlier this month.

Climate models need more frequent releases of input data

Vaishali Naik, Paul J. Durack, Zebedee Nicholls, Carlo Buontempo, John P. Dunne, Helene T. Hewitt, Claire MacIntosh & Eleanor O'Rourke

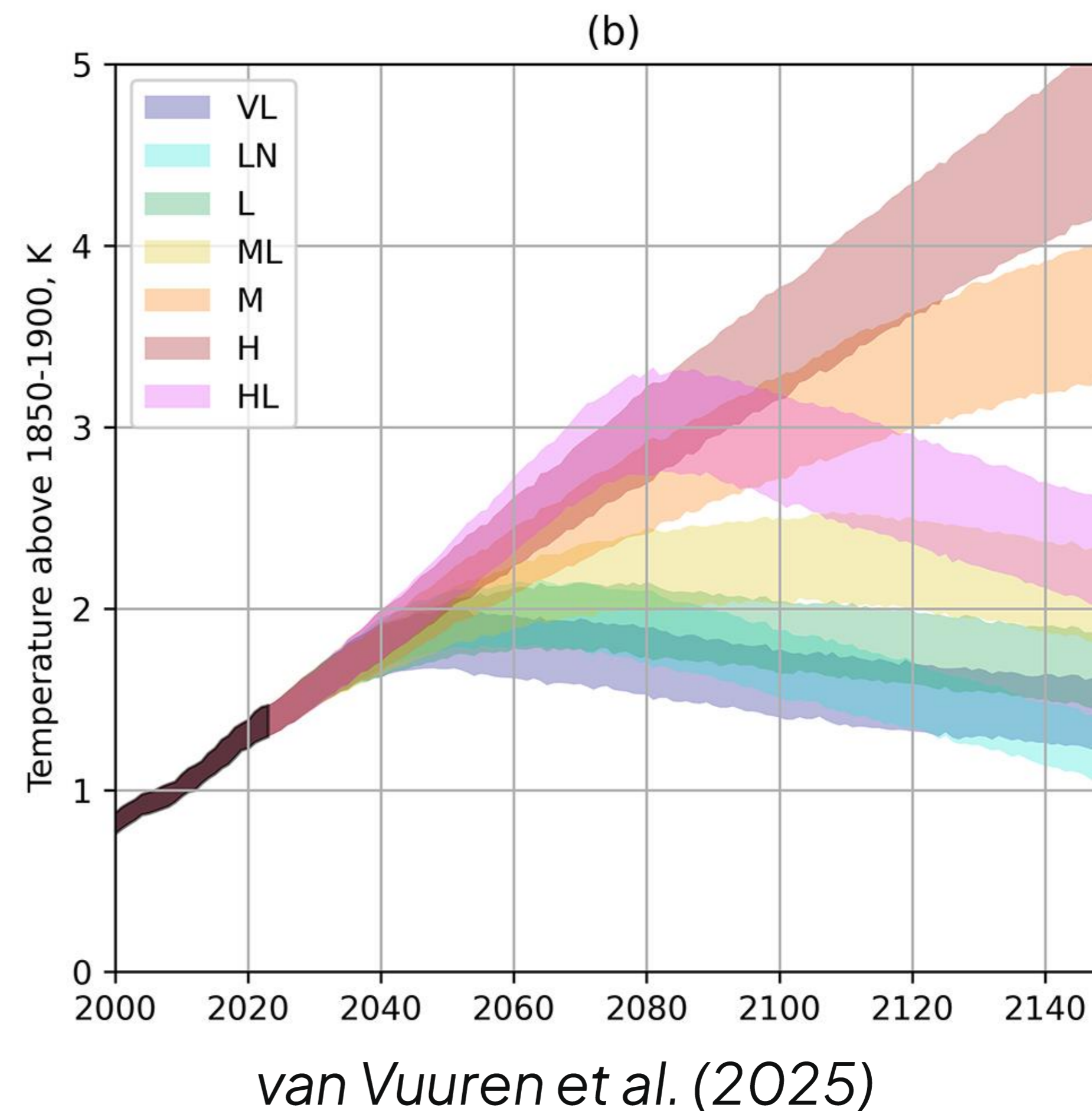
Annual updates to 'climate forcing' data sets would allow simulations to keep pace as global warming accelerates human activities amplifying warming faster than scientists expected, or might natural changes in the Earth system have a stronger role than presumed? Researchers and policy-makers need answers fast. used for monitoring and research to understand how the Earth system has evolved. Although these and other analyses by climate researchers use the most up-to-date observations, model simulations tend to lag.

- All CMIP7 DECK forcing datasets are now available and being used in “production simulations” (including volcanic, GHG concentrations and ozone funded under ESA CCI).
- There is an active Github where dataset details are discussed and issues raised.
- The community is working towards delivering annual extensions of historical forcings (Nature comment Naik et. al., 2025) – C3S will release a tender on “support for operational historical climate forcings provision” in April.

CMIP7 scenarios

- High: As high as plausible
- Three low scenarios: L, LN, VL
- Overshoot scenario: LN
- Medium: the world where current policies take us, not most likely, not best estimate.

The CMIP Panel is working with downstream activities such as CORDEX (regional downscaling), ISIMIP (impacts) and ISMIP7 (ice sheets) to ensure scenario data will allow be available to support their delivery to AR7. Data for H and VL scenarios is expected from a number of centres by July 2026.

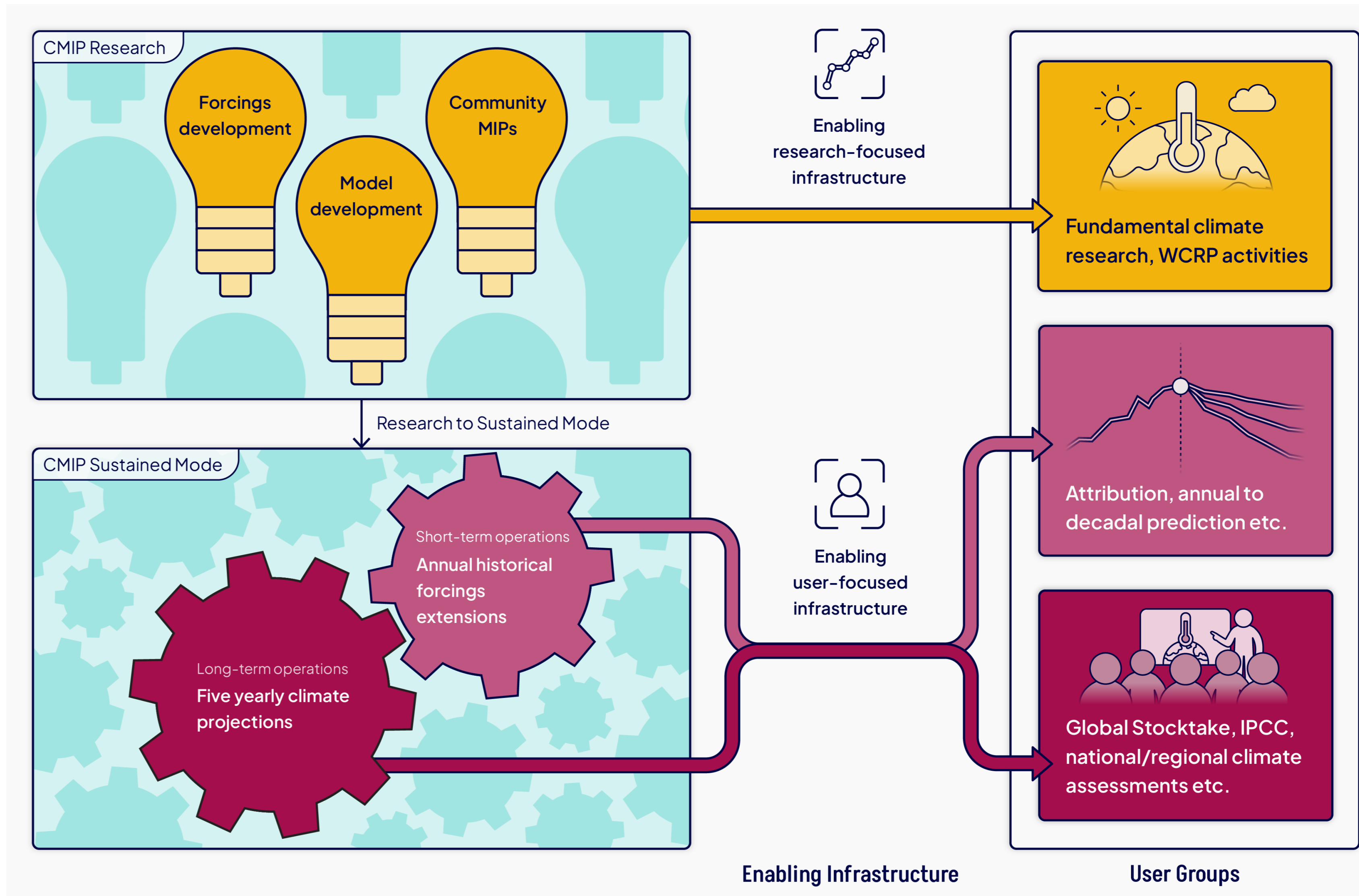


Towards a sustained mode for climate information

- Climate information is needed more regularly than phases of CMIP provide.
- A scoping group from CMIP, WGCM, WIP and others worked through 2024–2025 to scope a vision.
- Hewitt et al (2025) “Towards provision of regularly updated climate data from the Coupled Model Intercomparison Project” lays out this vision.
- Annual extensions of historical forcings is the first priority (Nature comment Naik et. al., 2025).

What is required?

- Dedicated staff and resources (not in kind)
- A change in culture – from research timelines to operational delivery.
- Appropriate, and effective, delivery structures and governance.





Rapid Evaluation Framework



Overview

- **Vision:** A community owned evaluation framework, built upon, and compatible with, existing community evaluation packages that incorporates an application programming interface (API) for executing metrics generation from those community evaluation packages, across the globe.
- **Goal:** The Rapid Evaluation Framework (REF) is a complete end to end system providing a systematic and rapid performance assessment of the expected models participating in the CMIP Assessment Fast Track, supporting the next IPCC Assessment Report 7 (AR7) cycle.
- **Outcome:** The REF provides ability to fully integrate evaluation tools into the CMIP publication workflow, and their diagnostic outputs published alongside the model output on the Earth System Grid Federation (ESGF) through an easily accessible website. The REF serves as a starting point for deeper exploration of CMIP model data.

Introducing the online version - the dashboard



<https://dashboard.climate-ref.org>

Rapid Evaluation Framework
Diagnostics Data Explorer Executions Datasets
Dark

CMIP7 Assessment Fast Track Rapid Evaluation Framework

Systematic and comprehensive evaluation of climate models through comparison with observational data

Explore Data →
Introduction
Learn More

Rapid Evaluation Framework
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Data Explorer

Explore and visualize climate model evaluation diagnostics across different Earth system components and scientific themes.

Diagnostics in REF v1 that compare models with observations use only single reference datasets. In addition, many of the REF diagnostics currently operate on single model ensemble members. This means that the tool cannot yet support many different sources of uncertainty. This is an ambition for a future iteration of the tool.

What's Available

- Thematic Areas:** Curated entry points organized by scientific domains (Atmosphere, Sea, Land, Earth System, Impact & Adaptation)
- Diagnostics:** Standardized evaluation metrics and analyses from multiple providers (PMP, ESMValTool, and ILAMB/COMB)
- Visualizations:** Interactive charts, time series, spatial plots, and comparison views across CMIP6 models and observations. CMIP7 coming soon!
- Model Comparisons:** Side-by-side evaluation of different models, experiments, and realizations

How to Use

- Select a **Thematic Area** that matches your scientific interest
- Browse available metrics and diagnostics for that theme
- Explore execution results with interactive visualizations
- Compare model performance across different datasets and experiments
- Download figures and data for your own analysis and reporting (example Jupyter notebooks coming soon)

For detailed information about individual diagnostics, including methodology, validation data, and technical specifications, visit the [full diagnostic catalog](#) →

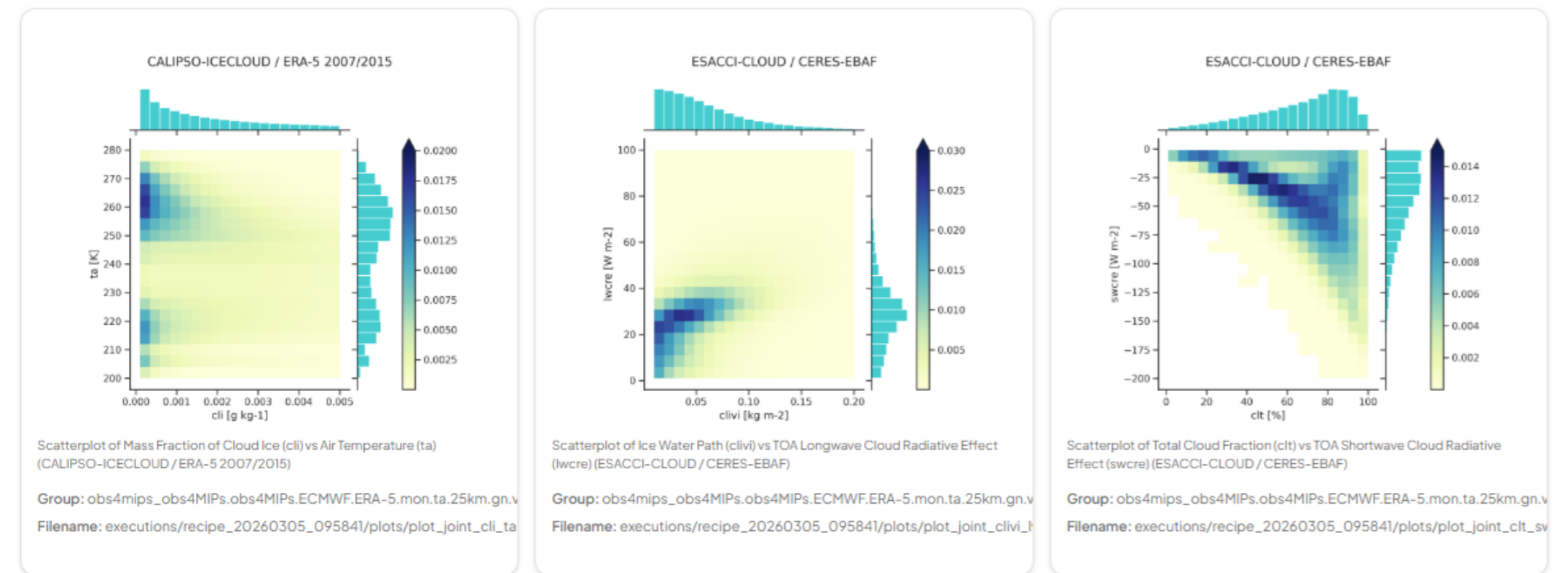
Note: This Data Explorer is under active development. We welcome your feedback, suggestions, and ideas for improvement. [Share your thoughts on GitHub](#) →

Reference Observations

Observed relationships between paired cloud-relevant variables from satellite data (CERES, CALIPSO, ERA5, GPCP), providing the benchmark against which model scatterplots are compared.

Filter by Figure Name

Selectors:



Theme Explorer

Browse climate model evaluation results organized by scientific theme.

Technical

Toggle between technical descriptions and plain language summaries using the button above.

3.1. Annual cycle and seasonal mean of multiple variables

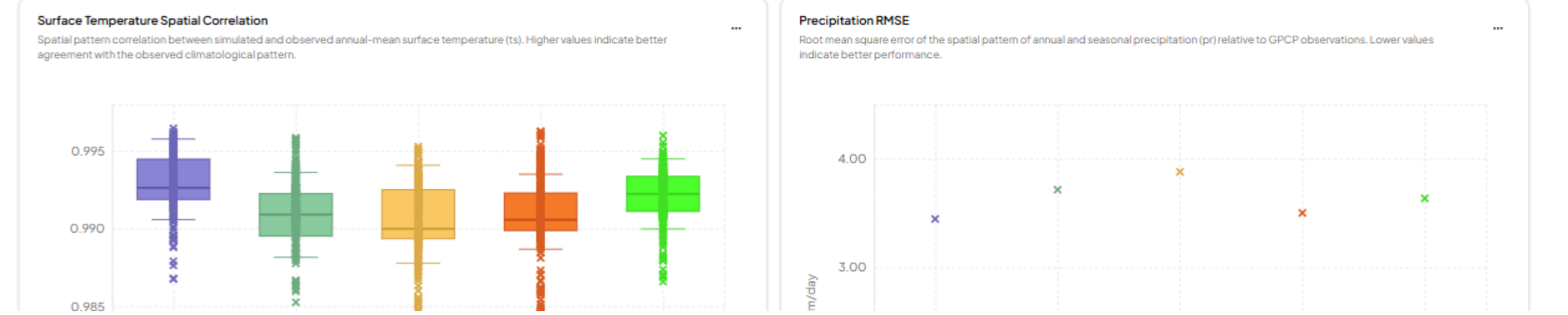
CMIP Model Benchmarking Task Team

Mean state metrics quantify how well models simulate observed climatological fields at a large scale, gauged by a suite of well-established statistics such as RMSE, mean absolute error (MAE), and pattern correlation. The seasonally and annually averaged fields of multiple variables from large-scale observationally based datasets and results from model simulations are compared.

Why it matters

These metrics quantify how well models simulate observed climatological fields at a large scale.

Ref: C3S-GTO-ECV-9-0, SAGE-CCI-OMPS-v0008, ERA-5



REF expansion

- REF is nearly CMIP7-ready!
- The REF is a community effort. We are very grateful to the organisations that have directly funded, and those that have given dedicated staff time, to build the REF.
- While we have put a lot of effort into making the REF open source and expandable by the community, expansion will require:
 - community agreement
 - coordination to deliver
 - dedicated resources
- Community coordination and governance will be provided by ESMO with any CMIP related diagnostics or other CMIP-related REF matters deferred to CMIP Panel. Responsibilities of this panel will include approval of new diagnostics, reference datasets and new packages into the publicly available, community supported REF.
- There will be a call for applications for this governing body next quarter .

Using the REF

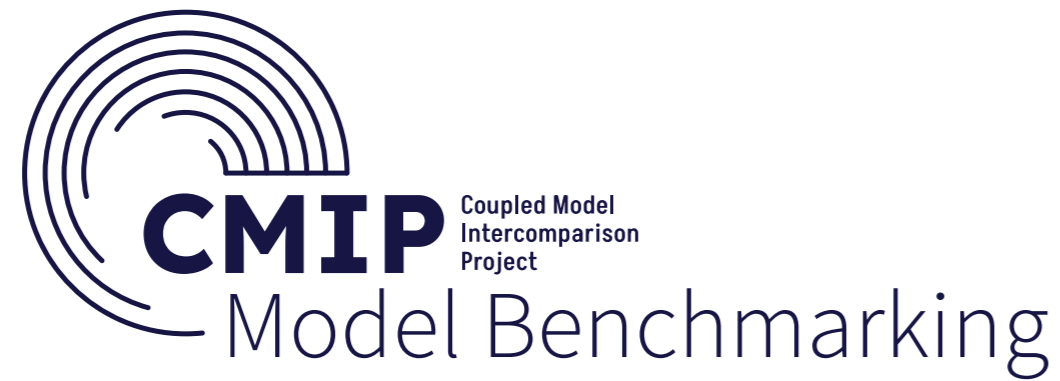


This best practice note was prepared by members of the CMIP and Rifs joint task team on Responsible Data Use and members of the CMIP Model Benchmarking Task Team.

This document provides non-binding community guidance on how to interpret REF outputs in a rigorous and informed manner.

With thanks to:

- CMIP Model Benchmarking Task Team



- Funders:



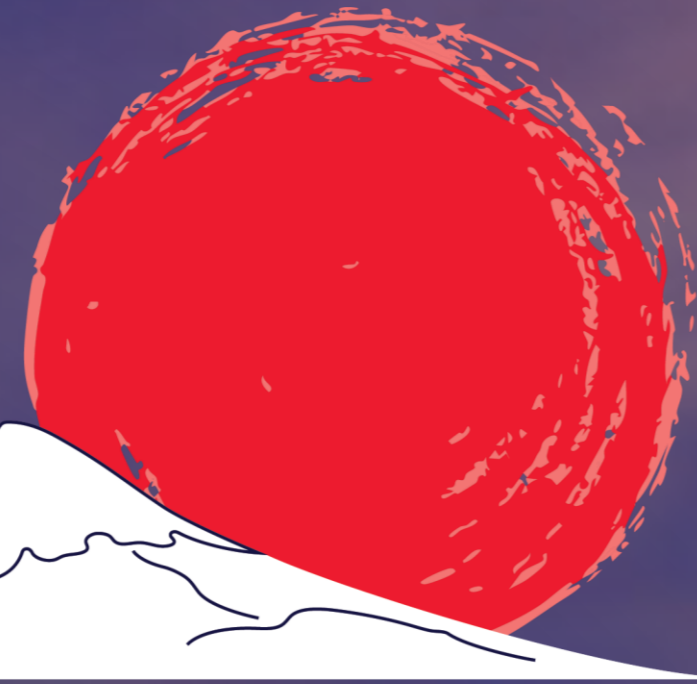
- REF delivery team & packages



CMIP 2026

COMMUNITY WORKSHOP

9-13 MARCH
KYOTO JAPAN



Coming together





CMIP Community Workshop 2026

- Over 430 in person participants (and more than 200 virtual)
- Inspirational venue where Kyoto Protocol was adopted in 1997.
- Seven plenaries, nine science sessions, ten poster sessions, nine side sessions, an icebreaker and a reception!
- A huge diversity of science topics and community interests were presented, discussed and debated.
- Great enthusiasm and energy around scientific and technical opportunities.
- ECR leadership and initiation on display
- Experienced the breadth and depth of CMIP data use.
- Experienced how CMIP unites a unique and diverse community of interests.
- Lots of new links and collaborations created.
- Everyone is very excited about the REF!



Coordinated Regional Downscaling Initiative (CORDEX)

Update and new International Project Office

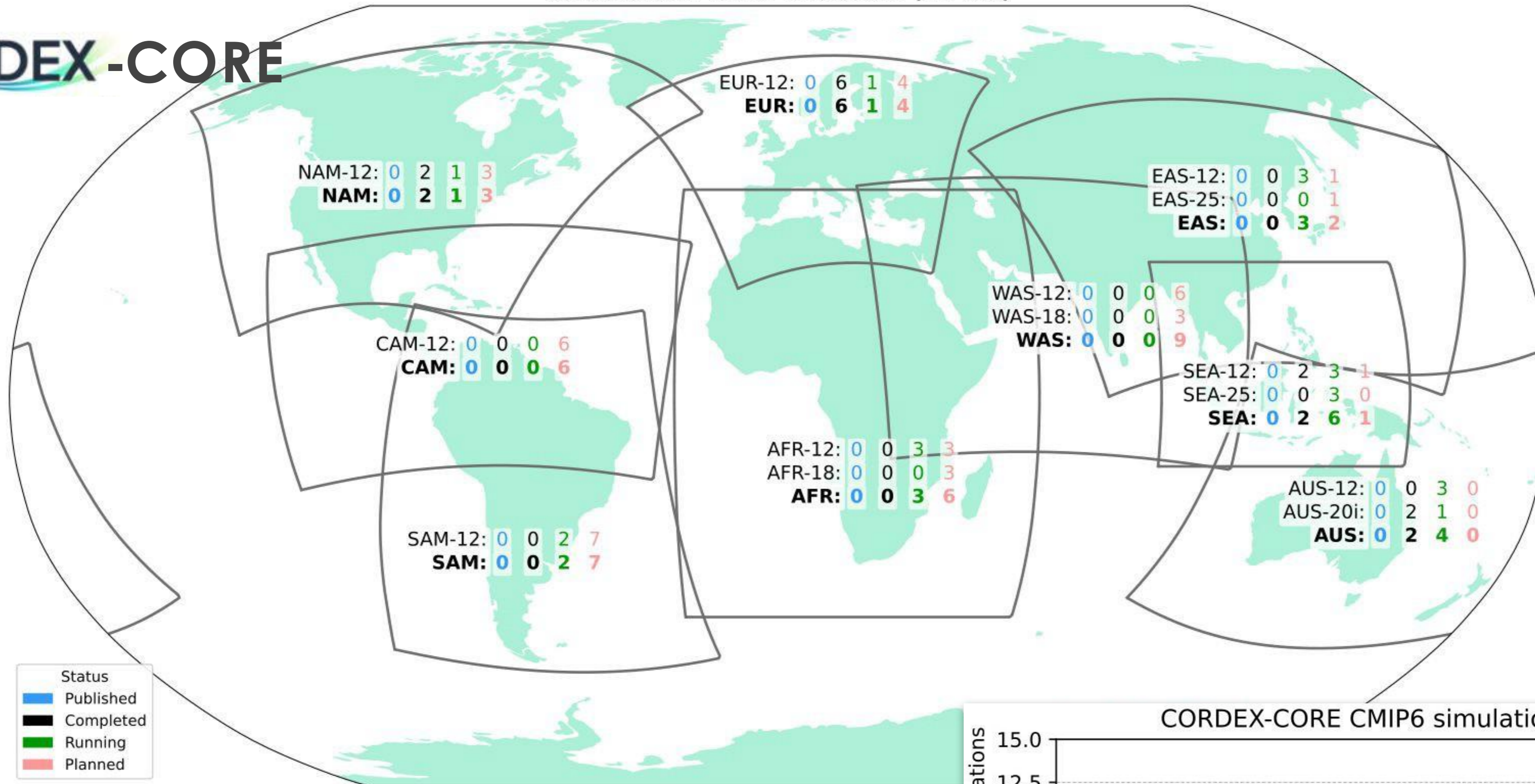
CORDEX update

- CORDEX is about to release the CORDEX-CMIP6 ensemble and preparing for CORDEX-CMIP7
- CORDEX-CMIP7-AFT is planning to meet the the AR7 deadlines with minimal protocol and model updates with respect to CORDEX6, so they can be used jointly.
- Three new task teams and a joint working group have been established and an open call for members will be launched soon.

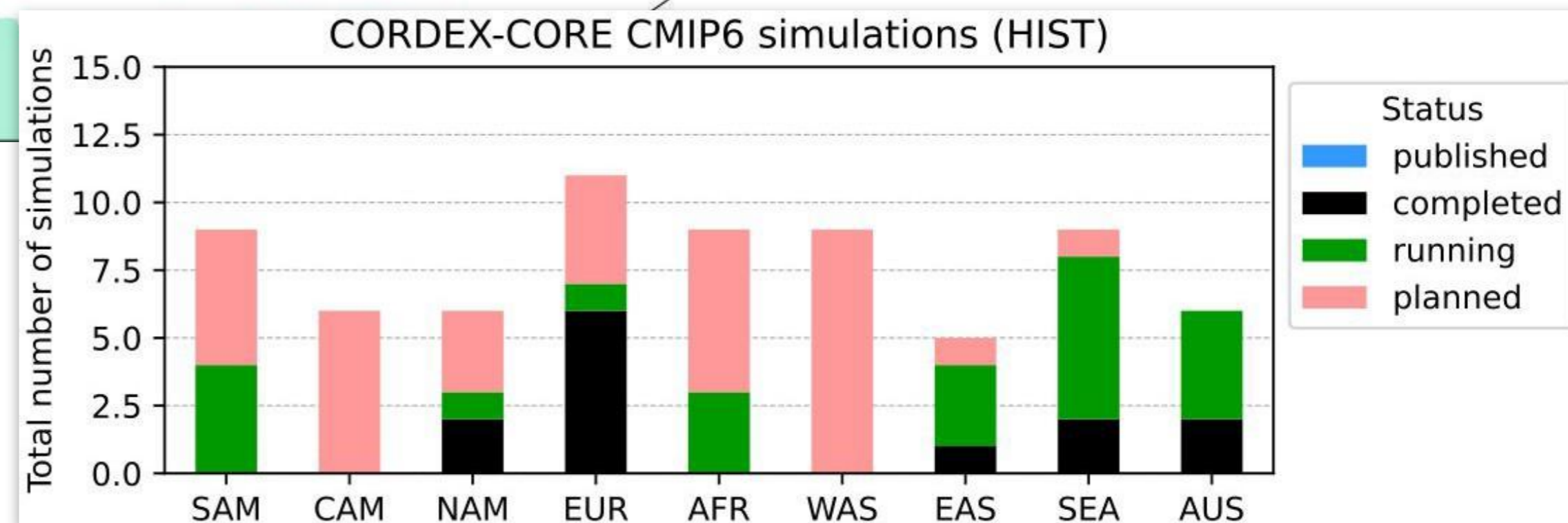


CORDEX-CORE CMIP6 simulations (SSP370)

- SAM
- CAM
- NAM
- EUR
- MED
- MENA
- AFR
- WAS
- CAS
- EAS
- SEA
- AUS
- ARC
- ANT



CORDEX-CORE CMIP6 simulations (HIST)



Emerging observational needs for CORDEX

- Struggling with “standard” observations (station and derived gridded products) as reach the km scale.
- For example, a lack of reliable observations over cities and surrounding areas – these are vital for the evaluation of urban models.
- Would be interested in reviewing the available satellite products with sufficiently long records to support model evaluation for CORDEX.

A new International Project Office for CORDEX (IPOC)

- ESA and the University of Cape Town (UCT) were successful in their bid to host the new IPOC.
- The Director and Programme Manager will be based at ECSAT with the Science and Communications Officer based at UCT.
- The recruitment process for the new IPOC Director is underway.
- The IPOC will be supporting the CORDEX Scientific Advisory Team (Co-chairs – José Manuel Gutiérrez, Melissa Bukovsky and Silvina Solman).
- Thanks to former hosts, SMHI, for their support of the IPOC for 10 years.

CORDEX within the WCRP landscape

