CMIP | WCRP EGU General Assembly

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Who are you?

slido

Go to slido.com and
enter **#CMIP-townhall**
Or, scan the QR code

CMIP
Coupled Model Intercomparison Project

Photography encouraged

Welcome to the CMIP Townhall

Tuesday 16th April 2024, EGU

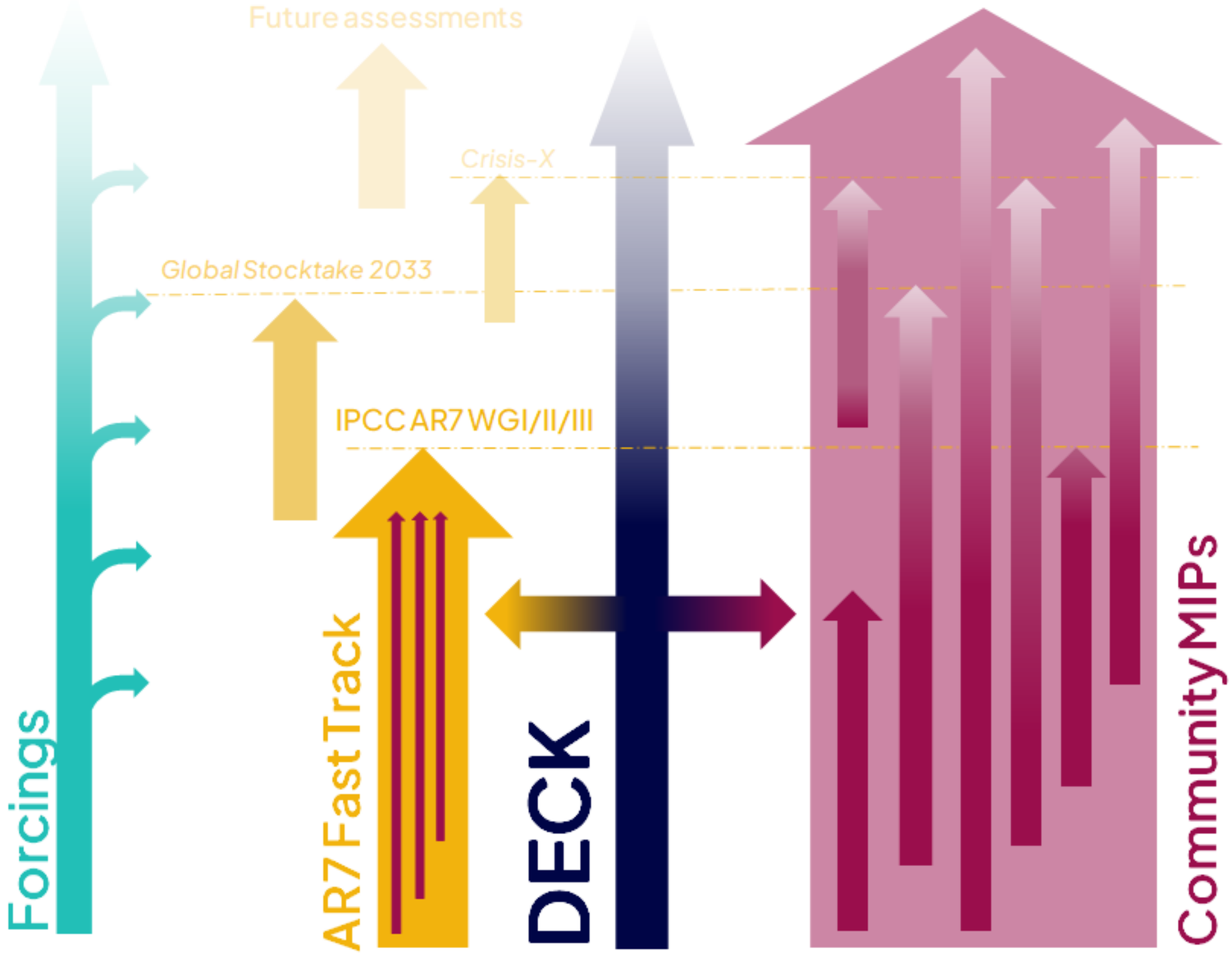
The CMIP AR7 Fast Track

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.

CMIP infrastructure, standards and tools support ongoing science and assessment activities.

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



The DECK

The Diagnostic, Evaluation and Characterization of Klima (DECK) was introduced in CMIP6 alongside the historical simulations to maintain continuity and help document basic characteristics of models across different phases of CMIP

Historical simulations

Two historical simulations added to the DECK for future CMIP phases to reduce confusion.

New simulations

Three simulations added to DECK that were in RFMIP during CMIP6. These experiments help to characterise the effective radiative forcing (ERF) in models.

Community MIPs

- Can run on timeline determined by the needs of the MIP and facilitating community science needs.
- May or may not choose to align with IPCC or other fast track timelines.
- Can benefit from CMIP infrastructure and tools.
- If do align will need to adhere to strict deadlines.
- The CMIP Panel will not be endorsing MIPs but have developed best practice guidance.
- MIPs are encouraged to register to support community collaboration and requests for Panel feedback and IPO support can be submitted.

What are the CMIP fast tracks?

- A compact set of experiments including the DECK and selected experiments from Community MIPs recommended by the CMIP Panel.
- Chosen to support specific needs e.g., scientific assessments such as AR7.
- Do not reflect prioritisation of experiments on any basis apart from timeline and relevance to the target user/problem.
- Participation in fast tracks or Community MIPs depends on scientific and other interests.

The AR7 Fast Track co-creation process

The Strategic Ensemble Design Task Team (TT) developed a proposed set of experiments to the CMIP Panel through brainstorming within the TT, with stakeholders, and interaction with MIP chairs.

Two rounds of consultation:

- Early v1 proposal shared with modelling centres for their views and appetite/readiness for CMIP7
- v2 proposal shared with both modelling centres and to open consultation with the wider CMIP and user community.

CMIP AR7 Fast Track experiment selection and DECK additions endorsed by WGCM in March 2024.

View the summary survey results

bit.ly/CMIPFastTrack-surveyresults

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DECK

- amip
- piControl and esm-piControl
- 1pctCO2
- abrupt-4×CO2
- piClim-control
- piClim-anthro
- piClim-4×CO2
- historical and/or esm-historical

Additions to the DECK since CMIP6

CMIP AR7 Fast Track

Climate services

DCPP

- Initialised prediction (2025-2036)

ScenarioMIP

- High scenario
- Medium scenario
- Overshoot scenario
- Low scenario
- Very low scenario
- Low overshoot scenario

Process understanding

AerChemMIP

- piClim-X
- hist-piSLCF/hist-piAer
- SSPX-SLCF

C4MIP

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

CFMIP

- amip-p4k
- amip-piForcing
- abrupt-2×CO2
- abrupt-0p5CO2

DAMIP

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

GeoMIP

- G7-1.5K-SAI

LMIP

- land-hist

PMIP

- *LIGabrupt*

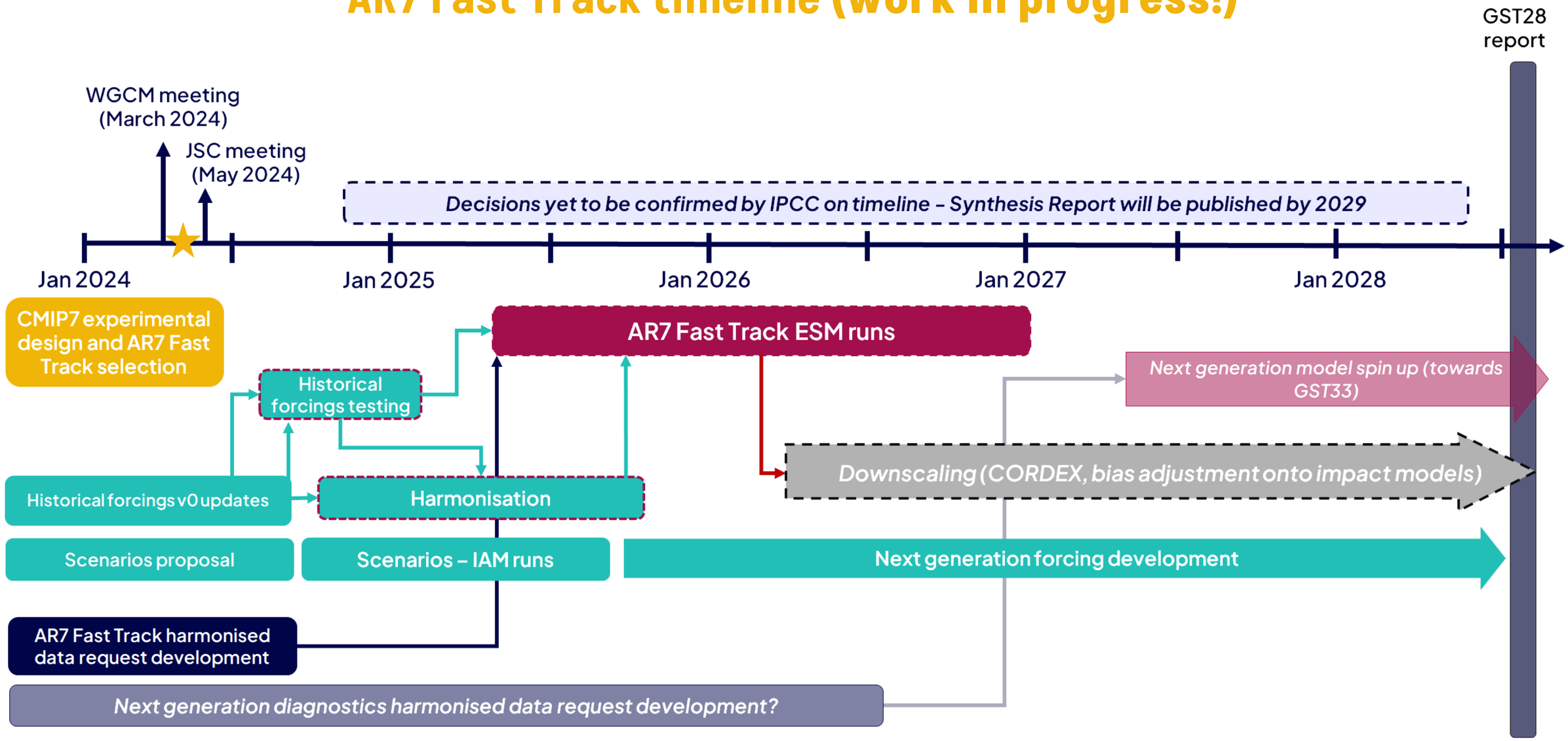
RFMIP

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

Learn more about each experiment and why it has been included in the Fast Track

bit.ly/FastTrack-experiments

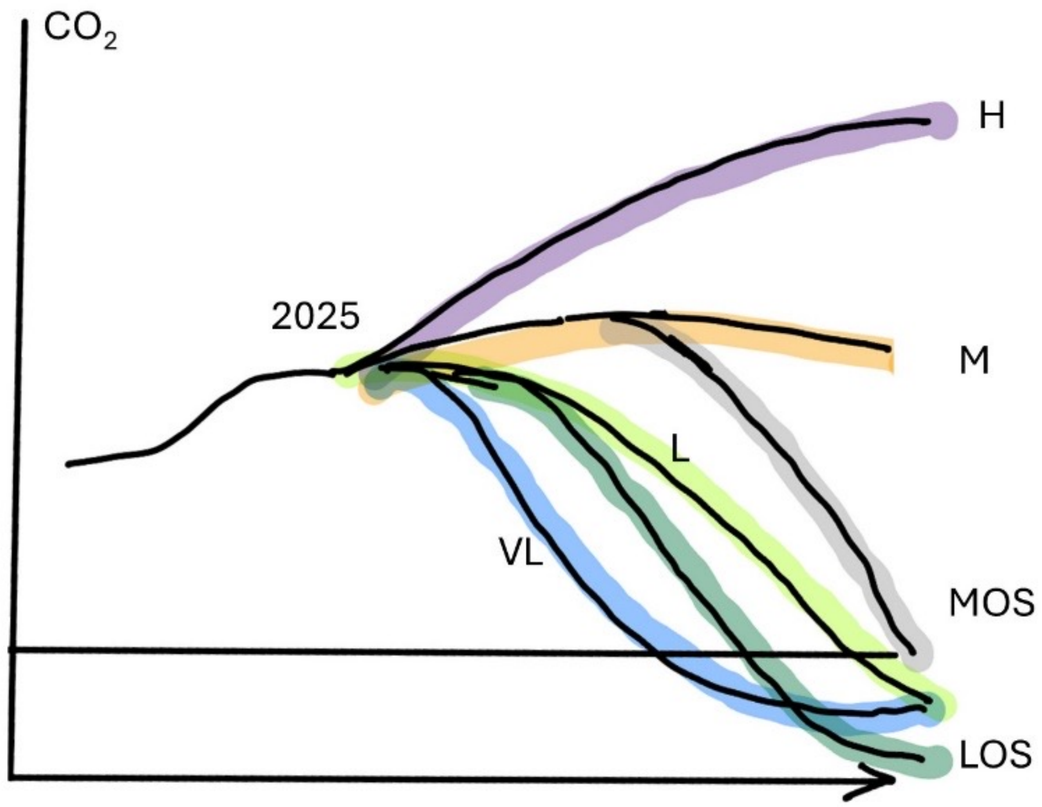
AR7 Fast Track timeline (work in progress!)



Historical forcings

- CMIP Forcings Task Team working to resolve known forcing issues for CMIP7 DECK experiments and deliver data updates, **extending until at least December 2021**.
- Pre-release testing versions of most datasets being generated will be made publicly available through input4MIPs ESGF project in mid-2024.
- CMIP7 DECK datasets finalized and **frozen** for wider use in early 2025 (these will be different from CMIP6) - latest timeline available here
- Data available for broader use across AR7 Fast Track experiments; MIP-specific forcing data will not be covered by CMIP7 DECK datasets.
- Harmonisation WG established ensuring CMIP7 DECK to ScenarioMIP continuity.
- GMD forcing special issue - evaluation and documentation of CMIP7 forcings.
- Longer term ambition to move to a regular and sustained delivery of annual forcings update.

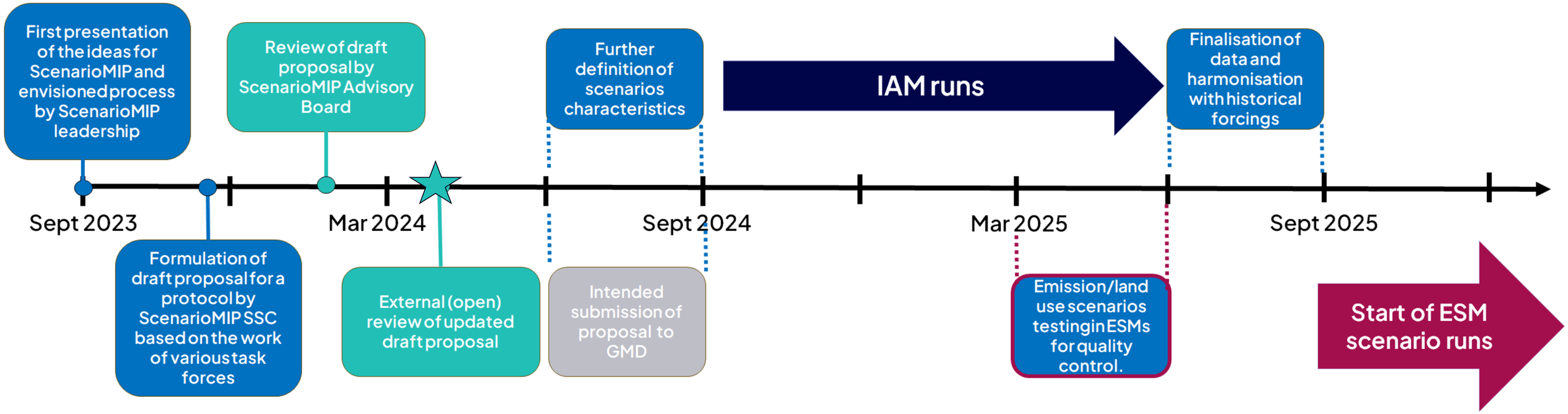
ScenarioMIP proposed design



Scenario name	Brief description
High (H)	High emission scenario to explore possible high end impacts
Medium (M)	Medium emission scenario consistent with current policies
Overshoot (MOS)	Scenario follows medium scenario and mid-century diverts rapidly leading to an overshoot of 2 °C
Low (L)	Scenario consistent with staying with high probability below 2 °C
Very Low (VL)	Scenario consistent with limited overshoot of 1.5 °C (as low as possible)
Very Low, Overshoot (LOS)	Scenario with similar end-of-century impact to VL, but with overshoot

If possible, scenarios are to be run in emission-driven mode (for CO_2)

ScenarioMIP timeline and consultation



Follow the link below and/or QR code to participate in the open community review of the ScenarioMIP draft proposal by Monday 13 May

wcrp-cmip.org/scenariomip-cmip7-proposal

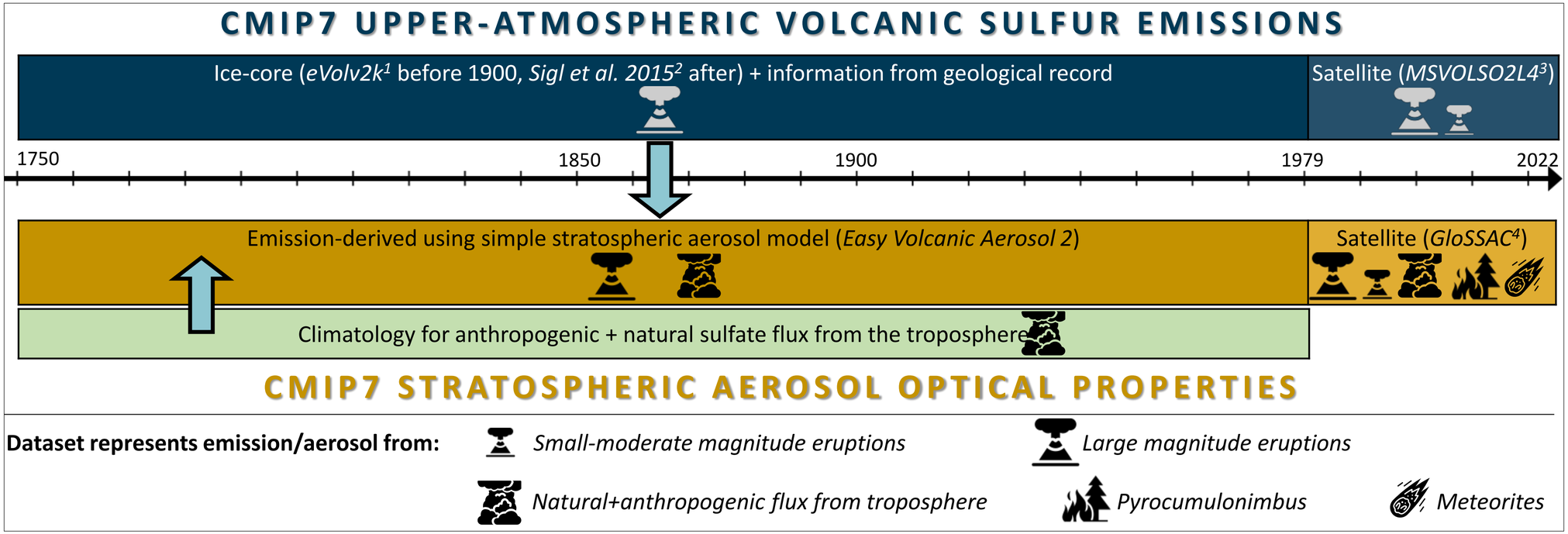
Forcings spotlight

Volcanic SO_2 emissions and stratospheric aerosol properties

Dr. Thomas Aubry, University of Exeter and Forcings TT member

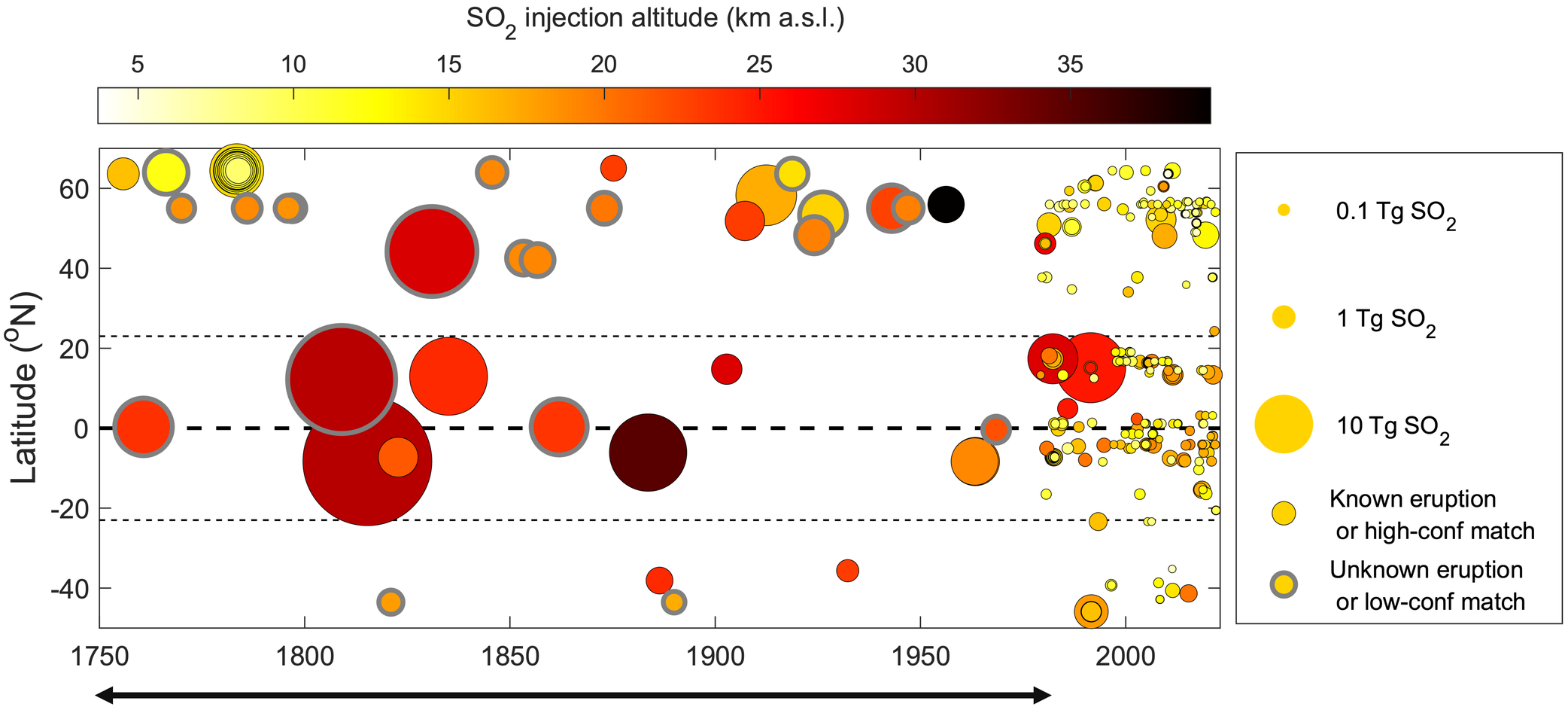
Catering to both models with/without interactive stratospheric aerosols

- Creation of new **emission dataset** for models with interactive stratospheric aerosol capabilities **(*v0 ready*)**
- **Aerosol optical properties dataset** for other models **(*v0 in preparation*)**
- For consistency, all pre-satellite aerosol optical properties derived from emission using the Easy Volcanic Aerosol (EVA) model calibrated against satellite period.



Sneak peak on stratospheric volcanic sulfur emission dataset

** Dataset includes numerous other variables/metadata not shown. Available on ESGF by May and documentation paper in prep*



Pre-satellite emission bias: few small-moderate eruptions in v0, priority fix for v1

CMIP Climate Forcings | WCRP

More details, giving feedback and opportunities

EGU24-9312 Poster (session ITS1.10/CL0.1.9)
Historical volcanic sulfur emissions and stratospheric sulfate aerosol optical properties for CMIP7
Wednesday, 17 Apr, 10:45–12:30 (CEST) Hall X5 | X5.113

EGU24-1919 Poster (session AS3.13)
Easy Volcanic Aerosol version 2: progress toward an updated volcanic aerosol forcing generator
Thursday, 18 Apr, 10:45–12:30 (CEST) Hall X5 | X5.24

We expect to hire **two postdocs in Summer-Autumn 2024** to improve our datasets and quantify uncertainty and how they propagate to climate simulations.

Come talk to me in person or email t.aubry@exeter.ac.uk!

AR7 Fast Track science goals – in development!

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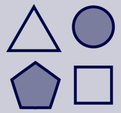
Pattern effect

Interactions between forcings, feedbacks and natural variability

Warming spatial patterns influence on climate change trajectory



Extremes

Changes in frequency and severity of extreme weather with climate change

Evolution of weather patterns with warming

Carbon cycle

Alignment of CO_2 emissions and climate stabilisation

New modelling capabilities for modelling carbon sources and sinks

Tipping points

Risks of crossing tipping points in future climate

Investigation of overshoot scenarios

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Share your thoughts

What are the science questions that can be best addressed by the multi-model approach, by Earth System and Climate models, and by MIPs during CMIP7?

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Or scan the QR code

Model Benchmarking

Birgit Hassler, *Task Team co-lead*

The Model Benchmarking TT

Diversity in expertise (realms and methods), user group representation, gender, location, career stage

Collaboration with two **Fresh Eyes on CMIP** Subgroups

- Model Evaluation
- Data Analysis

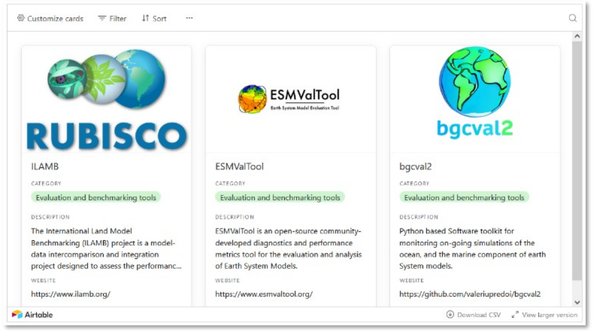
Task Team Goals

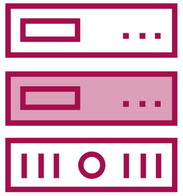
- Systematic and rapid performance assessment of the expected models participating in CMIP7 (including the model output and documentation)
- Enhancing existing community evaluation tools that facilitate performance assessment of models
- Integration of evaluation tools into CMIP publication workflows and fostering publication of their diagnostic outputs alongside the model output on the ESGF

- Rebecca Beadling, *USA*
- Ed Blockley, *UK*
- Jiwoo Lee, *USA*
- Valerio Lembo, *Italy*
- Jared Lewis, *Australia*
- Jianhua Lu, *China*
- Luke Madaus, *USA*
- Elizaveta Malinina, *Canada*
- Brian Medeiros, *USA*
- Wilfried Pokam Mba, *Cameroon*
- Enrico Scoccimarro, *Italy*
- Ranjini Swaminathan, *UK*

Model Benchmarking Tools – Information "Cards" & Videos

- **Main characteristics** of (open source) benchmarking and evaluation tools available for analyses of CMIP-style data summarized in an overview "card" or an information video
- Collected information **presented centrally** on the CMIP website for easy access
- Cards can be filled out for **all available open-source benchmarking and evaluation tools** if they can be used for CMIP data analysis; pre-defined questionnaire available on the CMIP website





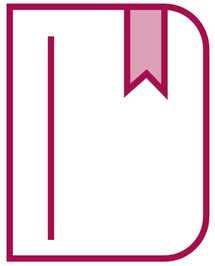
Status: first cards available

Started: October 2023

wcrp-cmip.org/tools/model-benchmarking-and-evaluation-tools/

Retrospective paper

- **Definitions** of “evaluation”, “validation” and “benchmarking”
- What was **available** for CMIP6 (methods, philosophies, tools)?
- What was **used** for CMIP6?
- What **worked well** for CMIP6 and what did not work for CMIP6?
- **Extensive information** about different benchmarking and evaluation tools



Status: being finalized

Planned submission: May 2024

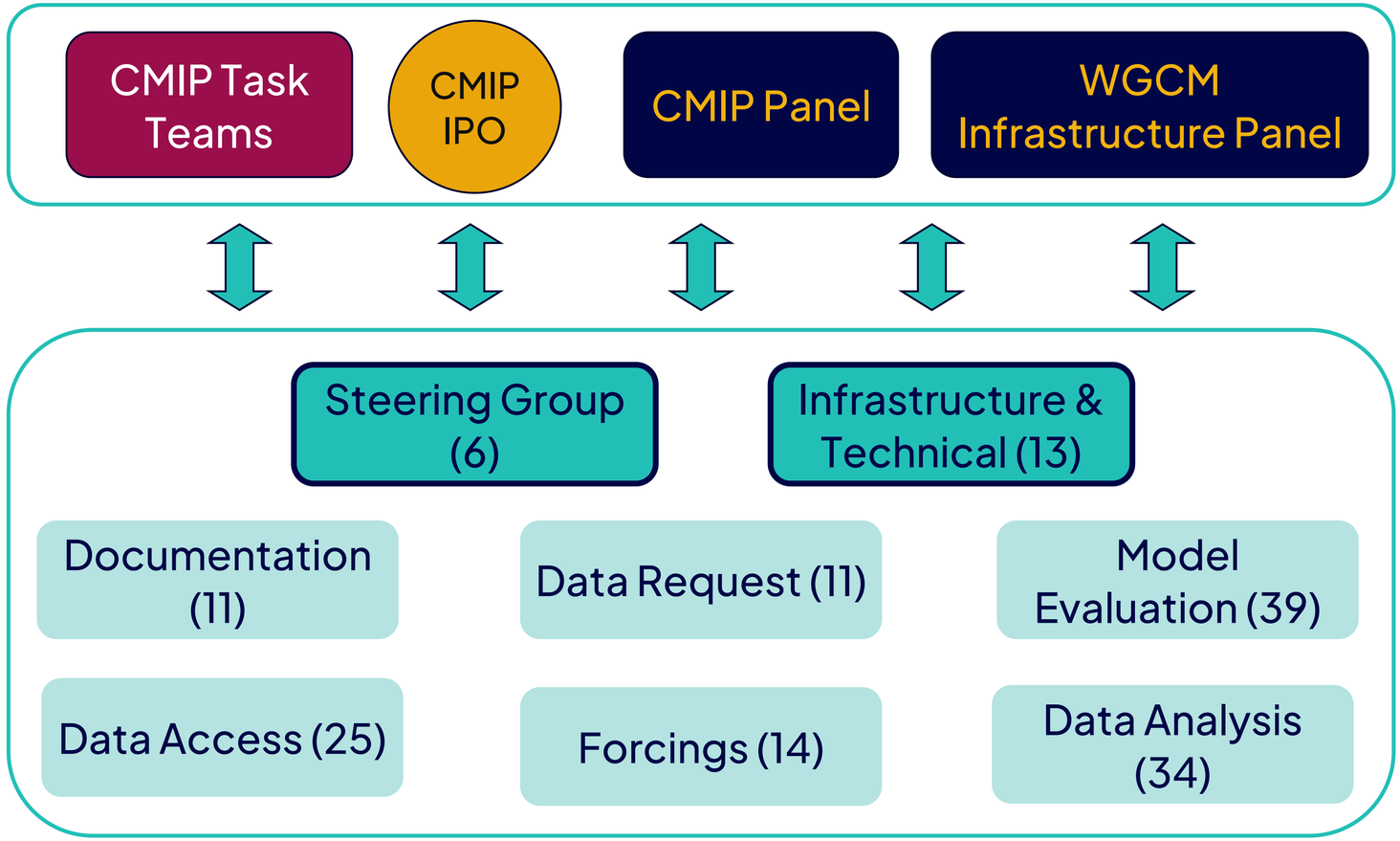
What is the way forward?

- Based on the findings of the extensive information collected about different tools, and the retrospective paper – what do we think should be the **benchmarking/evaluation focus for CMIP7**?
- What **framework** would ideally be available for instantaneous benchmarking and evaluation at the time of data submission? Is such a framework even possible?
- How to **avoid the bottlenecks** encountered in CMIP6 benchmarking/ evaluation?
- Comprehensive community evaluation in **near-real time** possible?

Fresh Eyes on CMIP

Douglas Rao and Julia Mindlin, *co-leads*

Overview



A new working group integrating the voices of early career scientists into the CMIP process by working closely with CMIP task teams and other relevant stakeholders.

Responsible use of CMIP data

Demand for and use of climate data is increasing, but people need understand:

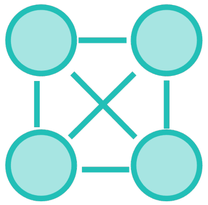
- **assumptions,**
- **parameterisations,** and
- **limitations**

of the models that have created the data

Fresh Eyes on CMIP have identified a need to provide guidance for the responsible use of CMIP data to aid users in identifying and understanding which data to use for their purpose.

Project goals and aims

Investigate how CMIP data has been used



Identify the type of misuses seen in across these use cases

Produce guidance on recommended practices to avoid the misuse of CMIP output (with examples)

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Share your thoughts

What do you think are the barriers to using climate information responsibly?

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Get involved

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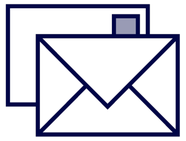
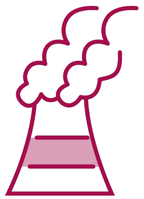
See all engagement opportunities and vacancies at wcrp-cmip.org/get-involved



CMIP mailing lists

All consultations, events, news, and other engagement opportunities will always be shared on the CMIP Community News Mailing List:

bit.ly/CMIP-mailinglists



ScenarioMIP proposal review

Community review of the ScenarioMIP CMIP7 proposal is live and available on the CMIP website

www.wcrp-cmip.org/scenariomip-cmip7-proposal

CMIP Seminars

Monthly seminars highlighting work from across the CMIP community.

Sign up now to present or to attend!

bit.ly/CMIPSeminars

Fresh Eyes Directory

Making early career scientists' opportunities and collaboration open and transparent

wcrp-cmip.org/fresh-eyes-directory/

Thank You

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cmip-ipo@esa.int