CliC and WGSIP

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Briefly about CliC

- The Climate and Cryosphere (CliC) is a Core Project of the WCRP (https://climate-cryosphere.org/about-clic/)
- CliC's mission is « *to advance understanding of climate-driven changes in the frozen parts of our planet and to support efforts to mitigate and adapt to their impacts on ecosystems and human society.* »

Scientific Steering Group (SSG)

Co-chairs: Edward Hanna and Amy Lauren Lovecraft

International Project Office (IPO)

Executive Director: Keith Alverson
Host Institution: University of Massachusetts Amherst

Model Intercomparison Projects

- **Ice Sheet Model Intercomparison Project for CMIP6 and CMIP7** (ISMIP6/ISMIP7)
- **Marine Ice Sheet Ocean Model Intercomparison Project** (MISOMIP2)
- **Sea Ice Model Intercomparison Project** (SIMIP)
- **Glacier Model Intercomparison Project** (GlacierMIP)

Research Projects

- **Antarctic Sea Ice Processes and Climate** (ASPeCt, co-sponsored with SCAR)
- **Arctic Sea Ice Working Group** (ASIWG)
- **Biogeochemical Exchange Processes at Sea-Ice Interfaces** (BEPSII, co-sponsored with SOLAS, SCAR, and IASC)
- **Arctic-Midlatitude Climate Linkages** (LINKAGES)
- **Ice Sheet Mass Balance and Sea Level** (ISMASS, co-sponsored with SCAR and IASC)

Interdisciplinary Activities & Networks

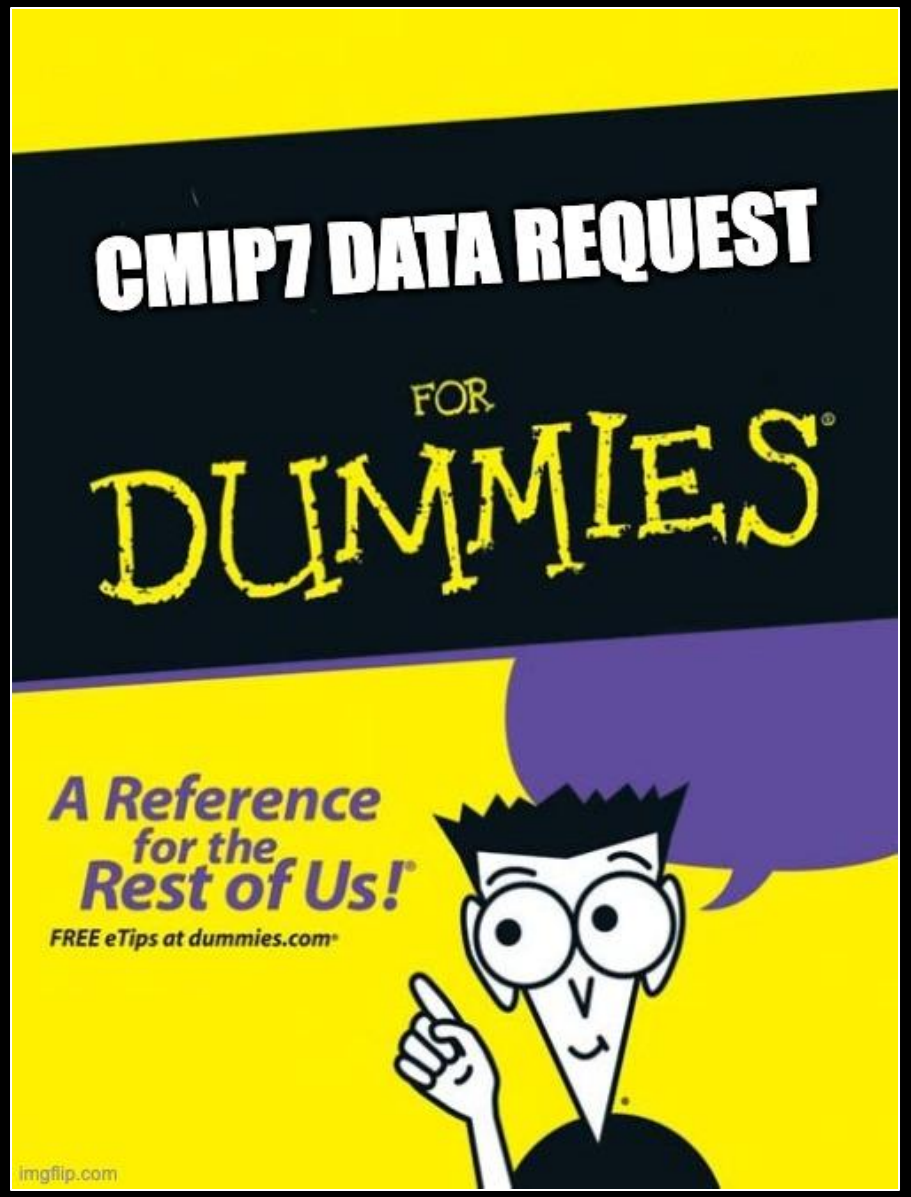
- **Northern Oceans Regional Panel** (NORP, co-sponsored with CLIVAR)
- **Southern Ocean Region Panel** (SORP, co-sponsored with CLIVAR and SCAR)
- **Polar CORDEX**
- **Permafrost Carbon Network** (PCN)
- **Impacts of Changes in the Mountain Cryosphere** (IC-MontC)

The LINKAGES group within CliC

- https://climate-cryosphere.org/linkages/
- Led by Edward Hanna and Jim Overland/Muyin Wang

Arctic Science Summit Week will be held in Boulder, CO from 20–28 March, 2025.

If you're interested in drivers, global impacts and/or climate feedbacks associated with Arctic Amplification of global warming, please consider submitting an abstract to the following session, co-convened by CliC's Linkage Between Arctic Climate Change and Mid-Latitude Weather Extremes (LINKAGES).



François Massonnet
Martin Vancoppenolle
Patricia DeRepentigny

CMIP Coupled Model Intercomparison Project

WCRP World Climate Research Programme

Active task teams

The currently active task teams are:

- **Climate Data Access** Co-leads: Atef Ben Nasser, IPSL and Robert Pincus, Columbia
- **Climate Data Request** Co-leads: Martin Juckes, STFC and Chloe Mackallah, CSIRO
- **Climate Forcings** Co-leads: Paul Durack PCMDI/LLNL and Vaishali Naik, NOAA
- **Climate Model Benchmarking** Co-leads: Birgit Hassler, DLR and Forrest Hoffman, ORNL
- **Climate Model Documentation** Co-leads: David Hassell, NCAS and Guillaume Levavasseur, IPSL
- **Strategic Ensemble Design** Co-leads: Ben Sanderson, CICERO and Isla Simpson, NCAR

The CMIP7 Data Request

CORE

All-purpose set of variables suitable for production in all WCRP MIPs

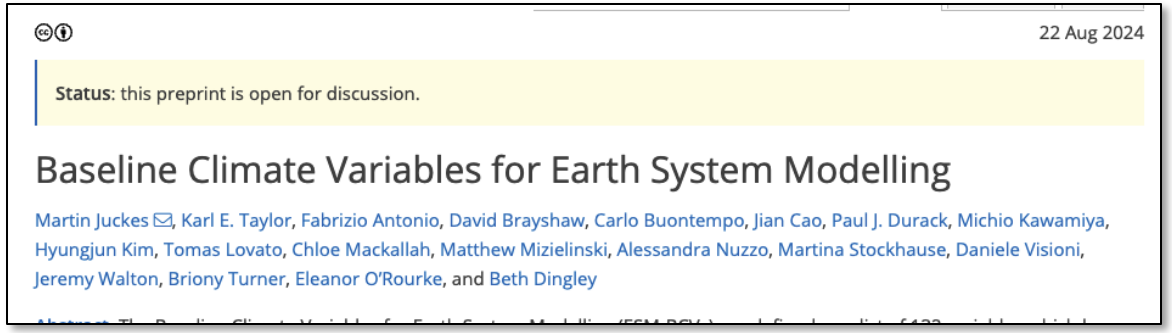
- Baseline Climate Variables for Earth System Model Output

Updates to list governed by ESMO (proposed)

132 variables based on most heavily used data in CMIP6

Used for baseline analyses, benchmarking.

Already defined (see Juckes et al. 2024)



22 Aug 2024

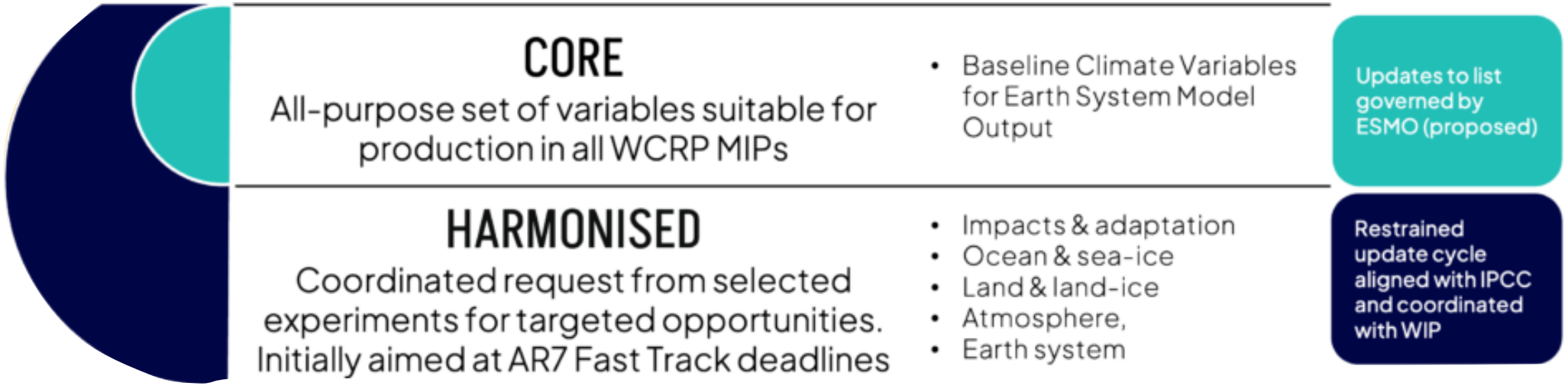
Status: this preprint is open for discussion.

Baseline Climate Variables for Earth System Modelling

Martin Juckes, Karl E. Taylor, Fabrizio Antonio, David Brayshaw, Carlo Buontempo, Jian Cao, Paul J. Durack, Michio Kawamiya, Hyungjun Kim, Tomas Lovato, Chloe Mackallah, Matthew Mizielinski, Alessandra Nuzzo, Martina Stockhause, Daniele Visioni, Jeremy Walton, Briony Turner, Eleanor O'Rourke, and Beth Dingley

CMIP
Coupled Model Intercomparison Project

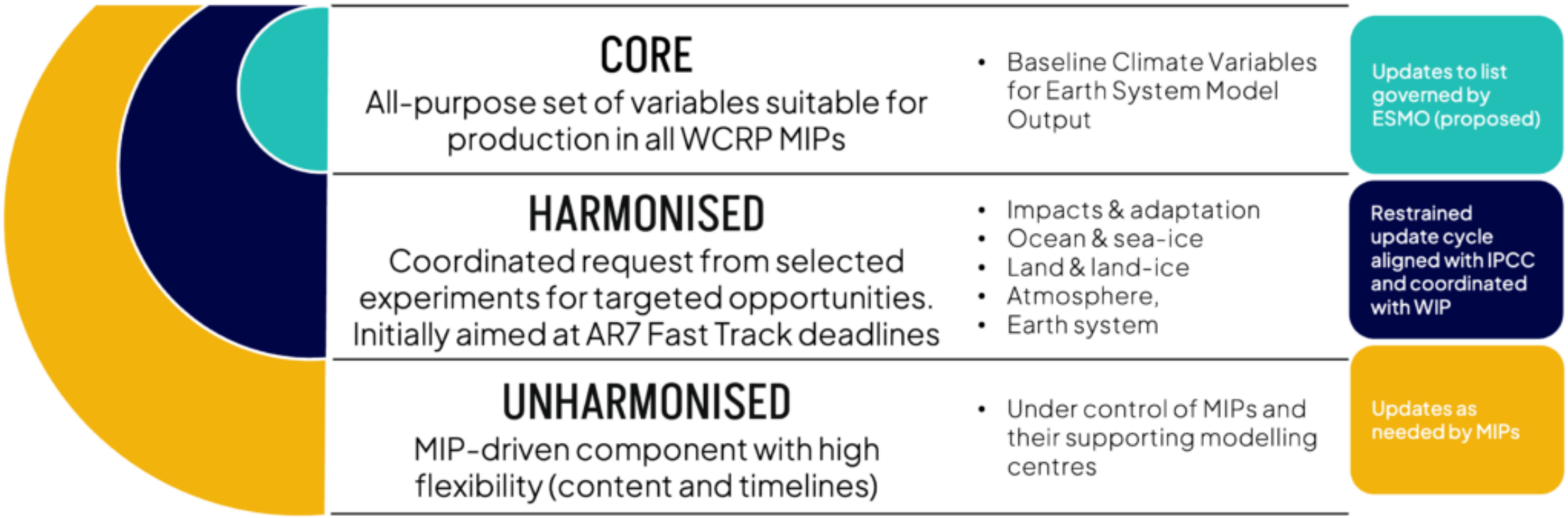
WCRP
World Climate Research Programme



~1000 variables to facilitate the achievement of scientific objectives. Serves the Fast Track.

CMIP Coupled Model Intercomparison Project

WCRP World Climate Research Programme



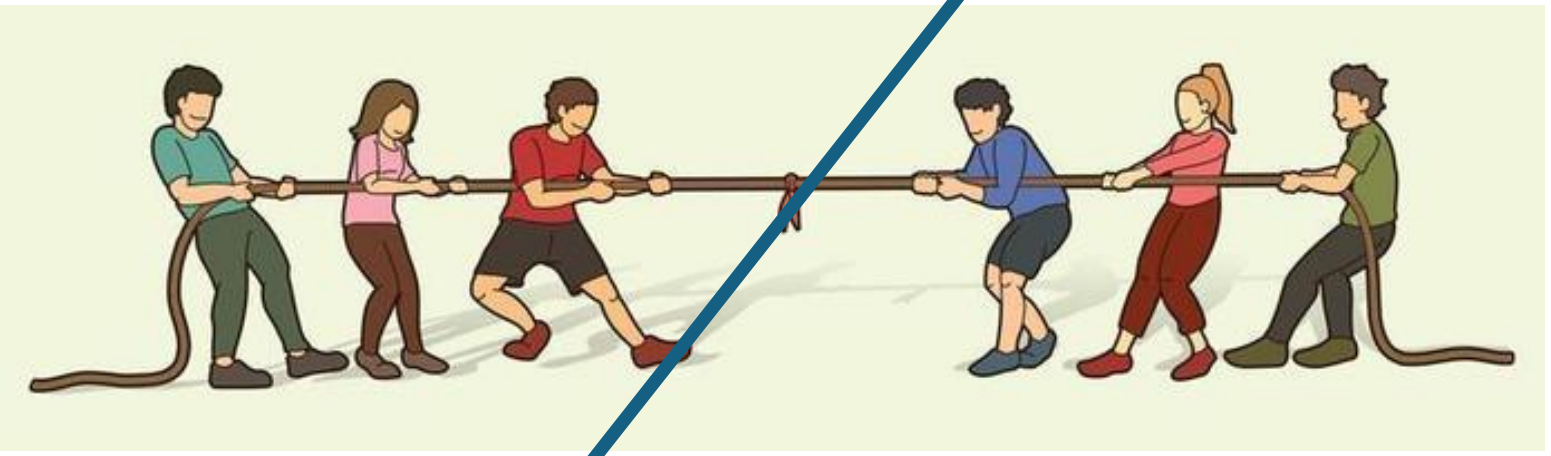
Conceptual / loose at the moment

Data Request: a tale of tensions

Ensuring timely release of data request for workflow integration

Scientific needs: the sky is the limit!

Scientists like to request many variables (including new ones) at highest frequency possible, « just in case of ».

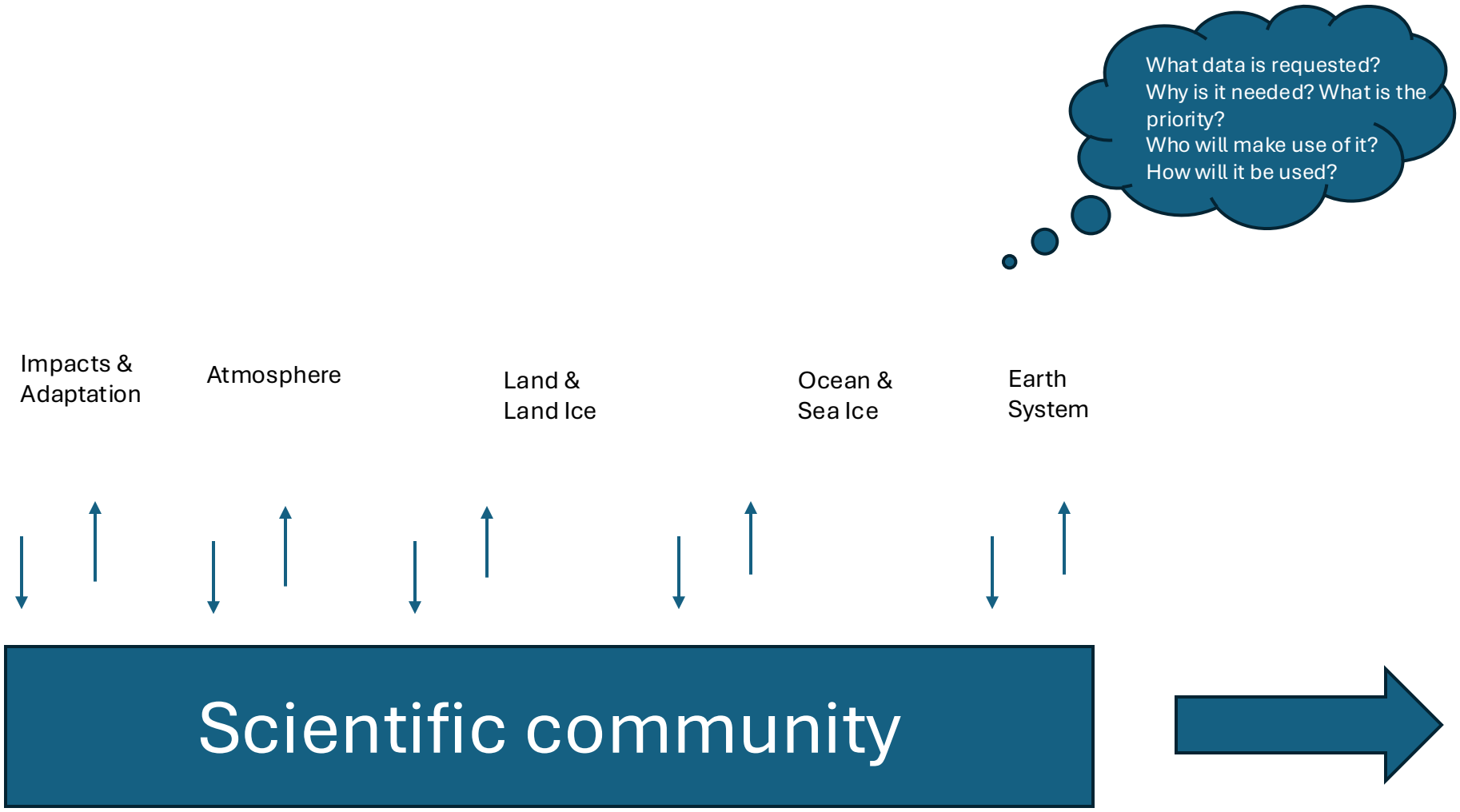


Modeling centers limitations:

Coding diagnostics takes time, I/O operations slow down the code, data needs to be archived and moved around

Taking the time for a well-thought data request where the community is consulted and engaged

Data request: Five Thematic Author Teams

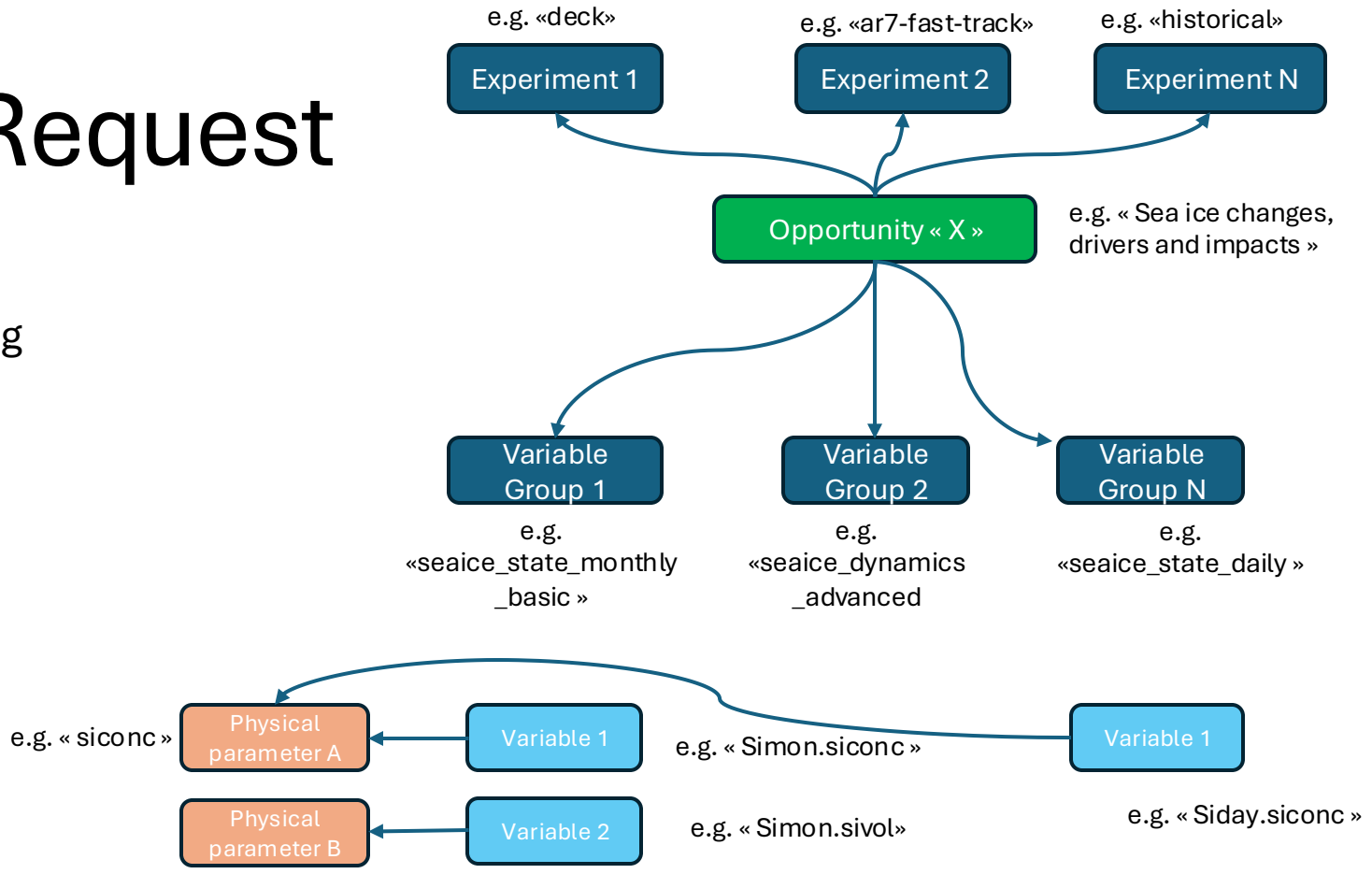


Organizing the Data Request

While CMIP6 was bottom-up (variables being proposed), CMIP7 is top-down.

Opportunities
« broad, overarching applications with clearly defined science and/or societal use and impact »

Examples: Marine Biogeochemistry, Earth's Energy Budget, Plant Phenology…

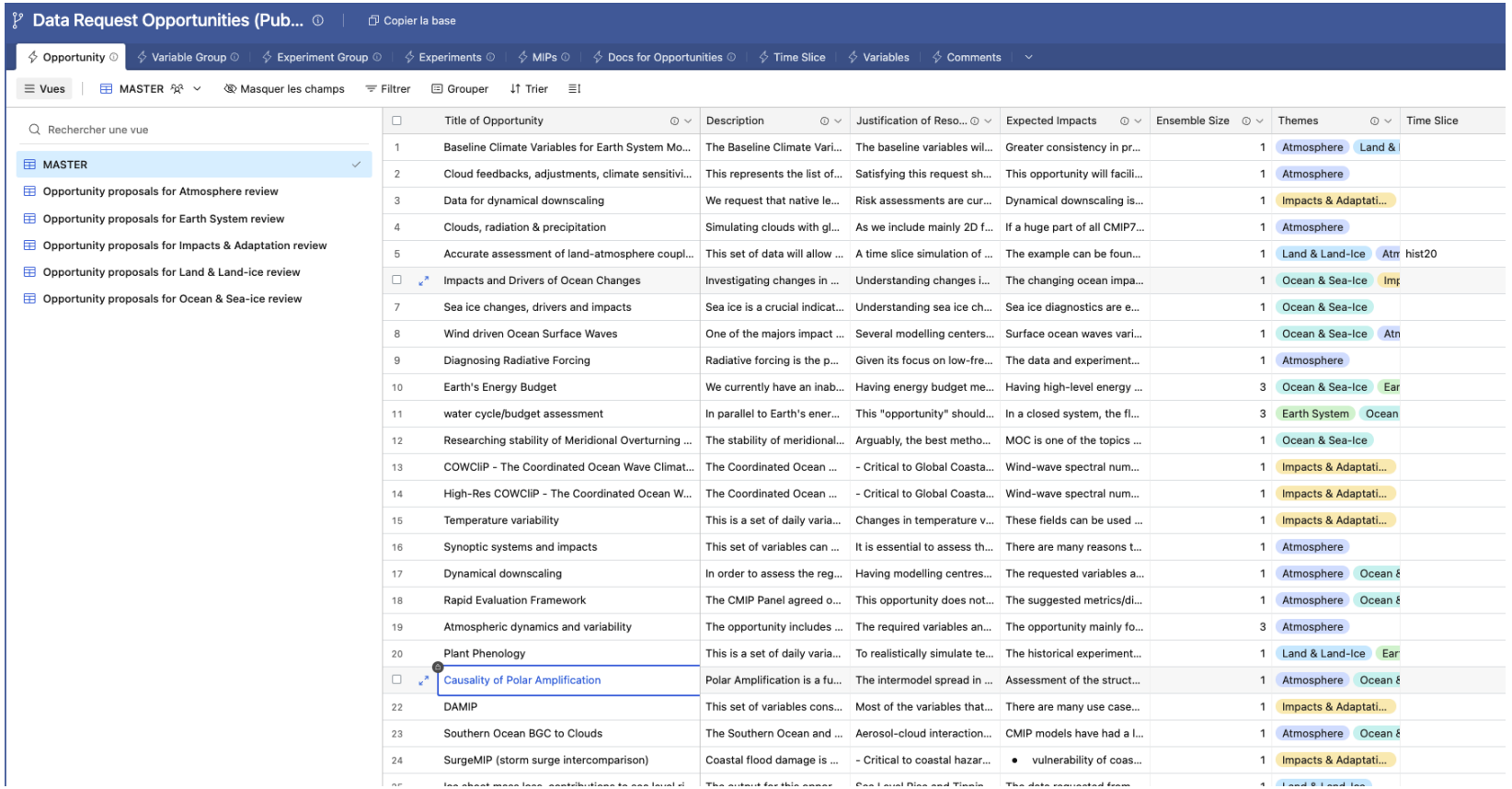


Ensures a match with Climate and Forecast (CF) conventions

A variable will not be on the ESGF portal unless it is referenced in an opportunity!

Collecting information for the data request

« Airtables » for consultation / commenting / proposing new content

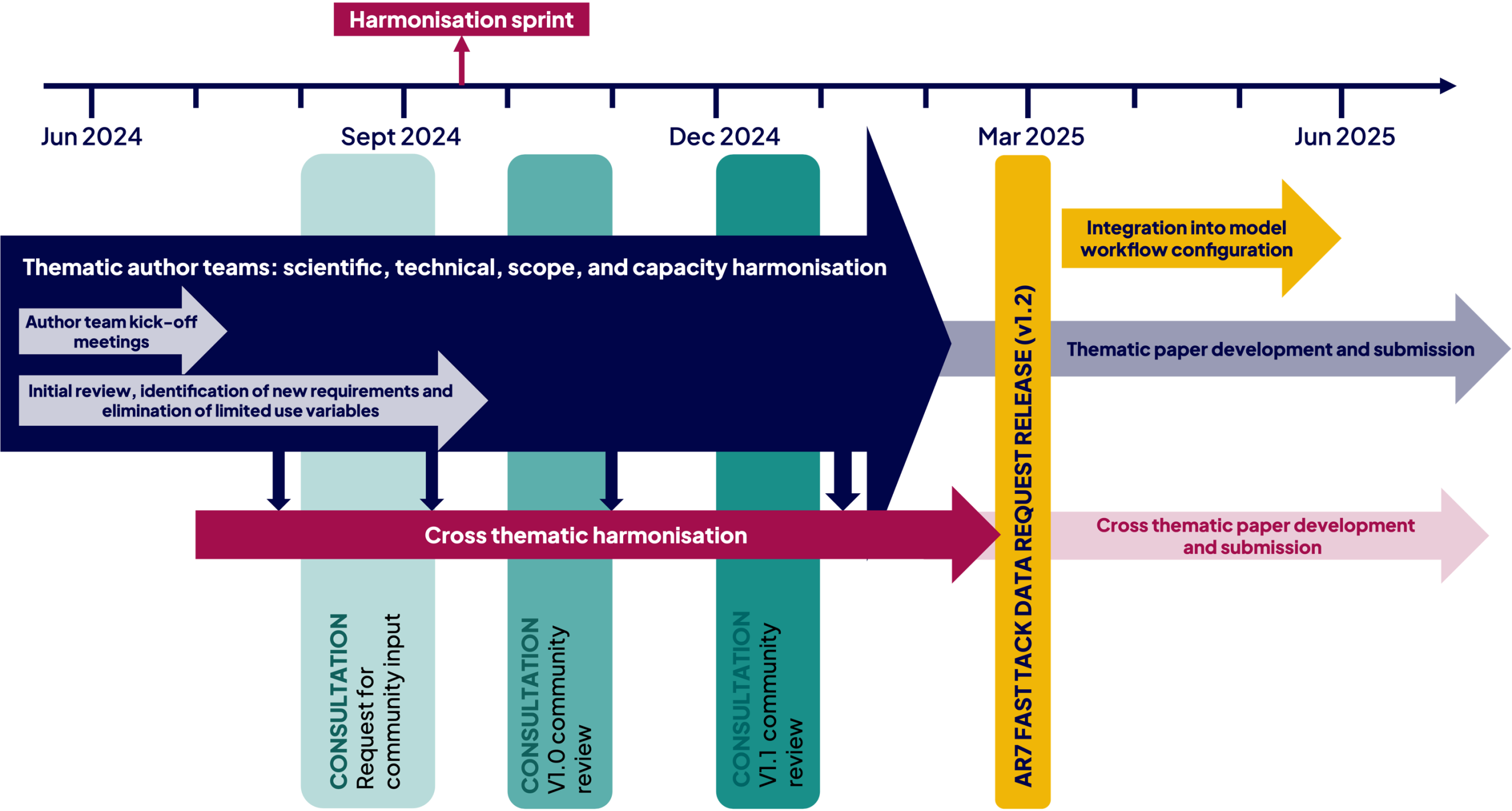


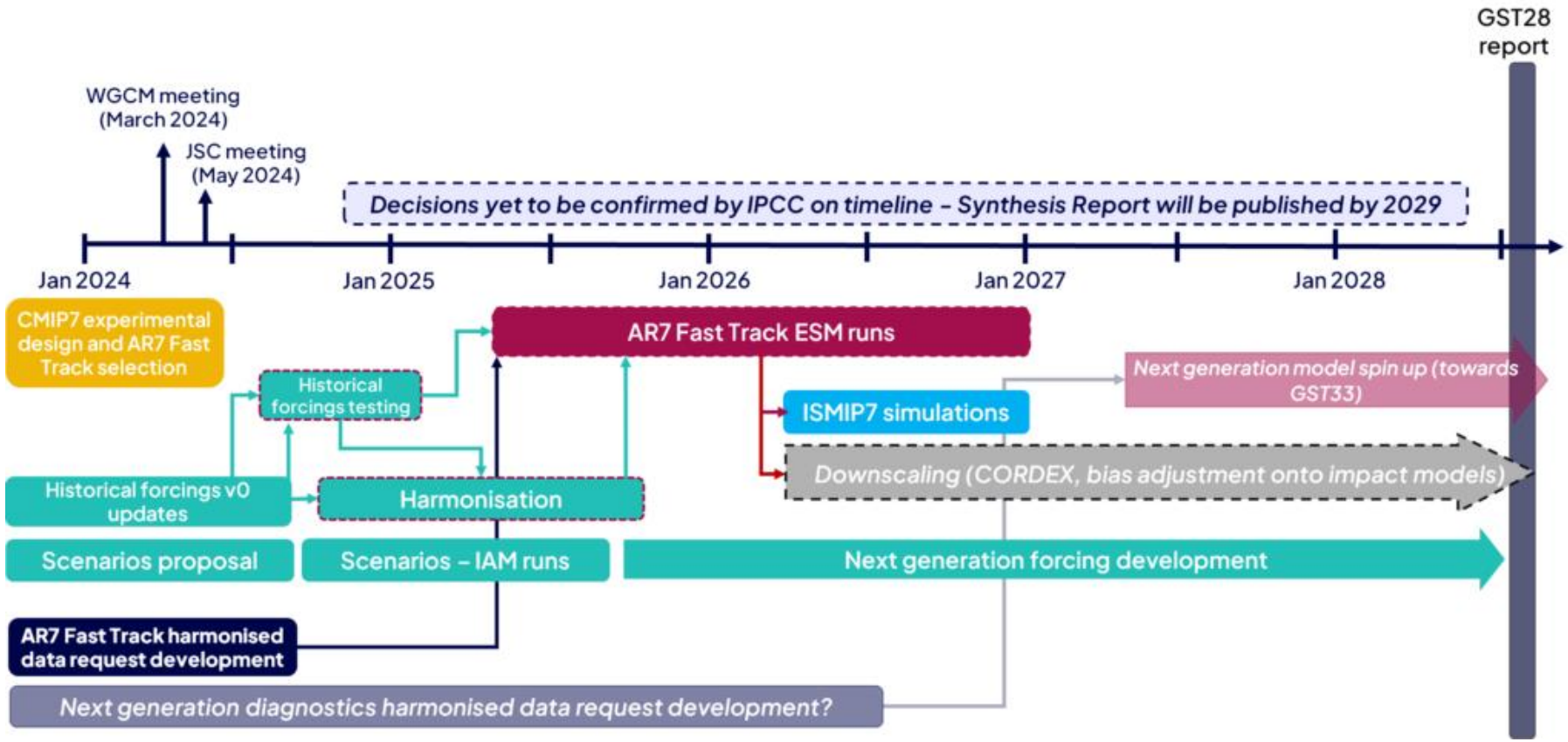
	Title of Opportunity	Description	Justification of Reso...	Expected Impacts	Ensemble Size	Themes	Time Slice
1	Baseline Climate Variables for Earth System Mo...	The Baseline Climate Vari...	The baseline variables wil...	Greater consistency in pr...	1	Atmosphere, Land &	
2	Cloud feedbacks, adjustments, climate sensitivi...	This represents the list of...	Satisfying this request sh...	This opportunity will facili...	1	Atmosphere	
3	Data for dynamical downscaling	We request that native le...	Risk assessments are cur...	Dynamical downscaling is...	1	Impacts & Adaptati...	
4	Clouds, radiation & precipitation	Simulating clouds with gl...	As we include mainly 2D f...	If a huge part of all CMIP7...	1	Atmosphere	
5	Accurate assessment of land-atmosphere coupl...	This set of data will allow ...	A time slice simulation of ...	The example can be foun...	1	Land & Land-Ice, Atr	hist20
	Impacts and Drivers of Ocean Changes	Investigating changes in ...	Understanding changes i...	The changing ocean impa...	1	Ocean & Sea-Ice, Imp	
7	Sea ice changes, drivers and impacts	Sea ice is a crucial indicat...	Understanding sea ice ch...	Sea ice diagnostics are e...	1	Ocean & Sea-Ice	
8	Wind driven Ocean Surface Waves	One of the majors impact ...	Several modelling centers...	Surface ocean waves vari...	1	Ocean & Sea-Ice, Atr	
9	Diagnosing Radiative Forcing	Radiative forcing is the p...	Given its focus on low-fre...	The data and experiment...	1	Atmosphere	
10	Earth's Energy Budget	We currently have an inab...	Having energy budget me...	Having high-level energy ...	3	Ocean & Sea-Ice, Ear	
11	water cycle/budget assessment	In parallel to Earth's ener...	This "opportunity" should...	In a closed system, the fl...	3	Earth System, Ocean	
12	Researching stability of Meridional Overturning ...	The stability of meridional...	Arguably, the best metho...	MOC is one of the topics ...	1	Ocean & Sea-Ice	
13	COWCliP - The Coordinated Ocean Wave Climat...	The Coordinated Ocean ...	- Critical to Global Coasta...	Wind-wave spectral num...	1	Impacts & Adaptati...	
14	High-Res COWCliP - The Coordinated Ocean W...	The Coordinated Ocean ...	- Critical to Global Coasta...	Wind-wave spectral num...	1	Impacts & Adaptati...	
15	Temperature variability	This is a set of daily varia...	Changes in temperature v...	These fields can be used ...	1	Impacts & Adaptati...	
16	Synoptic systems and impacts	This set of variables can ...	It is essential to assess th...	There are many reasons t...	1	Atmosphere	
17	Dynamical downscaling	In order to assess the reg...	Having modelling centres...	The requested variables a...	1	Atmosphere, Ocean &	
18	Rapid Evaluation Framework	The CMIP Panel agreed o...	This opportunity does not...	The suggested metrics/di...	1	Atmosphere, Ocean &	
19	Atmospheric dynamics and variability	The opportunity includes ...	The required variables an...	The opportunity mainly fo...	3	Atmosphere	
20	Plant Phenology	This is a set of daily varia...	To realistically simulate te...	The historical experiment...	1	Land & Land-Ice, Ear	
	Causality of Polar Amplification	Polar Amplification is a fu...	The intermodel spread in ...	Assessment of the struct...	1	Atmosphere, Ocean &	
22	DAMIP	This set of variables cons...	Most of the variables that...	There are many use case...	1	Impacts & Adaptati...	
23	Southern Ocean BGC to Clouds	The Southern Ocean and ...	Aerosol-cloud interaction...	CMIP models have had a l...	1	Atmosphere, Ocean &	
24	SurgeMIP (storm surge intercomparison)	Coastal flood damage is ...	- Critical to coastal hazar...	• vulnerability of coas...	1	Impacts & Adaptati...	

Next steps and useful links

- CMIP7 v1.0beta data request released (feedback until 17 November): https://wcrp-cmip.org/cmip7-data-request-v1-0beta/

https://wcrp-cmip.org/cmip7/cmip7-data-request/public-consultation/


Harmonisation sprint
Jun 2024
Sept 2024
Dec 2024
Mar 2025
Jun 2025
Thematic author teams: scientific, technical, scope, and capacity harmonisation
Author team kick-off meetings
Initial review, identification of new requirements and elimination of limited use variables
Integration into model workflow configuration
Thematic paper development and submission
Cross thematic harmonisation
Cross thematic paper development and submission
CONSULTATION Request for community input
CONSULTATION V1.0 community review
CONSULTATION V1.1 community review
AR7 FAST TACK DATA REQUEST RELEASE (v1.2)


GST28 report
WGCM meeting (March 2024)
JSC meeting (May 2024)
Decisions yet to be confirmed by IPCC on timeline – Synthesis Report will be published by 2029
Jan 2024
Jan 2025
Jan 2026
Jan 2027
Jan 2028
CMIP7 experimental design and AR7 Fast Track selection
AR7 Fast Track ESM runs
Historical forcings testing
Next generation model spin up (towards GST33)
ISMIP7 simulations
Downscaling (CORDEX, bias adjustment onto impact models)
Historical forcings v0 updates
Harmonisation
Scenarios proposal
Scenarios – IAM runs
Next generation forcing development
AR7 Fast Track harmonised data request development
Next generation diagnostics harmonised data request development?