



# **WORLD CLIMATE RESEARCH PROGRAMME**

*Extraordinary Session of the WCRP Joint Scientific Committee (JSC41B)*

**New Home on “Earth System Modelling and Observational Capabilities”**

Progress Report

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# Introduction

Purpose: Address overall coordination mechanism across all model, data and observations activities within the programme.

Initial charge: Task Teams on “Modelling and Computing Infrastructure” and “Seamless Data and Data Management”, jointly charged to work on possible scenarios for the establishment of a Model-Data Home and make recommendations at JSC41b; M. Kimoto and M. Visbeck were the JSC liaisons.

Challenges: Buy-in from the community, efficient links to other homes, efficient links to LHAs

See also: Document with details on the JSC41b web site



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# 1. Progress towards identifying goals and outcomes (1/3)

**Vision: To serve as an overall coordination mechanism across necessary model, data and observations activities within the programme** with the following aims:



1. To foster a seamless and value-chain model-data-observation approach across Earth system components, fundamental and applied disciplines, time and spatial scales, infrastructures in support of research, services and policy to optimise the Earth system model developments and formulate the observational requirements to better monitor, understand and predict the climate system (Goals 1-4 of the WCRP Strategic Plan)
2. To bring about integrated modelling and data infrastructures, data policy, protocols and standards to serve the broader interest of the programme (Critical Infrastructures of the WCRP Strategic Plan)



## 1. Progress towards identifying goals and outcomes

- Key science goals, objectives and scope
- What would be some of the high level outcomes and impacts you hope that the new home will achieve?



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# 1. Progress towards identifying goals and outcomes (2/3)

3. To share best practices, data, knowledge, challenges and opportunities, and ensure efficient communication across WCRP constituencies, communities, external partners and stakeholders, with a particular attention to engagement, equal access and inclusion of the 'global south' (Engagement and Partners of the WCRP Strategic Plan)
4. To identify critical stakeholders, scientific ambition and resourcing needs along this model-data-observation value chain, to develop a risk mapping and mitigation measures, and to remove fragmentation, duplications and suboptimal aspects in the programme on those matters



## 1. Progress towards identifying goals and outcomes

- Key science goals, objectives and scope
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# 1. Progress towards identifying goals and outcomes (3/3)

Scope (this is a small selection from the reference document):



- Data science
  - Foster a stronger Earth system approach for reanalyses/assimilation, which currently are largely uncoupled
  - Coordinate observations, reanalyses, data science and data management research issues across the programme and across WMO
- Modelling
  - Promote the understanding and reduction of the many systematic errors found in Earth system models
  - Explore the comprehensive use of data science and machine learning
- Computing and data infrastructures
  - Adopt a seamless climate data management
  - Promote the adaptation of codes for exascale computing architectures, data infrastructures and the necessary efficient output management

## 1. Progress towards identifying goals and outcomes

- Key science goals, objectives and scope
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## 2. Relationships

- **Internal**
  - Linkages to WCRP constituencies, homes and LHAs
- **External**
  - WWRP, GAW, GCOS, space agencies (via CEOS/CGMS WG Climate) and Future Earth (e.g., AIMES, PAGES), SOLAS
  - Engagement with data standardization initiatives like NetCDF/CF and the World Data System (WDS-ISC)
  - Broader stakeholders like UNFCCC, IPCC (IPCC TG-Data and the IPCC Data Distribution Centre), GFCS (and initiatives like C3S), IOC-UNESCO, ISC, WMO entities like WMO Lead Centres and Global Producing Centres, NMHSs, Regional Climate Centres, etc.
- What role for broader engagement opportunities with NGOs, industry and regional activities? How to handle the deficit in the global south?



### 2. Relationships

- Who are the priority research allies, partners and stakeholders?
- Have you had any discussions with these partners and stakeholders?
- How can we ensure geographical and gender diversity?

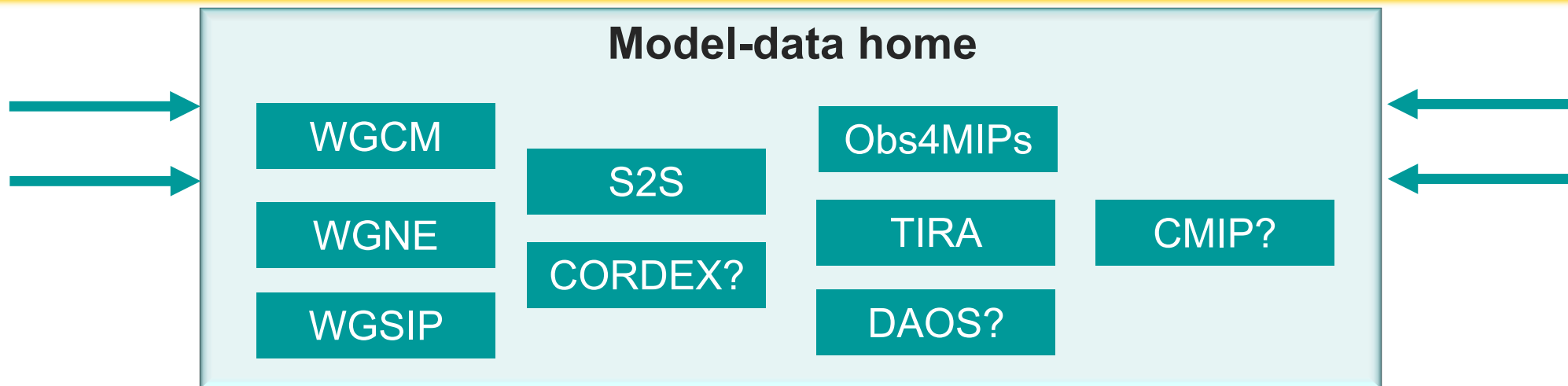
Stakeholders are those who might use the research outputs



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### 3. Structure



- Scientific steering group (or similar) reporting to JSC
- Ex-officio from other homes, LHAs, WWRP, GAW, GCOS and others
- Could also be framed as horizontal dimension across other homes
- Jump started from the reps of the Councils and groups brought in, then in the rotation move to an independent group after 2-3 years
- Advantage could be taken of the excitement around AI/ML by setting up a new specific group in this arena

### 3. Structure

- What would be the key structural elements and associated governance? (e.g. Scientific Steering Group, Working Groups etc)?

## 4. Resources

- This overall coordination will be hard to implement without necessary secretariat support, both from Geneva and a project office (either associated with the CMIP-IPO or not). This should be a priority once the home's structure is set.
- The following points need to be recognised to avoid hurdles and avoid putting current activities at risk:
  - The home has initially a coordination role of existing groups, with their own priorities and momentum.
  - The ambitious objectives will require specific actions to ensure the buy-in, adopt a common ground and merge communities.



### 4. Resources

- What additional resources might be needed (incl. IPO)
- Other support from WCRP? From others?



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# Example of resource challenge: Earth System Grid Federation

- Recent failure of the LLNL funding proposal to the US Department of Energy (DOE) to support ESGF points to the fragility of ESGF resourcing, and by extension CMIP (the other major international funded activity is IS-ENES, soft money from the EC).
- DOE will re-compete the proposal and will award it to continue support to ESGF, though likely to a new team with new staff.
- Funding for the development of ESGF from DOE and IS-ENES will likely sustain ESGF through to the end of 2022. But IS-ENES will need the countries support beyond that point.
- This **vulnerability** has implications for CMIP7 for new technologies, scope of CMIP7, support for ESGF or big data archival/access or alternate technologies going forward.
- The overall context for this occurs during the establishment of CMIP-IPO and WMO Resolution 67 on 'Institutionalization' of CMIP key elements.



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## 5. Timeline and roadmap (1/2)

This plan should be elaborated further after the JSC41b session. A team of 6-8 volunteers is proposed to design the implementation as follows:

1. **Year 1:** Set the home's governance, initial SSG, high-level contributions to both LHA and core activities and define secretariat support arrangements for JSC approval in 2021 and organise a kick-off event to also close the WCRP Data Advisory and Modelling Advisory Councils)
2. **Year 2:** Develop/update/revise governance and set specific research priorities with the home's constituencies and establish the external partnership arrangements for JSC's approval in 2022
3. **Years 3-5:** Implementation of research priorities, resource mobilization, communication and outreach
4. **Years 6-10:** Implementation of a revised plan following a mid-term review taking place in year 5



### 5. Timeline and roadmap

- An approximate timeline for the development the new home.



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## 5. Timeline and roadmap (2/2)

Volunteers identified, for JSC's consideration:

Member	Representing
Bill Merryfield	WGSIP co-chair
Carolyn Reynolds	WGNE co-chair
Nils Wedi	Incoming WGNE co-chair
Ben Galton-Fenzi	CliC and WDAC
Tingjun Zhang	CliC and WDAC
Mark Dowell	former WDAC member and former CEOS/CGMS WG Climate chair
Joerg Schulz	WDAC incoming co-chair and leaving CEOS-CGMS WG Climate chair
Susann Tegtmeier	WDAC co-chair
Gokhan Danabasoglu	OMDP and WMAC
Martin Visbeck	JSC liaison
Masa Kimoto	JSC liaison

To be complemented for expertise, gender and geographical balance

### 5. Timeline and roadmap

- An approximate timeline for the development the new home.



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## 6. Implementation options

Four main options proposed and developed during this consultation and summarized as follows:

1. **Option 1:** model-data home including CMIP governance; separate offices for resp. model-data home and CMIP coordination (23%)
2. **Option 2:** equivalent to option 1 but using CMIP branding, slightly revised CMIP framework, office(s) carry the CMIP brand (60%)
3. **Option 3:** model-data home NOT including CMIP governance; separate offices for resp. model-data home and CMIP coordination (4%)
4. **Option 4:** merger of current Councils without dedicated office support (13%)



NB Poll results on preference (%), 30 responses received, representation of the WCRP family

### 5. Timeline and roadmap

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# Questions – to guide the discussions

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- Have you had any discussions with these partners and stakeholders?
- How can we ensure geographical and gender diversity?

## 3. Structure

- What would be the key structural elements and associated governance? (e.g. Scientific Steering Group, Working Groups etc)?

## 4. Resources

- What additional resources might be needed (incl. IPO)
- Other support from WCRP? From others?

## 5. Timeline and roadmap

- An approximate timeline for the development the new home.

Guidance: answer each of these in following slides



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