



# WORLD CLIMATE RESEARCH PROGRAMME

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*Geneva, Switzerland*



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# JOINT SCIENTIFIC COMMITTEE (JSC)

WCRP MODELLING ADVISORY COUNCIL (WMAC)

WCRP DATA ADVISORY COUNCIL (WDAC)

## WORKING GROUPS ON:

COUPLED MODELLING (WGCM)  
NUMERICAL EXPERIMENTATION (WGNE)

SUBSEASONAL TO INTERDECADAL PREDICTION (WGSIP)  
REGIONAL CLIMATE (WGRC)



CRYOSPHERE-  
CLIMATE



OCEAN-  
ATMOSPHERE



LAND-  
ATMOSPHERE



Stratosphere-troposphere  
Processes And their Role in Climate

TROPOSPHERE-  
STRATOSPHERE



REGIONAL CLIMATE  
DOWNSCALING

## GRAND CHALLENGES

CLOUDS, CIRCULATION AND CLIMATE SENSITIVITY

REGIONAL SEA-LEVEL CHANGE AND COASTAL IMPACTS

CARBON FEEDBACKS IN THE CLIMATE SYSTEM

WEATHER AND CLIMATE EXTREMES

NEAR-TERM CLIMATE PREDICTION

MELTING ICE AND GLOBAL CONSEQUENCES

WATER FOR THE FOOD BASKETS OF THE WORLD

JOINT PLANNING STAFF (JPS)



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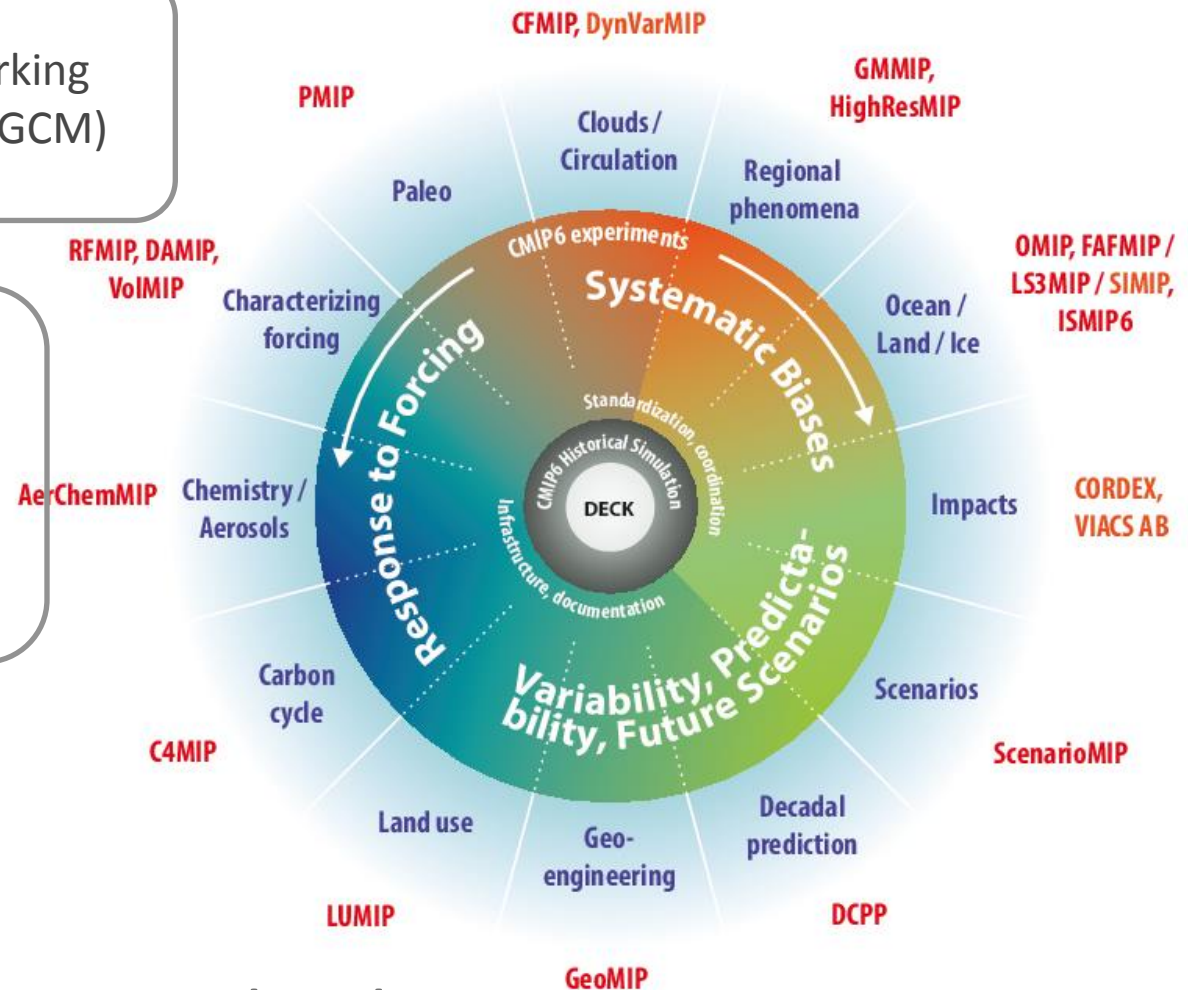


CMIP is a project of WCRP's Working Group on Coupled Modeling (WGCM)

CMIP has led to an improved understanding of past, present and future climate change and variability in a multi-model framework

CMIP defines common experiment protocols, forcings and output

## 21 CMIP6-Endorsed MIPs

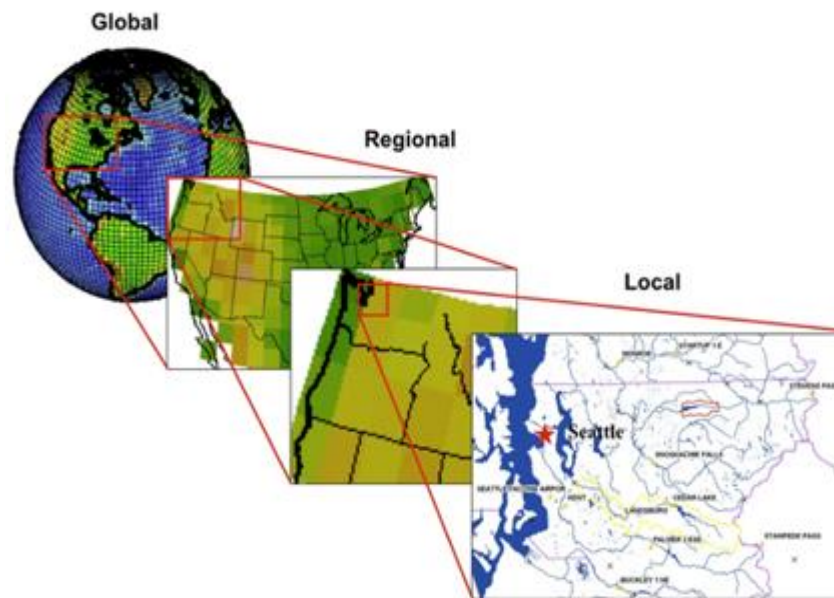




Advancing the science and application of regional climate downscaling, for improved regional climate information

*CORDEX scientific challenges:*

- **Added value** of downscaling, scales, bias and uncertainties, user-oriented metrics
- Understanding and simulating **human elements**, e.g. land use, urban development, climate and coastal cities
- Coordination of regional **coupled modeling**
- Precipitation, e.g. convective systems, monsoon
- Local wind systems



Model downscaling. NCAR Dr. Andrew Wood

# The Future of WCRP



**The Climate Science  
Requirements Changed**

## 2015: A Landmark Year



- Over 190 countries signed up to reduce emissions, with the target to stay within a 2°C world.
- 15-year agreement for the substantial reduction of disaster risk and losses in lives, livelihoods and health.
- 2030 agenda with 17 goals to end poverty and hunger, improve health and education, making cities more sustainable, combating climate change, and protecting oceans and forests.

## Understanding and Quantifying Weather and Climate Risk are at the Core of these Actions

# The Future of WCRP



## The Review of WCRP



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Unwieldy, complex and confusing.

Core Projects stuck in the past?

Where is whole system approach?

Where is next generation model development?

Where is the pathway to climate services?

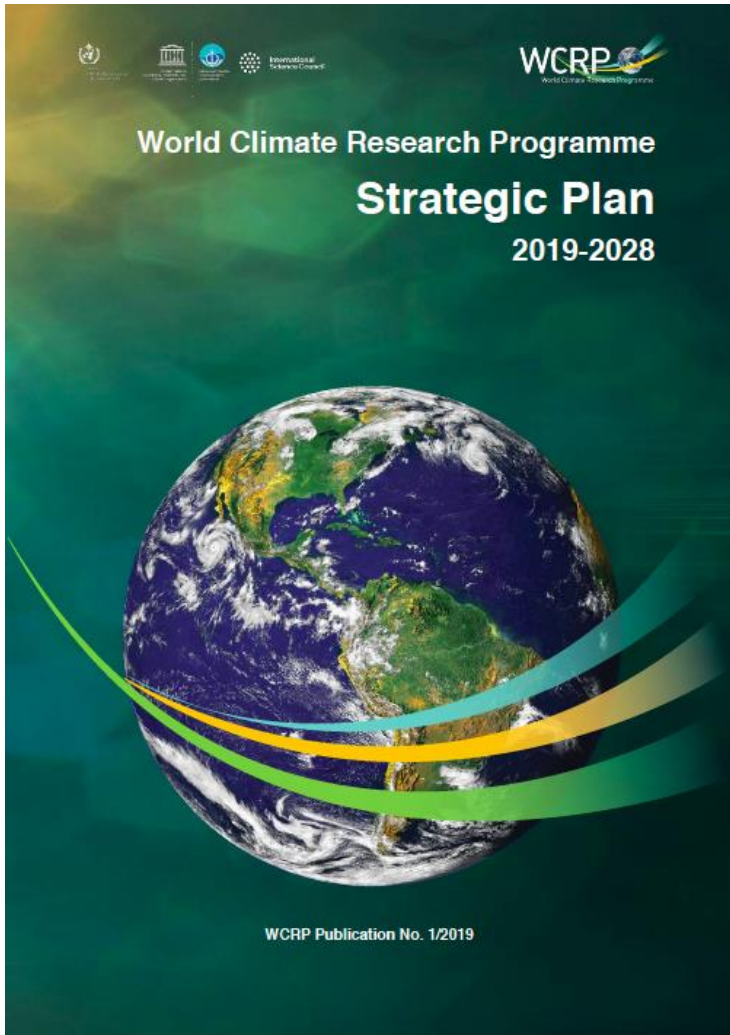
**Where is climate change?**

**CURRENT STRUCTURE IS NOT THE  
STRUCTURE FOR THE FUTURE**





# The Future of WCRP



## The New Strategic Plan of WCRP

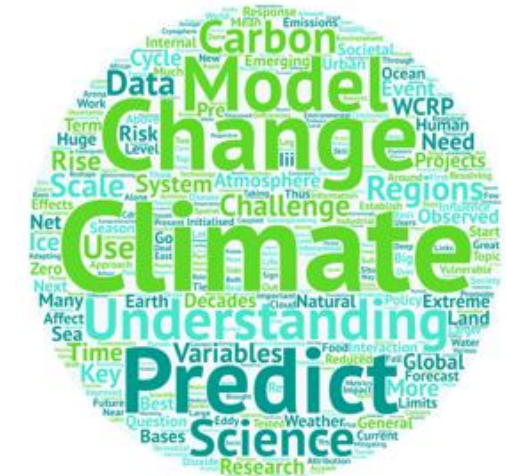
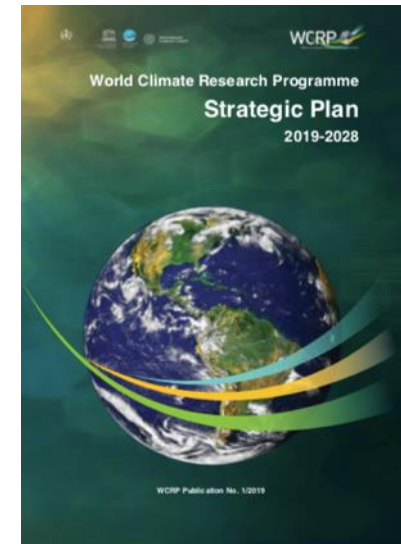


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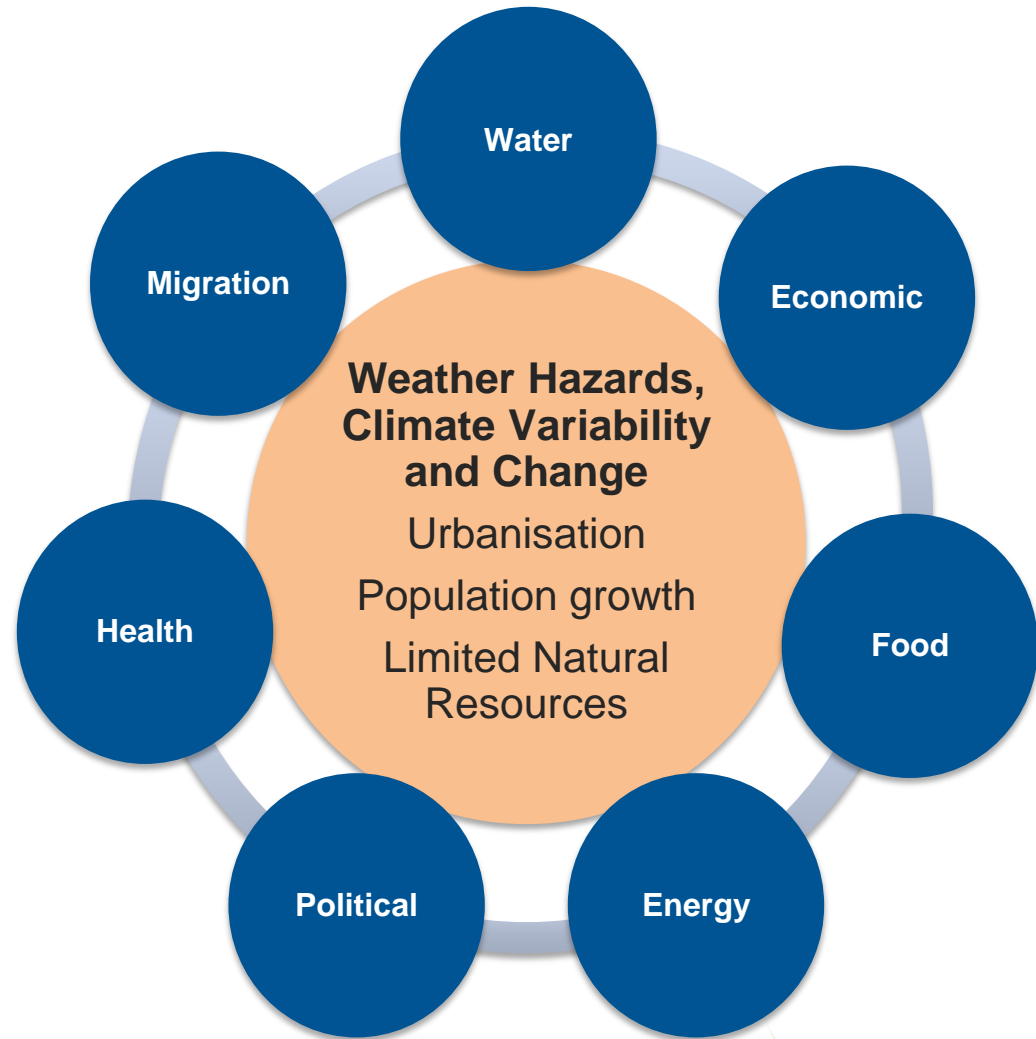
# WCRP Strategic Plan

- WCRP developed a new **Strategic Plan**, covering a 10-year time horizon (2019-2028)
- Takes into account the outcomes of the **co-sponsors review** (finalized in June 2018)
- Importance of **basic science, seamless approach** (time, space, ESM, R-O) and **links to services and policy** emphasised
- Accompanying **Implementation Plan** under development

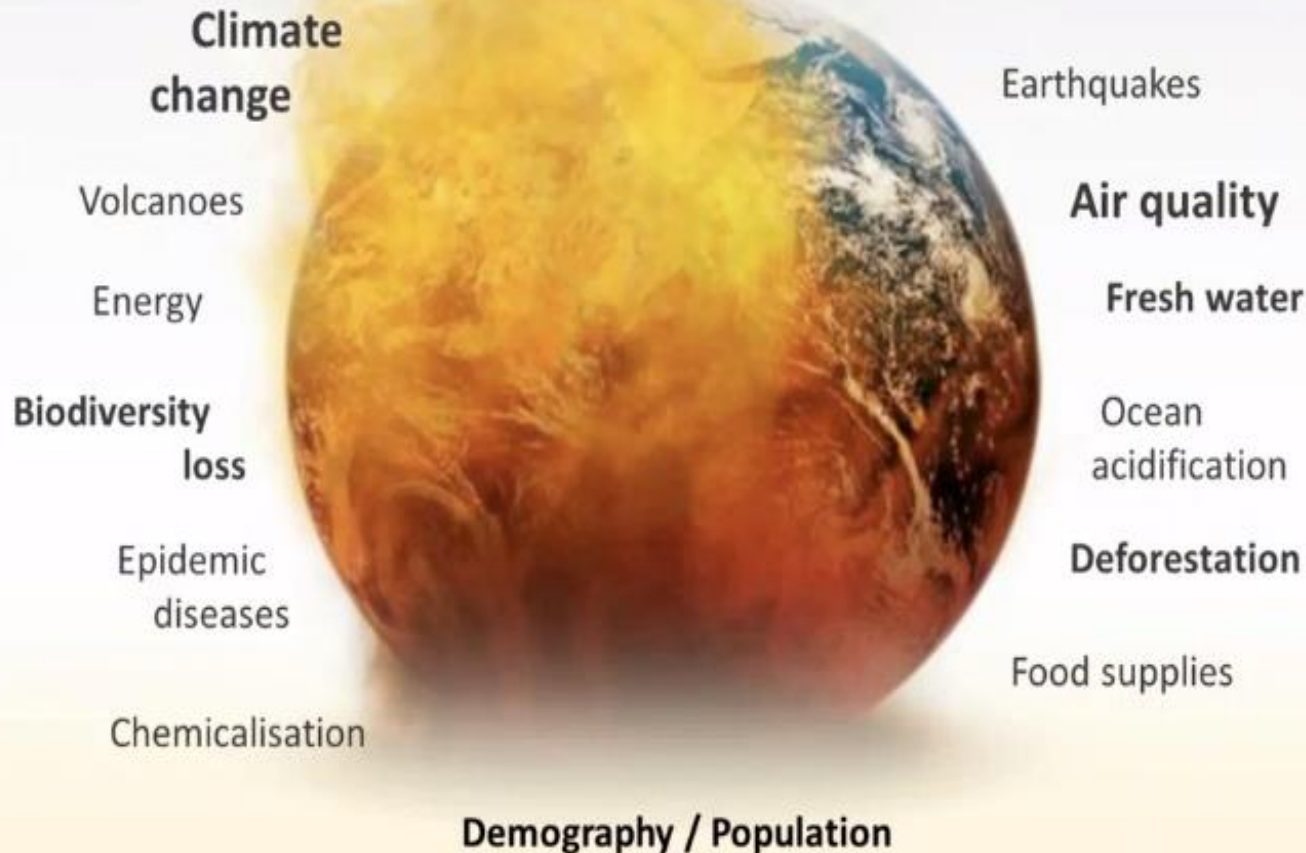


# Targeting: 21<sup>st</sup> CENTURY CHALLENGES IN AN INTERCONNECTED WORLD

Exposure to extreme weather and climate events threatens to derail the sustainability of economic development and social welfare across the globe, and to threaten the securities on which we rely for our health and well-being.



# CONTRIBUTION TO Solving GRAND CHALLENGES <sup>•</sup>



## DISCIPLINES

Natural Sciences

Social Sciences

Medicine

Technology

But: Climate Change cannot be seen in isolation. It must be addressed together with the other grand challenges facing society

**From ideas**

**To implementation**



# GLOBAL IMPACT / INTEGRATED SYNTHESIS



# Vision and Mission

- **New Vision**

*A world that uses sound, relevant and timely climate science to ensure a more resilient present and sustainable future for humankind.*

- **New Mission**

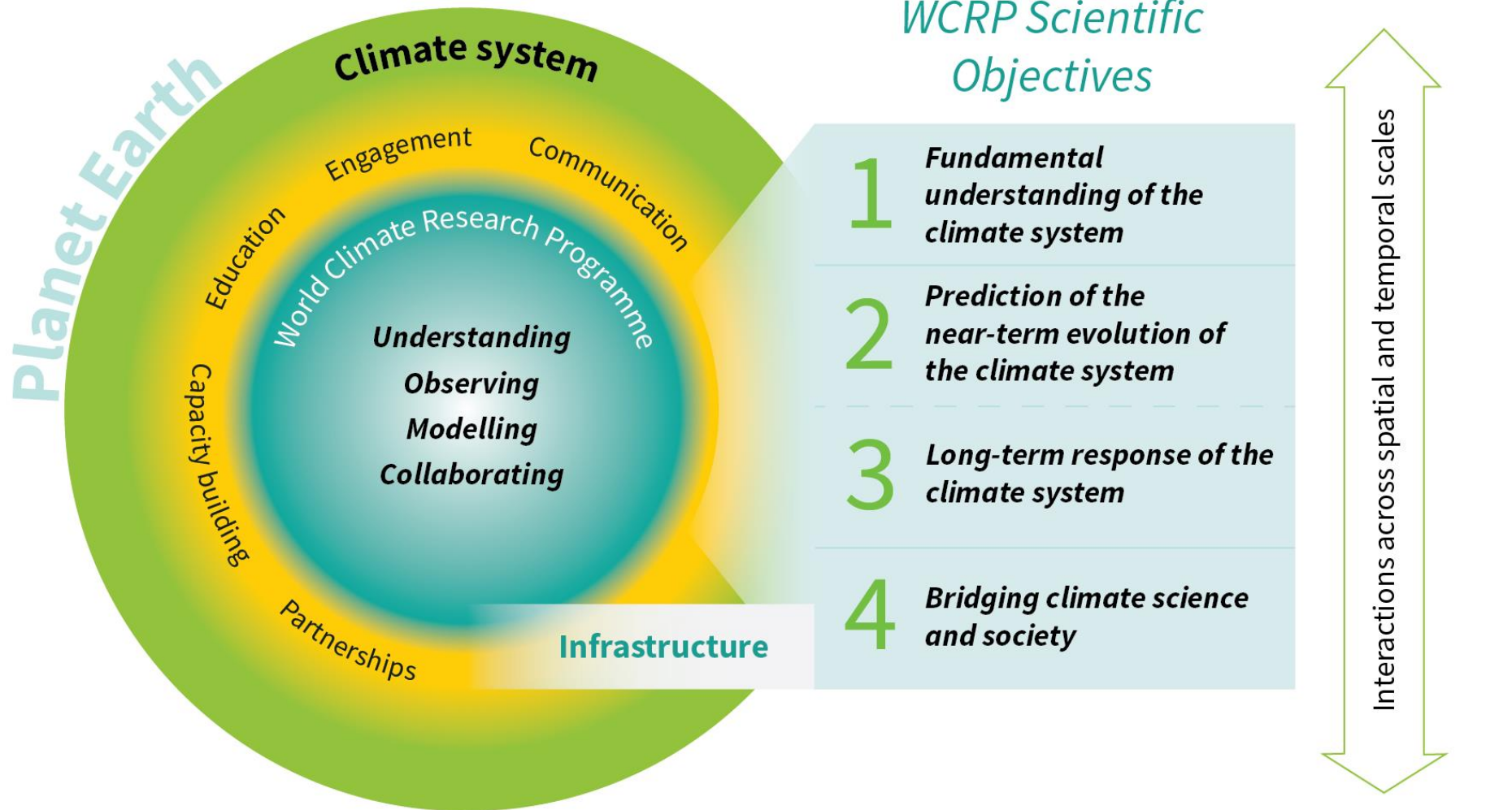
*The World Climate Research Programme (WCRP) coordinates and facilitates international climate research to develop, share and apply the climate knowledge that contributes to societal well-being.*



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# WCRP Strategic Plan



# Status of WCRP Strategic Plan

- Draft completed in November 2018
- Presented at AGU meeting in December 2018
- Sent to WCRP Sponsors; comments received
- Implemented changes; final version agreed on by JSC April 2019
- To be sent to Sponsors for final agreement



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# General Considerations

- **Strategic Plan** = the 'what'
  - Follows the vision, mission and context evolution
  - Positioning, niche, relevance, new directions, focus on big picture
  - Two purposes: galvanize the community, marketing tool
- **Implementation Plan** = the 'how', setting the Strategic Plan in motion, should naturally follow the logic of the Strategic Plan
  - Resources
  - Structures
  - Milestones
  - Deliverables
  - Measures of Success
  - Risk assessment, etc...



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# The Future of WCRP

## The Implementation Plan



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# A Framework for Implementing the WCRP Strategic Plan

# Key Science Questions

## DRAFT for consultation and refinement

### 1. Fundamental processes – academic community

- Revisiting aggregation and scaling
- Process understanding and parameterization
- Society's need for prediction and attribution: what needs to be done to improve it?
- Climate sensitivity - fundamental science
- Reservoir changes (heat/carbon/water)
- How does our science and knowledge adapt to new and disruptive technologies such as advances in machine learning / data assimilation / data fusion...

### 2. Climate services community (e.g. GFCS)

- Society's need for prediction and attribution: what needs to be done to improve it?  
[Earth system/Environmental prediction]
- Prediction, attribution and evolution of Extremes
- Regional hotspots (e.g. high latitudes, Pacific Islands) - sensitivity and human impacts
- How will climate interact with overall development trends, including urbanization?



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# Key Science Questions

## DRAFT for consultation and refinement

### 3. Scenarios (e.g. IPCC community)

- Climate sensitivity - communication of uncertainty
- Prediction, attribution and evolution of Extremes
- Reservoir changes (heat/carbon/water)
- Impact of different forcings (aerosols)

### 4. Mitigation/Adaptation community, Post-Paris Agreement, Decision-makers and doers (e.g. UNFCCC, urban planners, etc.)

- Geoengineering: assess impact; prediction and attribution
- How will climate interact with overall development trends, including urbanization

And a process for reviewing and refining these  
including via consultation



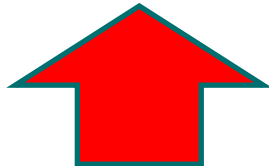
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# Implementation Plan – Draft Structure

1. Introduction
2. The WCRP Strategy: Vision, Mission and Objectives
3. Engagement
4. Conceptual Framework
5. Partnerships
  - Identifying key Partners
  - Co-designing Science Questions
  - Identifying common infrastructure
  - Clarifying their role in the Strategy
  - Reaffirming current, and building new
6. Implementation
  - Transition Plan
  - Schedule: Gant Chart, Milestones, Deliverables
7. Measures of Success
8. Risks and contingencies

**By April 2020**



Up to April 2022  
Fully consultative



- Support Functions (incl. support offices)
- External Governance: Sponsors, JSC, Governing Board, JPS
- Internal Structure and Governance
- Resources, budgets, finance management

# Implementation Plan – Action Elements

## Research Projects

- Lifecycle (start and end) with a clear timeline and deliverables
- Joint and co-designed with Partners outside WCRP
- Deliver to Strategic Plan Objectives
- WCRP attributes: Integration; Scale; Relevance; Climate Change; Discovery and Innovation

Jointly through dialogue and co-design

**Conferences, Workshops, WCRP Forum?**

**Enduring capability - people:  
Climate System Elements  
Infrastructure and Integration**

**Projects and fora to engage and empower ECRs; and regional partners: part of the WCRP family**

**Regular Syntheses, Assessments, Gap Analyses    Rapid Assessments and Reports**

**Reference data sets (observed, modelled)**

**Evaluations, Inter-comparisons, Benchmarking, Standards**

**Coordination**

**Educational services and activities**

**Stakeholder engagement and outreach**

**Capacity building and communication**

# Implementation Timeline - early draft

## **1. Now to April 2020 (JSC-41)**

- Refine science questions and conceptual framework
- Refine key elements for delivery and engagement
- Science, funding and infrastructure needs

## **2. Then: up to 2 years for consultation and development of a new structure, governance: by April 2022 (JSC-43)**

- In parallel – develop and deliver syntheses of core activities

## **3. *Then: up to a further 2 years to transition to the new structure and governance: by April 2024 (JSC-45)***



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