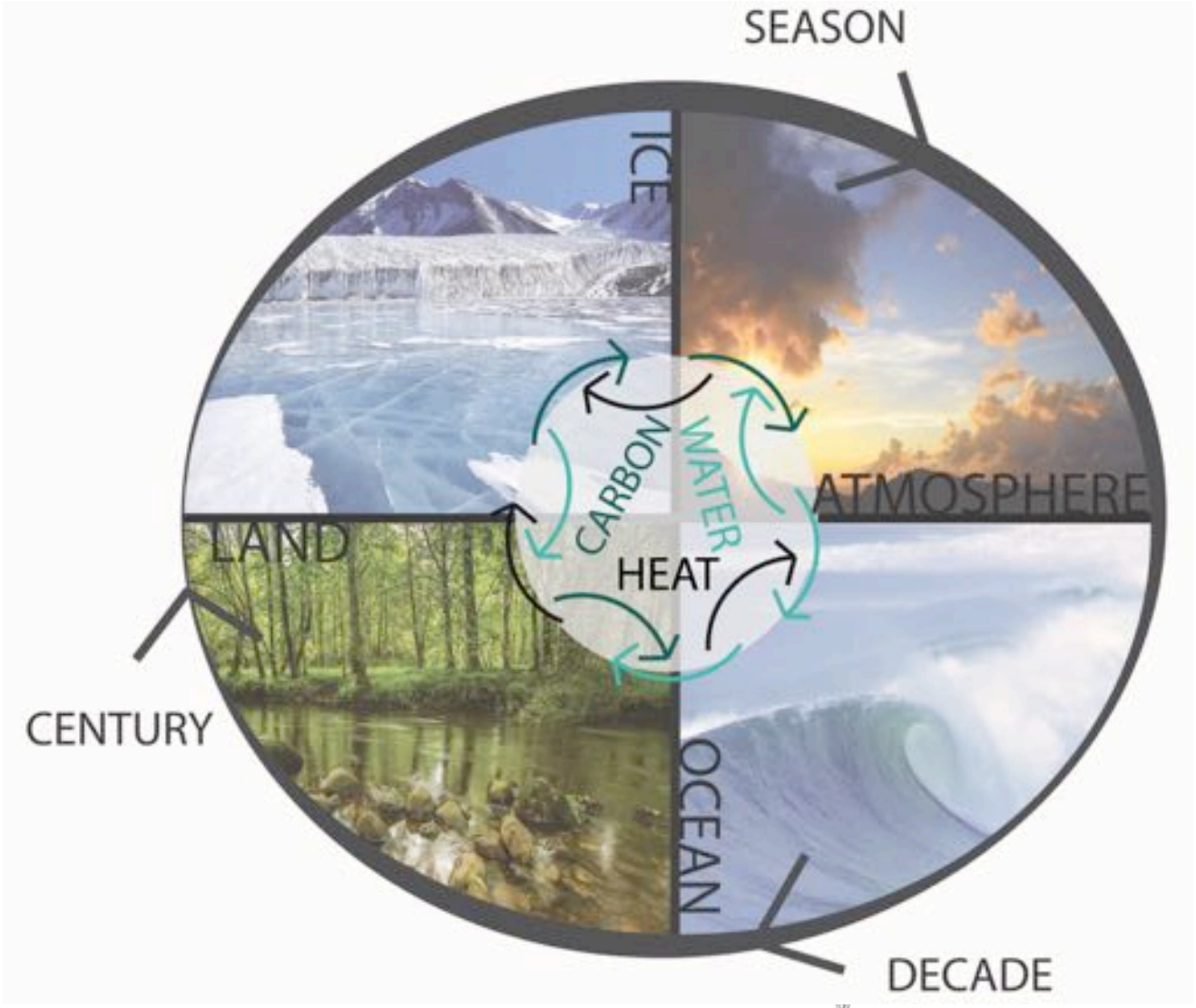
WORLD CLIMATE RESEARCH PROGRAMME

Guy Brasseur
Chair WCRP Joint Scientific Committee
11 May 2018
GEWEX Open Science Conference, Banff, Canada

WMO
INTERNATIONAL COUNCIL FOR SCIENCE
WCRP World Climate Research Programme

Role of WCRP

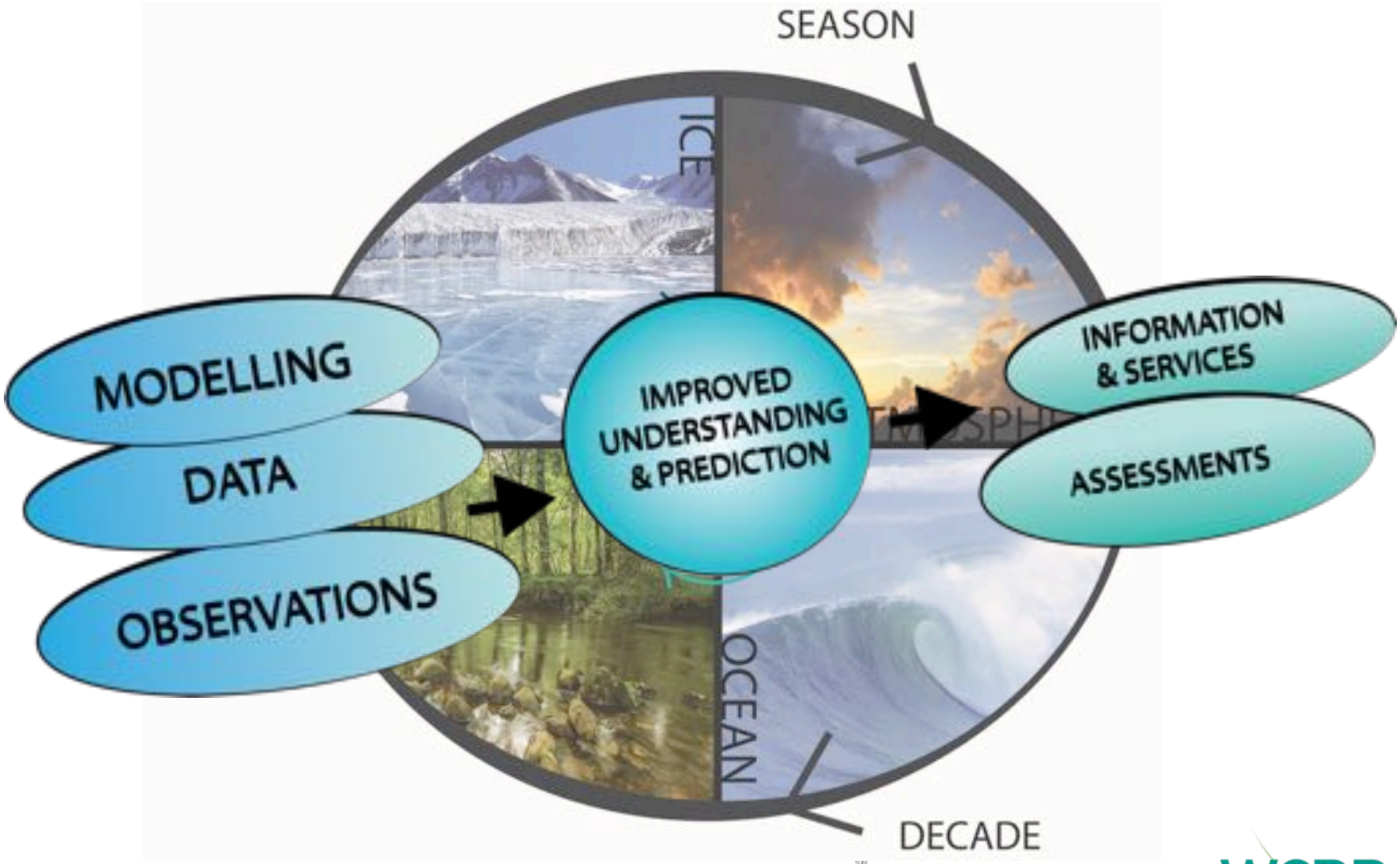


WMO

INTERNATIONAL COUNCIL FOR SCIENCE

WCRP
World Climate Research Programme

Role of WCRP



WMO

INTERNATIONAL COUNCIL FOR SCIENCE

WCRP World Climate Research Programme

WCRP Structure

JOINT SCIENTIFIC COMMITTEE (JSC)

WCRP MODELLING ADVISORY COUNCIL (WMAC)

WCRP DATA ADVISORY COUNCIL (WDAC)

JOINT PLANNING STAFF (JPS)

WORKING GROUPS ON:

SUBSEASONAL TO INTERDECADAL PREDICTION (WGSIP)
NUMERICAL EXPERIMENTATION (WGNE)
COUPLED MODELLING (WGCM)
REGIONAL CLIMATE (WGRC)

CliC	CLIVAR	GEWEX	SPARC	CORDEX
CRYOSPHERE-CLIMATE	OCEAN-ATMOSPHERE	LAND-ATMOSPHERE	TROPOSPHERE-STRATOSPHERE	REGIONAL CLIMATE DOWNSCALING

GRAND CHALLENGES

- CLOUDS, CIRCULATION AND CLIMATE SENSITIVITY
- NEAR-TERM CLIMATE PREDICTION
- REGIONAL SEA-LEVEL CHANGE AND COASTAL IMPACTS
- MELTING ICE AND GLOBAL CONSEQUENCES
- CARBON FEEDBACKS IN THE CLIMATE SYSTEM
- WATER FOR THE FOOD BASKETS OF THE WORLD
- UNDERSTANDING AND PREDICTING WEATHER AND CLIMATE EXTREMES

WMO UNESCO INTERNATIONAL COUNCIL FOR SCIENCE WCRP World Climate Research Programme

Grand challenges

WMO

INTERNATIONAL COUNCIL FOR SCIENCE

WCRP World Climate Research Programme

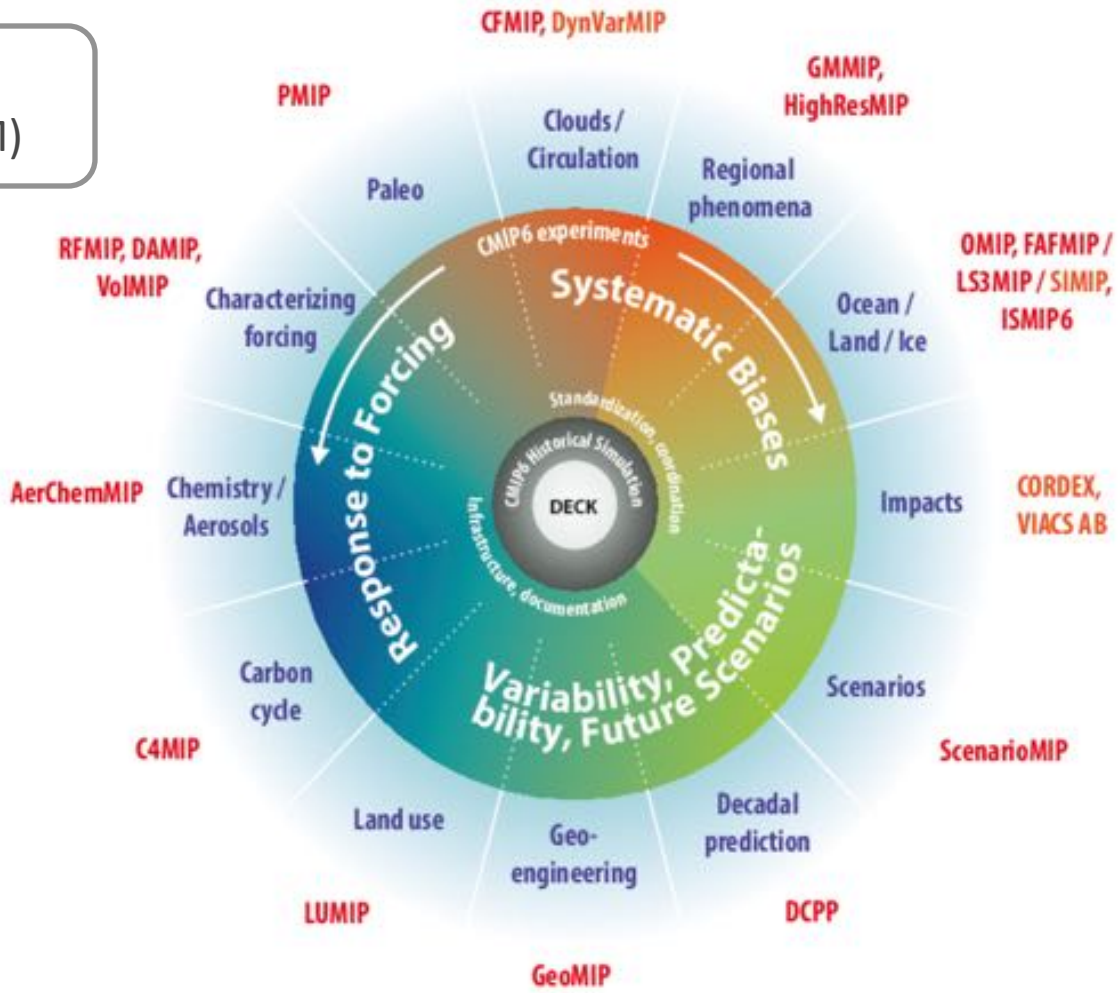
CMIP

Coupled Model Intercomparison Project

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

WMO UNESCO INTERNATIONAL COUNCIL FOR SCIENCE WCRP World Climate Research Programme

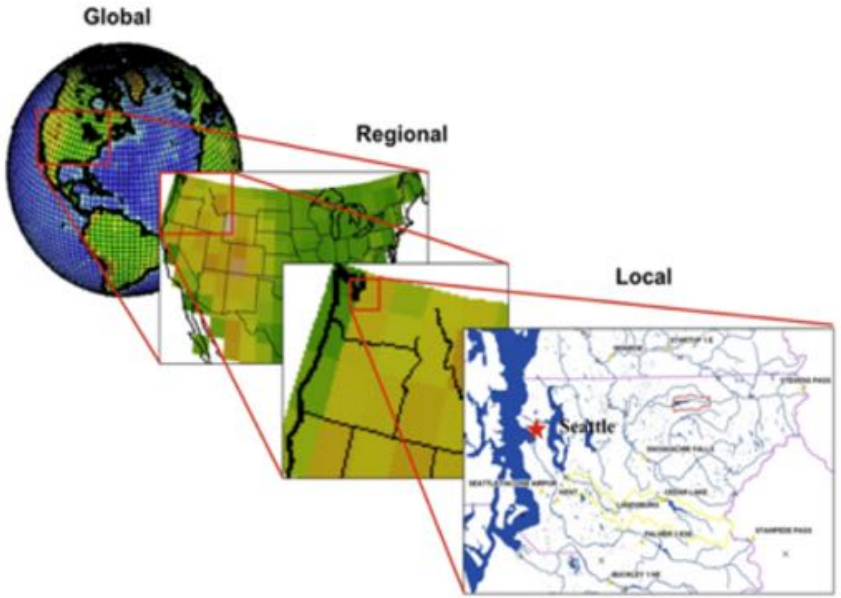
CORDEX

COordinated Regional climate Downscaling Experiment

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



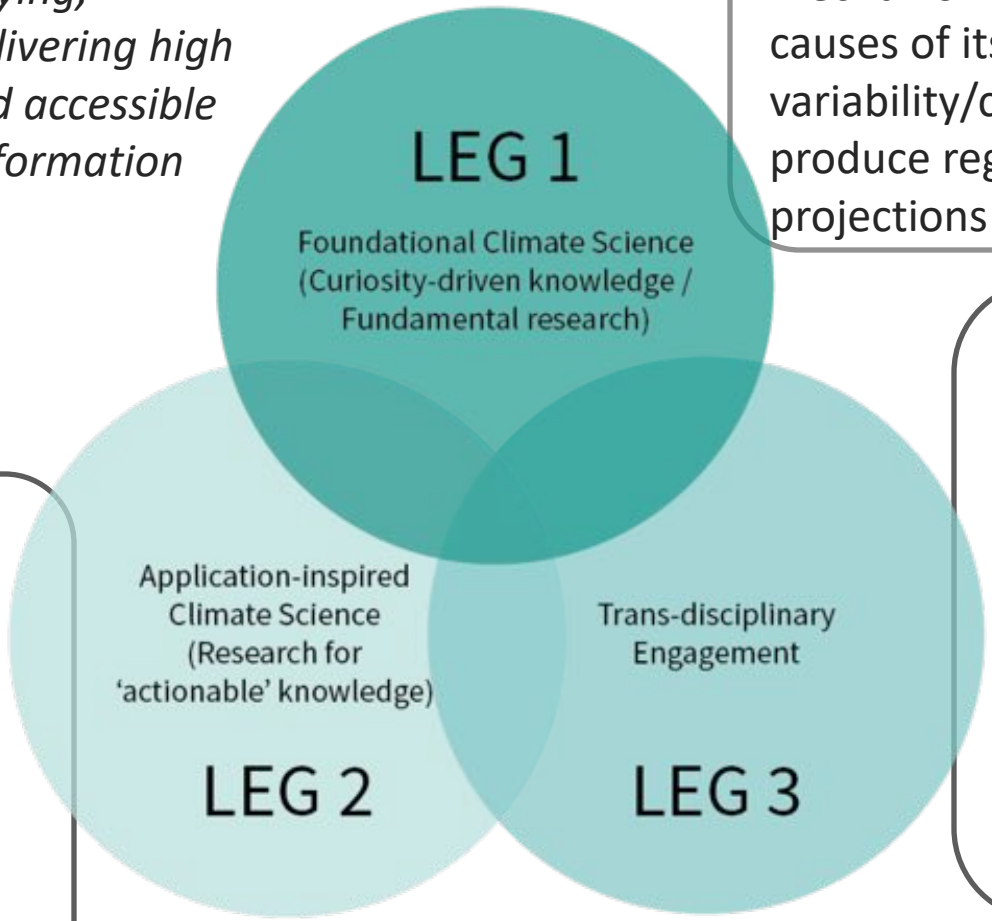
Model downscaling. NCAR dr. Andrew Wood

WCRP's Regional Approach

Climate information for regions

Enhancing the scientific basis to understand regional climate and its changes; identifying, quantifying and delivering high quality, reliable and accessible regional climate information

Leg 1: fundamental science aiming to understand mechanisms of climate and causes of its variability/change, and to produce regional climate projections



Leg 2: research to gain the integrated knowledge or understanding necessary to inform actions and decisions

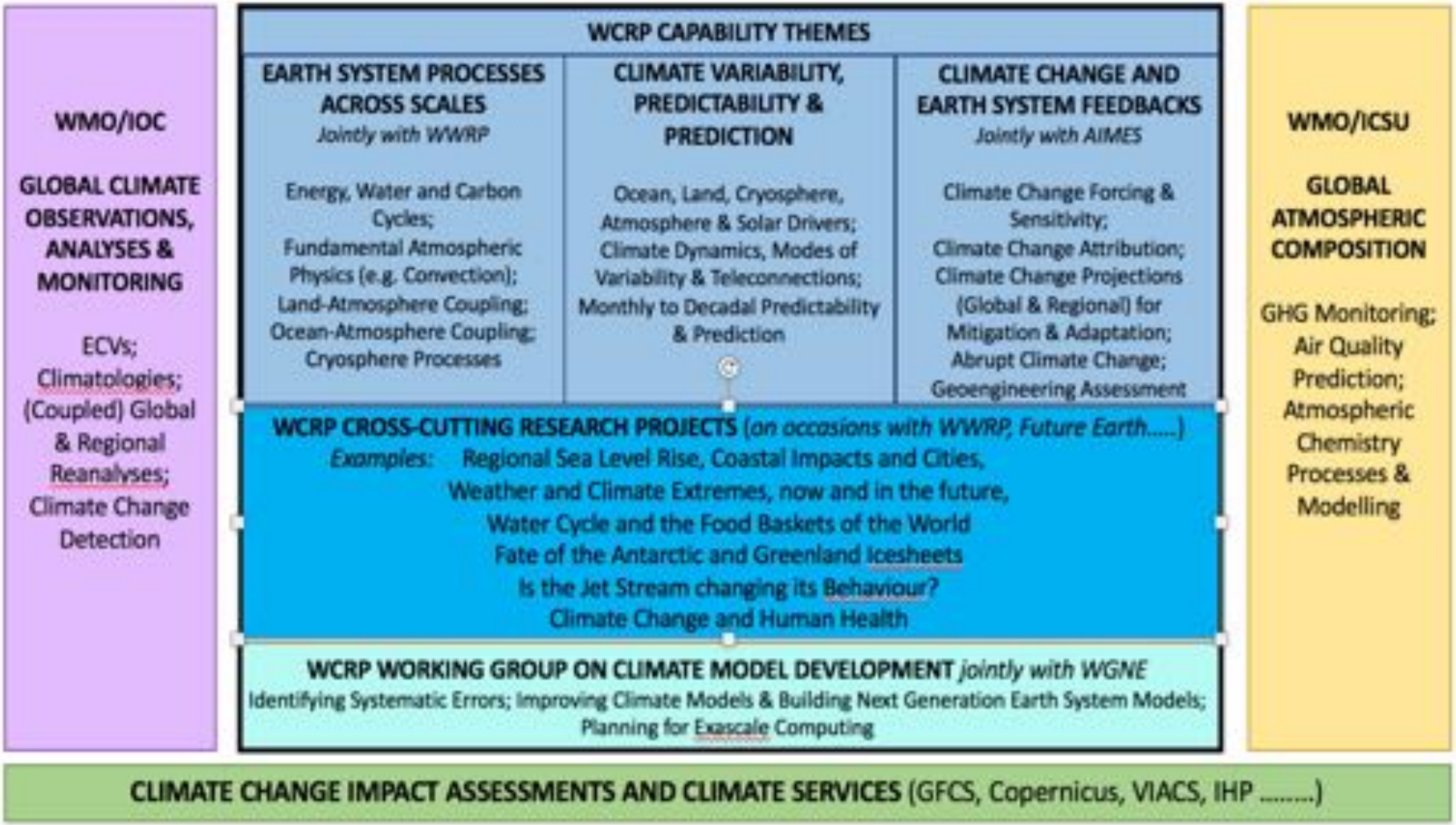
Leg 3: identify user requirements and needs that may guide research directions, and to determine the implication and relevance of climate knowledge derived from Legs 1 and 2 to applications/services.

WMO UNESCO INTERNATIONAL COUNCIL FOR SCIENCE WCRP World Climate Research Programme

Key Recommendations of the Review

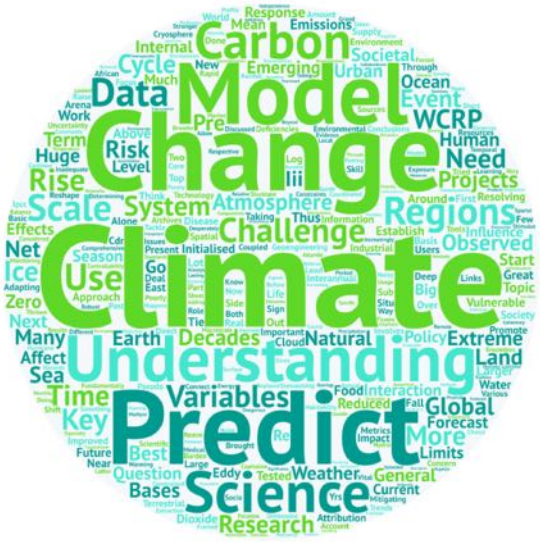
1. Science Strategy and Implementation: key societal needs, international coordination, bedrock science but relevance
2. Governance and the MoU, sponsors board
3. JSC Science Strategy leadership
4. JPS and Operations
5. WCRP structure to support implementation
6. Sponsors' financial support
7. Science for Services
8. Partnerships: WWRP, GAW, GCOS, Future Earth, etc

Key Recommendations of the Review Panel



WCRP Strategic Plan

- WCRP is developing a new Strategic Plan, covering a 10-year time horizon (2019-2028)
- Takes into account the outcomes of the co-sponsors review Importance of bedrock science, seamless approach (time, space, ESM, R-O) and links to services and policy emphasised
- 5-year accompanying Implementation Plan (2019-2023)



WMO | INTERNATIONAL COUNCIL FOR SCIENCE | WCRP World Climate Research Programme

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…**

WCRP Strategic Plan

Timeline

• SWOT Analysis	Sep -Nov 2017
• Writing of Initial Strategic Plan Draft	Nov 2017 - Feb 2018
• WCRP Strategic Plan Writing Retreat, IOC Paris	Feb 2018
• WCRP Community Consultation	March 2018
• JSC-39, Nanjing	Apr 2018
• Public Consultation	1 June – 31 Aug 2018
• Town Hall at AGU to Release the Strategic Plan (TBC)	Dec 2018


https://www.wcrp-climate.org/wcrp-sp-progress

WMO UNESCO INTERNATIONAL COUNCIL FOR SCIENCE WCRP World Climate Research Programme

WCRP SWOT Summary

STRENGTHS
- Active global science community collaborating toward common goals
- Excellent reputation and legitimacy (long history of global leadership) and strong co-sponsor backing
- Global research products
- Participation of leading scientists – strong scientific expertise

WEAKNESSES
- Overly complex structure
- Lack of clarity of focus/vision and boundaries
- Insufficient funding – complex and competitive
- Ineffective communication, successes not well showcased
- Not well connected to National Research Programmes, funding agencies, services etc. – requires global travel
- Reliance on voluntary efforts

OPPORTUNITIES
- Climate important to societal questions, particularly climate change
- Benefits (funding, in kind) associated with closer collaboration with operational agencies, international programs, etc. (stakeholders)
- Leadership needed to capitalize on new technologies
- Many emerging areas of research

THREATS
- Budget cuts and inefficient funding - leading to demotivation of volunteers/community
- Organizations with overlapping or perceived as overlapping mandates
- Fast-changing and reactive political landscape
- Perception that fundamental climate science is 'done' - reduction in support for fundamental science - perceived as irrelevant

26 September to 12 November 2017, 49 responses

WMO UNESCO INTERNATIONAL COUNCIL FOR SCIENCE WCRP World Climate Research Programme

Vision and Mission

- **Vision**

A world that uses relevant and authoritative climate science to ensure a resilient present and future for humankind and the planet.

- **Mission**

The World Climate Research Programme (WCRP) develops, shares and applies climate knowledge that contributes to societal well-being by supporting international climate research.

The Programme, working in partnership with many international initiatives, ensures the implementation of a climate research strategy on observation, analysis and prediction of climate system variability and change from weeks to century time scales and from local to global spatial scales.

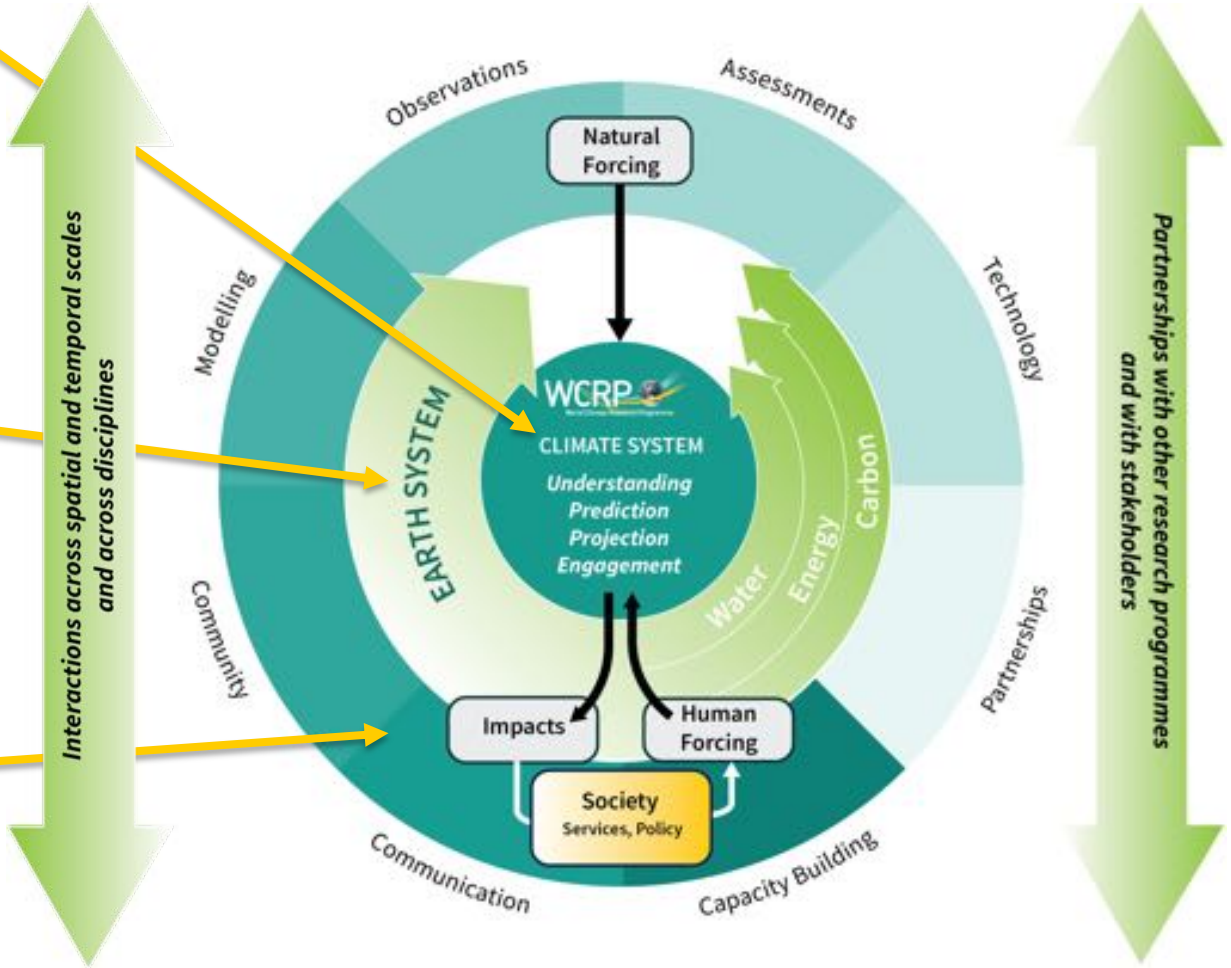
- Change in political landscape (post COP21, etc.) needs to be clarified

WCRP Strategic Plan

Overarching Objectives
Focuses on the far horizon - the scientific research required to address current and future challenges and take advantage of opportunities

Emphases
Highlights the bedrock science that must be supported and nurtured as new communities form and re-form around evolving scientific foci in support of the Objectives

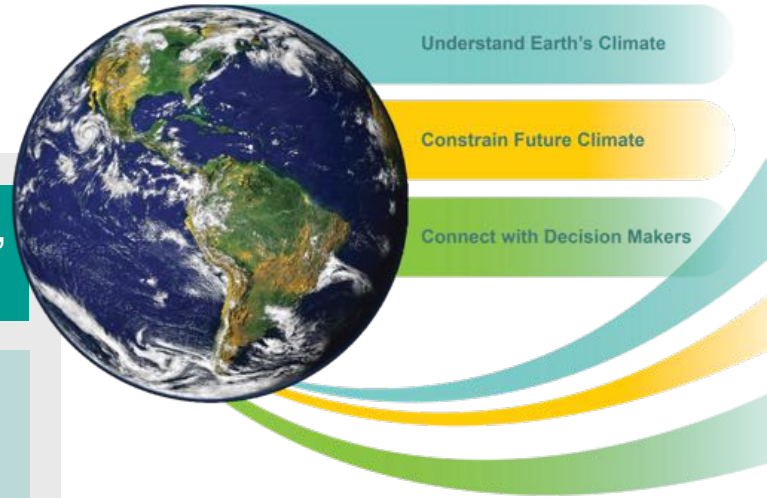
Imperatives
WCRP tools and capabilities, including those focused on technical capacity and those relating to human capacity driven activities



WMO
INTERNATIONAL COUNCIL FOR SCIENCE
WCRP World Climate Research Programme

WCRP Strategic Plan

Overarching Objectives



Processes and Feedbacks to Close the Energy, Water and Carbon Cycles

Improving Predictions and Quantifying Uncertainties

Constraining Projections and Identifying Sensitivities

Connecting Climate Science to Decisions

Bedrock Science (Emphases)

Tools and Capabilities (Imperatives)

Partnerships

WMO

UNESCO

INTERNATIONAL COUNCIL FOR SCIENCE

WCRP World Climate Research Programme

Imperatives

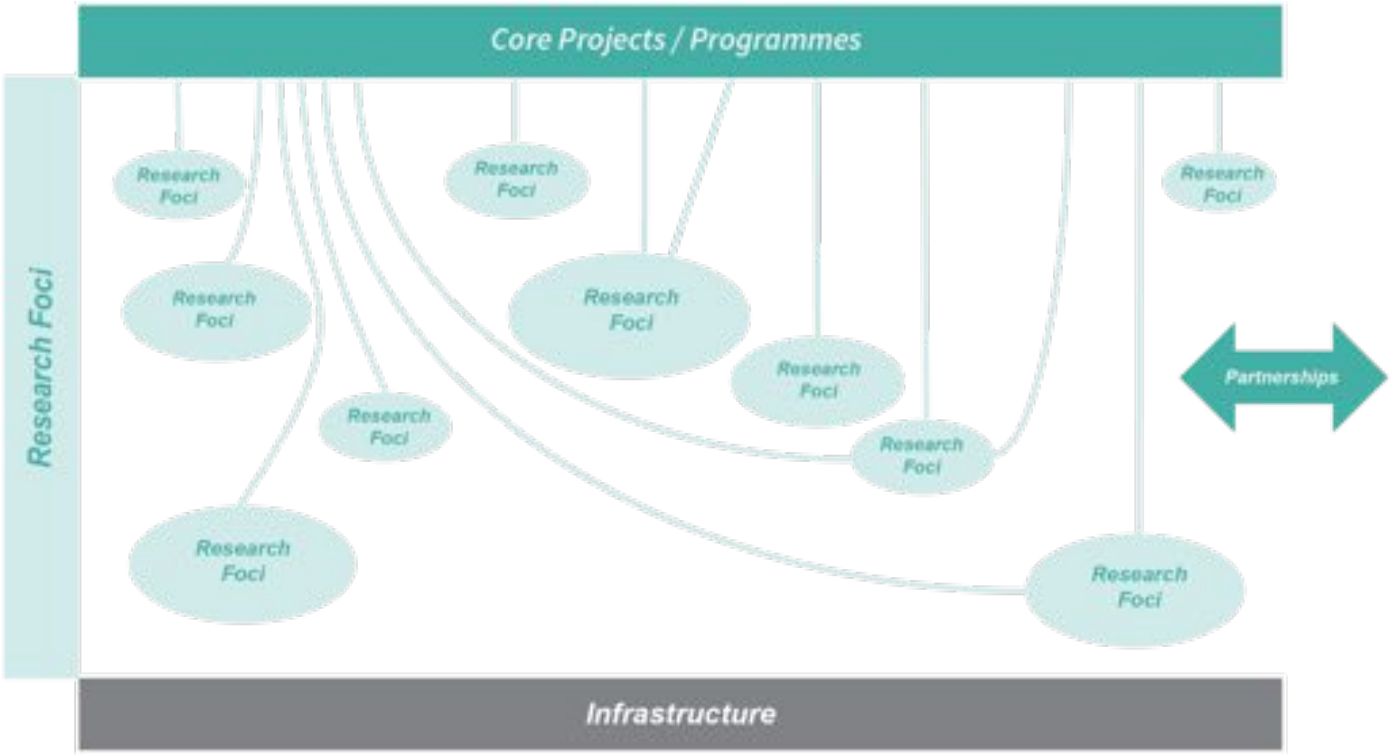
Building the capacity needed to execute globally coordinated climate science

1. Hierarchy of Earth and climate system **models**
2. **Observations** and datasets in support of climate science
3. Timely **assessments** of the state of the climate system
4. Open access, **high-end computing** and **data infrastructure**
5. Supporting a vibrant **climate research community** around the world
6. Communication and **education**
7. Outreach and **societal engagement**
8. Institutional and programmatic **partnerships**

Principles for the Future Structure of WCRP

- Aligned with our strategic plan.
- Allows fast and measurable progress towards our strategic goals.
- Engage scientific community as well as other stakeholders
- Includes “core” (long-term) and more targeted (short-term) aspects.
- Has a clear definition of milestones and deliverables, review mechanisms and known sunsets
- Is open to partnerships , diversity
- Recognizes the need for support (offices, financial)

Schematic of Theoretical Future Structure of WCRP




Thank You
WCRP
World Climate Research Programme
WMO
IOC
ICSU
International Council for Science
www.wcrp-climate.org
You Tube