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Chair WCRP Joint Scientific Committee
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GEWEX Open Science Conference, Banff, Canada
Role of WCRP
Role of WCRP

- MODELLING
- DATA
- OBSERVATIONS
- IMPROVED UNDERSTANDING & PREDICTION
- INFORMATION & SERVICES
- ASSESSMENTS
WCRP Structure

- 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
Grand challenges
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
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

Advancing the science and application of regional climate downscaling, for improved regional climate information
**WCRP’s Regional Approach**

*Climate information for regions*

**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.

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

**EARTH SYSTEM PROCESSES ACROSS SCALES**
- Jointly with WWRP
  - Energy, Water and Carbon Cycles;
  - Fundamental Atmospheric Physics (e.g. Convection);
  - Land-Atmosphere Coupling;
  - Ocean-Atmosphere Coupling;
  - Cryosphere Processes

**CLIMATE VARIABILITY, PREDICTABILITY & PREDICTION**
- Ocean, Land, Cryosphere, Atmosphere & Solar Drivers;
- Climate Dynamics, Modes of Variability & Teleconnections;
- Monthly to Decadal Predictability & Prediction

**CLIMATE CHANGE AND EARTH SYSTEM FEEDBACKS**
- Jointly with AIMES
  - Climate Change Forcing & Sensitivity;
  - Climate Change Attribution;
  - Climate Change Projections (Global & Regional) for Mitigation & Adaptation;
  - Abrupt Climate Change;
  - Geoengineering Assessment

**WCRP CROSS-CUTTING RESEARCH PROJECTS** (on occasions with WWRP, Future Earth.....)
- Regional Sea Level Rise, Coastal Impacts and Cities,
- Weather and Climate Extremes, now and in the future,
- Water Cycle and the Food Baskets of the World
- Fate of the Antarctic and Greenland Icesheets
- Is the Jet Stream changing its Behaviour?
- Climate Change and Human Health

**WCRP WORKING GROUP ON CLIMATE MODEL DEVELOPMENT jointy with WGNE**
- Identifying Systematic Errors; Improving Climate Models & Building Next Generation Earth System Models;
- Planning for Exascale Computing

**CLIMATE CHANGE IMPACT ASSESSMENTS AND CLIMATE SERVICES** (GFCS, Copernicus, VIACS, IHP .........)
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)
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
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
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
**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
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
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