



# WORLD CLIMATE RESEARCH PROGRAMME

*Michel Rixen*  
*WDAC8*  
*20-21 March 2019*  
*Marrakesh, Morocco*

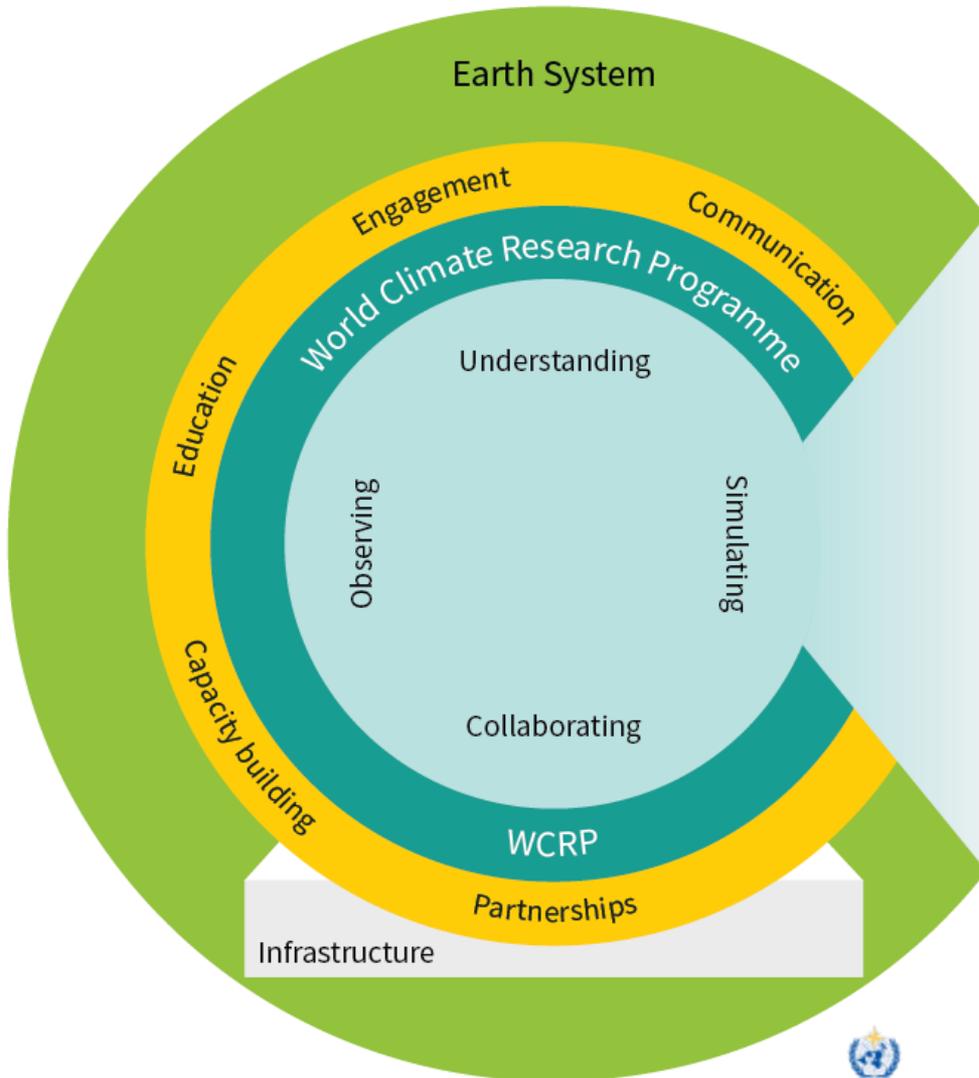


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# WCRP Strategic Plan



## WCRP Overarching Science Objective Themes

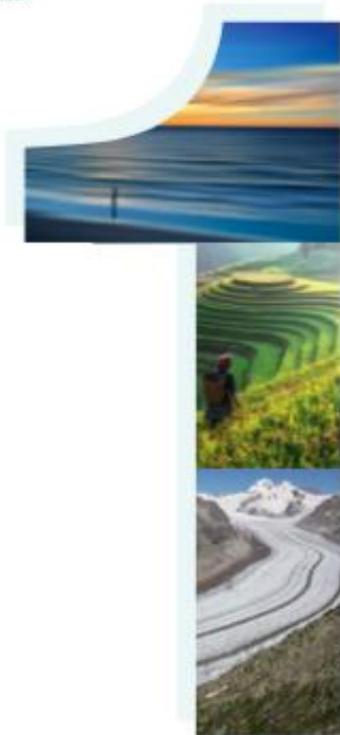
- 1 *Fundamental understanding of the climate system*
- 2 *Prediction of the near-term evolution of the climate system*
- 3 *Future evolution of the climate system*
- 4 *Bridging climate science and society*

Interactions across spatial and temporal scales

# WCRP Strategic Plan

## Objective 1

We need fundamental science to prepare society for unforeseen challenges.



Advancement of sciences that enable an integrated and **fundamental understanding of the climate, its variations and its changes, as part of a coupled** physical, biogeochemical, and socio-economic **system**.

Emphases:

- Climate dynamics: past and future global and regional changes in oceanic and atmospheric circulations
- Reservoirs and flows: radiative, hydrologic, cryospheric and biogeochemical changes on **energy, water, carbon**, and other climate-relevant compounds

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## Objective 2

Understanding predictability in the climate system helps to focus attention on societally relevant outcomes.



Frontiers of **predictions and quantify the associated uncertainties for sub- seasonal to decadal time scales across all climate system components.**

Emphases:

- Simulation capabilities of component systems and their coupling. Deterministic, statistical and machine learning approaches. Data assimilation and ensemble generation
- Predicting extreme events: regional climate hotspots and potential for crossing thresholds. Interactions between fast and slow extremes

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## Objective 3

Quantify the responses, feedbacks and uncertainties intrinsic to the changing climate system on longer timescales.

Emphasis:

- Earth system models. Development and integration. Representation of complex interactions between aquifers, vegetation and soil carbon, between permafrost, glaciers, and ice-sheets. Dynamical and statistical downscaling



# WCRP Strategic Plan

## Objective 4

Innovation in the generation of decision-relevant information and knowledge about the evolving Earth system.

Emphasis:

Interactions with social systems: Social processes and emergent behaviour in the Earth System. Interactions and feedbacks between climatic and socioeconomic systems

Engaging with society: **Actionable climate information, scientific assessments**, educational approaches and public communication strategies.

Climate information presents tremendous opportunities to collaborate with civil society, government and private industry to safeguard lives and valued assets.



# WCRP New Strategy

## Critical Infrastructures

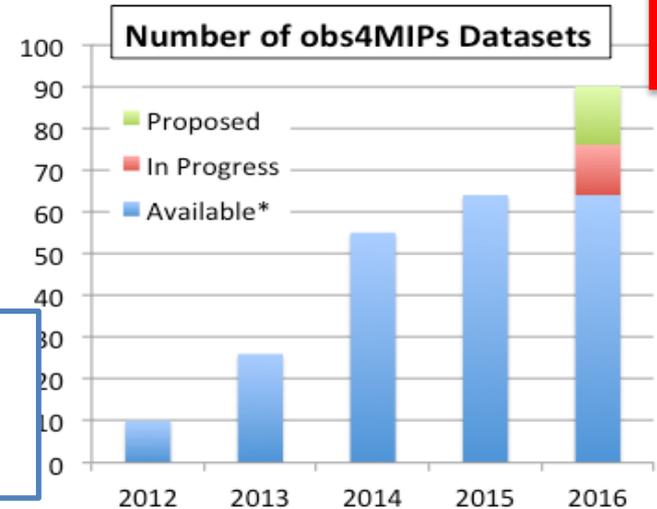
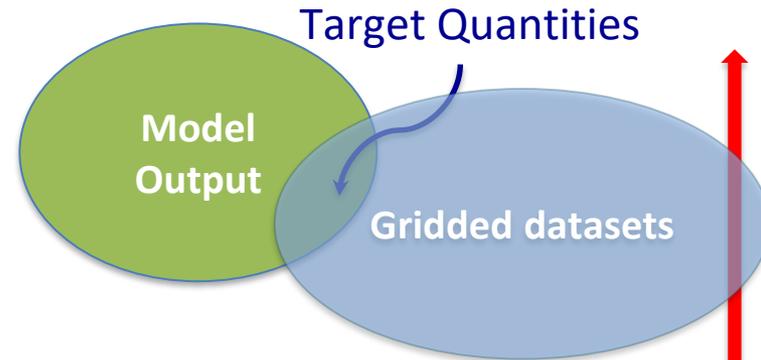
- I. A hierarchy of modeling tools
- II. Observations for process understanding
- III. Sustained reference data
- IV. High-end computing and data management



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- A project for identifying, documenting and disseminating observations for climate model evaluation in WCRP model intercomparisons, notably CMIP.
- Data (and tech notes) accessible with the distributed CMIP model output via ESGF, adhering to same conventions
- Guided by the WCRP Data Advisory Council obs4MIPs Task Team



Complete (~125)

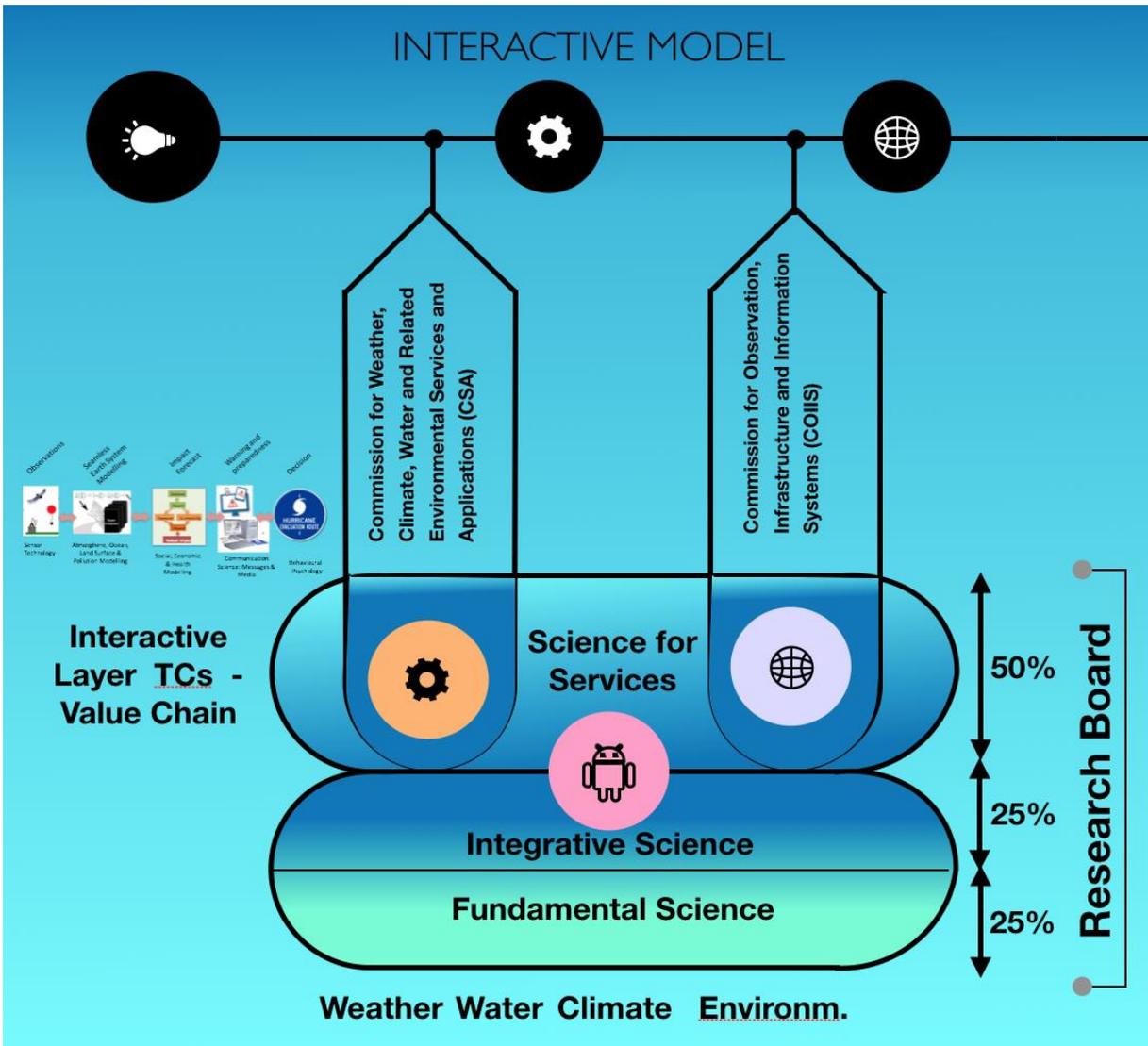
In Progress\* (~15)

Proposals from Data Call (~100)

.... and growing!



# Integration, integration and more... integration



- Infrastructure
- Models
- Time
- Space
- Disciplines
- Communities
- Value cycle
- ...

# WCRP CAPABILITY THEMES

**EARTH SYSTEM  
PROCESSES ACROSS  
SCALES**

*Jointly with WWRP*

**CLIMATE VARIABILITY,  
PREDICTABILITY &  
PREDICTION**

**CLIMATE CHANGE AND  
EARTH SYSTEM  
FEEDBACKS**

*Jointly with AIMES*

**WCRP CROSS-CUTTING RESEARCH PROJECTS**  
*(on occasions with WWRP, Future Earth....)*

**WCRP WORKING GROUP ON CLIMATE MODEL DEVELOPMENT**

*jointly with WGNE*

**WCRP WORKING GROUP ON CLIMATE INFORMATION FOR REGIONS**

*linking with Future Earth*

**WMO/IOC**

**GLOBAL  
CLIMATE  
OBSERVATIONS,  
ANALYSES &  
MONITORING**

*(CCI, GCOS...)*

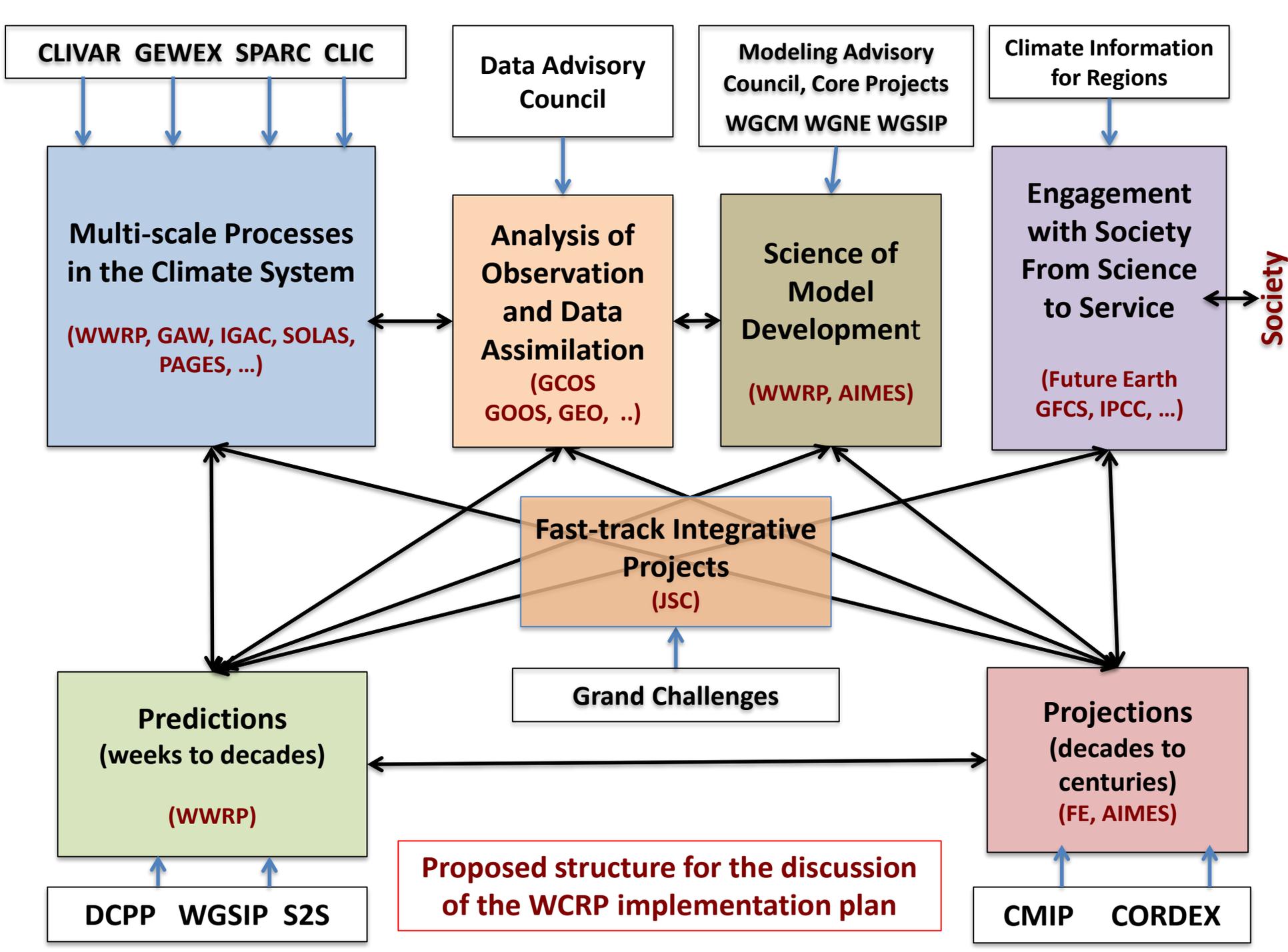
**WMO/ICSU**

**GLOBAL  
ATMOSPHERIC  
COMPOSITION**

GHG Monitoring;  
Air Quality  
Prediction;  
Atmospheric  
Chemistry  
Processes &  
Modelling

*(GAW,  
SPARC,IGAC)*

**CLIMATE CHANGE ASSESSMENTS AND CLIMATE SERVICES (UNFCCC, IPCC, GFCS, Copernicus, VIACS, .....)**



# Timeline

- WDAC8 Marrakesh

Feeding into:

Ro

- Retreat 4-5 May, Geneva: first brainstorm on TP/IP
- JSC40 6-10 May, Geneva: consolidation of inputs into TP/IP
- WMO 18<sup>th</sup> Congress, June'19: reform
- AGU Fall Meeting, 9-13 Dec 2018



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# WCRP – WG Climate

- WDAC as interface

## Focus

- Climate/Earth System
- Past, present and future
- Reservoirs, flows -> budgets, exchanges
- Data assimilation, reanalysis, initial conditions
- Model development, verification
- Data infrastructure, data mining/fusion
- ...



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# World Climate Research Programme Climate Science Week

# 40

# YEARS CLIMATE SCIENCE

## #WCRP40

## AGU Fall Meeting, San Francisco

8-13 December 2019



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[www.wcrp-climate.org/wcrp-agu2019](http://www.wcrp-climate.org/wcrp-agu2019)



# Thank You

[www.wcrp-climate.org](http://www.wcrp-climate.org)

