

Which Year's JSC report is this text from?

WMO, UNEP and ICSU have agreed to organize a joint conference on the climate impact of atmospheric CO₂ to review all aspects of the CO₂ problem and, on this occasion, to issue a second joint assessment of the potential influence of CO₂ (and other trace gases and aerosols) on climate and human activities .

No part of the planet remains uninfluenced by climate change and no climate science remains uninfluenced by WCRP

Vision

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

Eighth World Meteorological Congress in May 1979 formally established WCRP.

Priority areas



Agriculture and food security



Disaster risk reduction



Energy

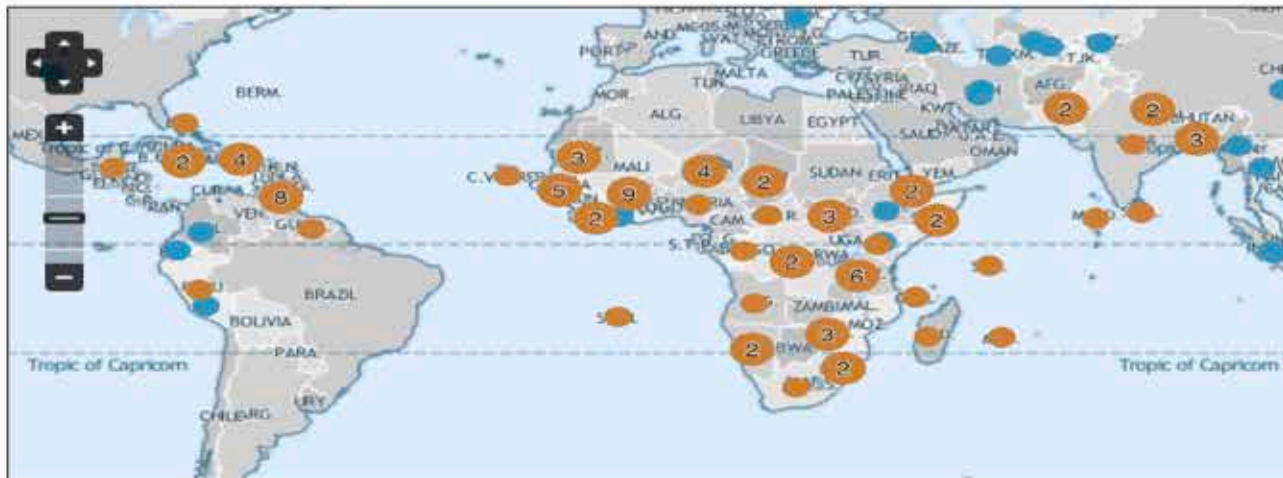


Health



Water

GFCS in action



Disclaimer: The depiction and use of boundaries, geographic names and related data shown on maps and included in lists, tables, documents, and databases on this website are not warranted to be error free nor do they necessarily imply official endorsement or acceptance by the WMO.

What has Worked in terms of Mobilizing Global Science Capacity?

Irrigation Optimization for 8000 farmers

Local forecast by
City, ST or ZIP code

Go

[Location Help](#)

A November Arctic Blast

An early blast of cold arctic air will consume much of the eastern two-thirds of the U.S. over the next few days, making it feel like the middle of winter. Numerous record lows and record low maximum temperatures are expected through Wednesday, as temperatures average 20 to 30 degrees below normal. [Read More >](#)



NOAA



UOG/WERI

University of
Hawai'i
MĀNOA

UH/SOEST

The Pacific ENSO Applications Climate (**PEAC**) Center was established in August 1994 and transitioned to Pacific ENSO Applications Climate (**PEAC**) Services in 2019 as a multi-institutional partnership, to conduct research and produce information products on climate variability related to the El Niño - Southern Oscillation (ENSO) climate cycle in the U.S.-Affiliated Pacific Islands ([USAPI](#)). PEAC's first collaborators were the National Oceanic and Atmospheric Administration - Office of Global Programs ([NOAA/OGP](#)), NOAA National Weather Service - Pacific Region ([NWS-PR](#)), the University of Hawaii - School of Ocean and Earth Science and Technology [UH/SOEST](#), the University of Guam - Water and Environmental Research Institute ([UOG/WERI](#)), and the Pacific Basin Development Council ([PDBC](#)). While OGP and PDBC are no longer involved, PEAC now has additional partnerships with the NOAA Climate Program Office ([NOAA/CPO](#)), the NOAA Climate Prediction Center ([NOAA/CPC](#)), and the International Research Institute for Climate and Society at Columbia University ([IRI](#)).

The MISSION of Pacific ENSO Applications Climate Services is to produce information products specific to the USAPI on the ENSO climate cycle, its historical impacts, and latest long-term forecasts of ENSO conditions, in support of planning and management activities in such climate-sensitive sectors as water resource management, fisheries, agriculture, civil defense, public utilities, coastal zone management, and other economic and environmental sectors of importance to the communities of the USAPI. The functions of the individual institutions comprising the PEAC are depicted in the [project organization chart](#).



X close

We provide authoritative information about the past, present and future climate, as well as tools to enable climate change mitigation and adaptation strategies by policy makers and businesses.

Key products and services



Climate bulletins



Climate Data Store



Data in action

Projects participating in the S2S Real Time Pilot Initiative:

Project ID No.	Name	Project Focus	Sector	User Partners
1	Sea Ice Prediction Network Phase 2	Improve understanding of Arctic sea ice and predictability	Agriculture, Forestry & Fishing Sector	Modelling centres; Shipping industry; Resource management; Defence; Marine mammal subsistence hunting
2	Monthly Climate Outlooks	To provide sub-seasonal to seasonal forecasts of temperature and precipitation extremes for DFID priority regions in Africa and South Asia (covering about 50 developing countries)	Humanitarian Sector	DFID humanitarian advisors and crisis anticipation advisors in the humanitarian sector (e.g., Start Network).
3	Experimental Subseasonal Forecasting of Atmospheric Rivers along the US West Coast	Provide probabilistic forecasts of atmospheric river occurrence at week-2 (8-day to 14-day) and week-3 (15-day to 21-day) lead over the Western U.S./North Pacific	Water Sector	California Department of Water Resources
4	ForPac: Towards Forecast-based Preparedness Action	ForPac aims towards more anticipatory Early Warning Systems for Flood and Drought Risk in Kenya, through improved S2S hazard forecasts and systematic approaches to the use of forecasts to trigger early actions.	Disaster Risk Management & Humanitarian Sector	Kenya National Drought Management Authority, Kenya Red Cross Society, Kenya Met Dept, ICPAC.
5	Asia Regional Resilience to a Changing Climate (ARRCC)	Applied science for end user application. Regional programme recognising the need for trans boundary delivery, with specific focus on 4 countries - Afghanistan, Bangladesh, Pakistan and Nepal.	DRR (Early Warning) & Agriculture, Forestry & Fishing Sector	ARRCC, Met Office Partnership (MOP) programme and RIMES, user partners to be finalised.
6	Navy Earth System Prediction Capability	Determining how to best utilize S2S model forecasts in a potential future operational Navy subseasonal TC prediction capability.	Defence Sector	Naval Research Laboratory; Joint Typhoon Warning Center
7	Digiscape	We are building platform technology that will allow us to take any seasonal climate forecast and use it to force an agricultural model such as for growing grains or pasture to provide real time forecasts.	Agriculture, Forestry & Fishing Sector	CSIRO Agriculture and Food stakeholder network
8	S2S4E Sub-seasonal to seasonal climate forecasting for energy	S2S4E (H2020 project) offers an innovative service to improve renewable energy (RE) variability management by developing new research methods exploring the frontiers of weather conditions for future weeks and months. The main output of S2S4E is a user co-designed Decision Support Tool (DST) https://s2s4e-dst.bsc.es/#/ that for the first time integrates sub-seasonal to seasonal (S2S) climate predictions with RE production and electricity demand.	Energy Sector	Energy producers: EDP Renovaveis, EnBW Energie Baden- Wurttemberg and Électricité de France.
9	GCRF-African SWIFT	Development and provision of improved, reliable, and actionable forecasts and early warning across eastern and western sub-Saharan Africa.	DRR (Early Warning); Agriculture, Energy & Water Sector	Spectrum of African user agencies identified by NMSs in agriculture, water, energy & health



Trans-disciplinary Research Oriented Pedagogy for Improving Climate Studies and Understanding (TROP ICSU). www.tropicsu.org

- ❖ **Resources designed to integrate climate science with core curriculum of high school and undergraduate college syllabi across the world**
- ❖ **How to enhance learning through location & language specific examples**
- ❖ **Lesson plans that integrate topics in the **Biological Sciences, Chemistry, Earth Sciences, Economics, Environmental Sciences, Geography, Humanities, Mathematics, Physics, Social Sciences, and Statistics** with climate-related topics**

TROP ICSU WORKSHOPS WITH TEACHERS ACROSS THE WORLD

Delhi, India: October 2018, Kampala, Uganda: November 2018, Thimphu, Bhutan: February 2019, Pretoria, South Africa: April 2019, Cairo, Egypt: April 2019, Tirupati, India: April 2019, Melbourne, Australia: May 2019, Adelaide, Australia: May 2019, Orsay, France: June 2019, Pune, India: June 2019, Beijing, China: June 2019



**International
Science Council**



Partners

- International Union of Biological Sciences IUBS
- International Union for Quaternary Research INQUA
- International Union of Soil Sciences IUSS
- International Mathematical Union IMU
- International Union of Geological Sciences IUGS
- International Union of Geodesy and Geophysics IUGG
- International Union of History and Philosophy of Science Technology IUHPST
- International Union of Forest Research Organizations IUFRO
- African Union of Conservationists AUC
- IMAGINARY
- Committee on Data for Science and Technology CODATA
- International Council for Science- Regional Office for Africa



- National academies of Australia, India, Mongolia, South Africa, Ecuador & Egypt
- World Climate Research Programme (WCRP)
- World Meteorological Organization (WMO)
- UN CC Learn

Mobilizing Global Climate Science Capacity

The World Climate Research Programme (WCRP) mission is to facilitate the analysis and prediction of **Earth system variability and change** for use in an increasing range of practical applications of direct relevance, benefit and value to society.

The two overarching objectives of the WCRP are:

to determine the predictability of climate;

and

to determine the effect of human activities on climate (assessing and attributing)

WCRP provides an international framework that:

- ❑ Generates major international scientific initiatives in the area of climate science and observation;
- ❑ Enables priority setting through an internationally-agreed agenda;
- ❑ Facilitates efficient and effective sharing of, and access to, resources, including computer resources and data;
- ❑ Stimulates and supports scientific networking;
- ❑ Develops common methodologies and experimental protocols for observations and modelling;
- ❑ Synthesizes and integrates individual research project results;
- ❑ Acts as a knowledge-base and think-tank for climate and global change assessments;
- ❑ Organizes relevant data and information management, and model intercomparisons.

The current Grand Challenges are:

- Melting Ice and Global Consequences
- Clouds, Circulation and Climate Sensitivity
- Carbon Feedbacks in the Climate System
- Weather and Climate Extremes
- Water for the Food Baskets of the World
- Regional Sea-Level Change and Coastal Impacts
- Near-term Climate Prediction

Unifying Themes

- ❖ Modeling – WGCM, WGSIP, CMIP, WGNE, S2S, DCP
- ❖ Observations and Analysis
- ❖ Education and Capacity Development
- ❖ Regional Climate

Core Projects



WCRP Major Project



**Co-Sponsored Projects:
SOLAS, IMBER,.....**

Not Holistic Enough?



Major scientific initiatives and results

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Regional climate studies

p. 26



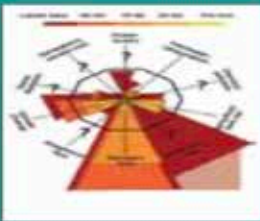
Analysis of climate system observations

p. 34



Contributions of WCRP Core Projects

p. 40



Climate information for decision-makers

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Capacity development

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Partnerships are key to success

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Future plan and priorities

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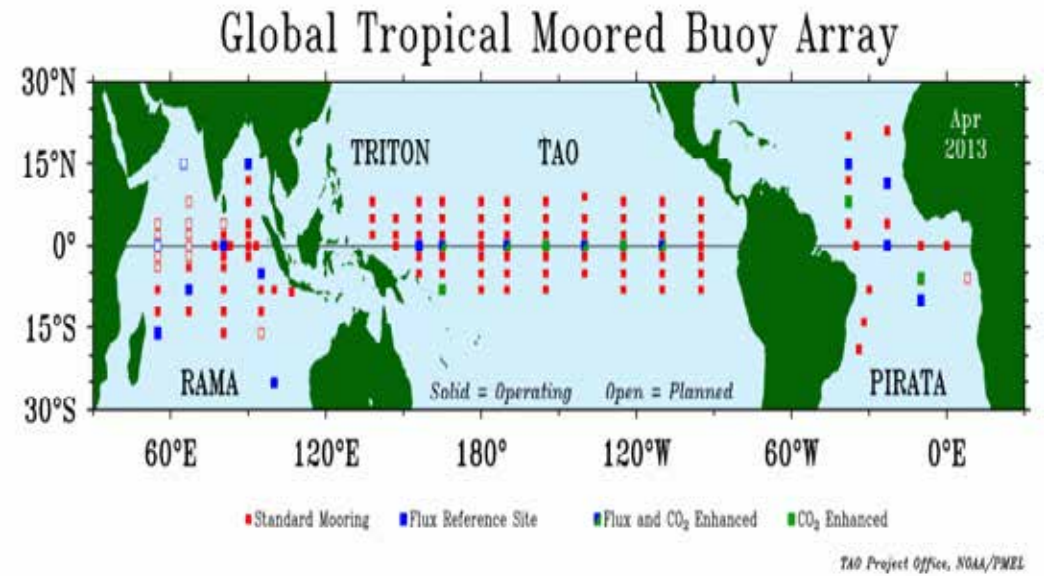
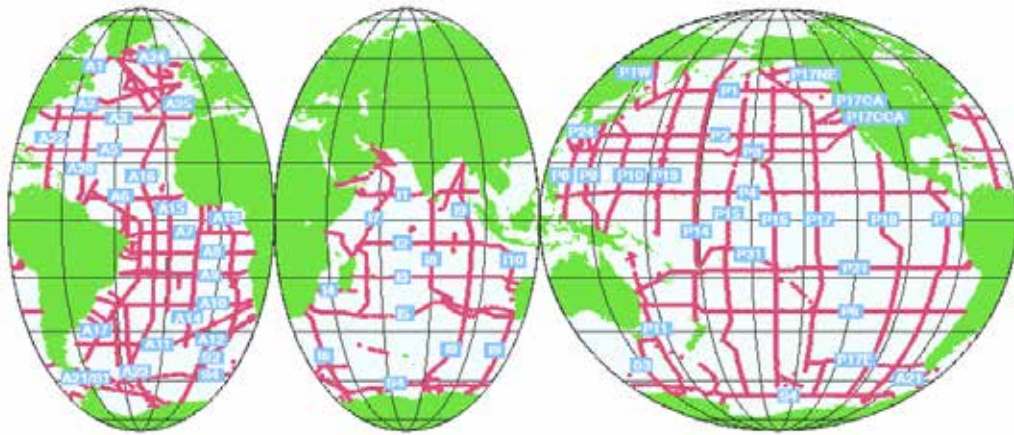
WCRP Accomplishment Report 2012

Asrar and
Busalacchi

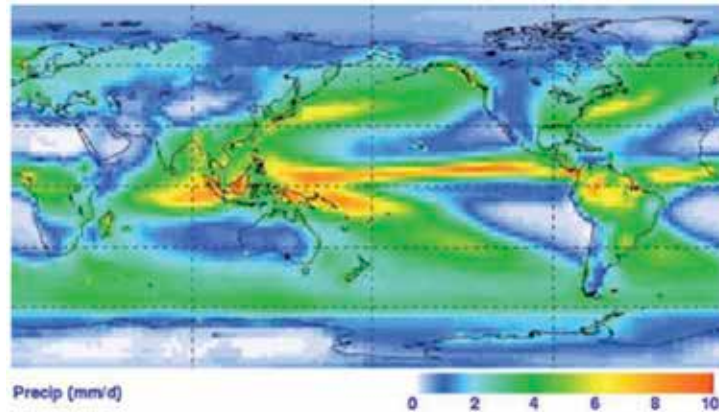
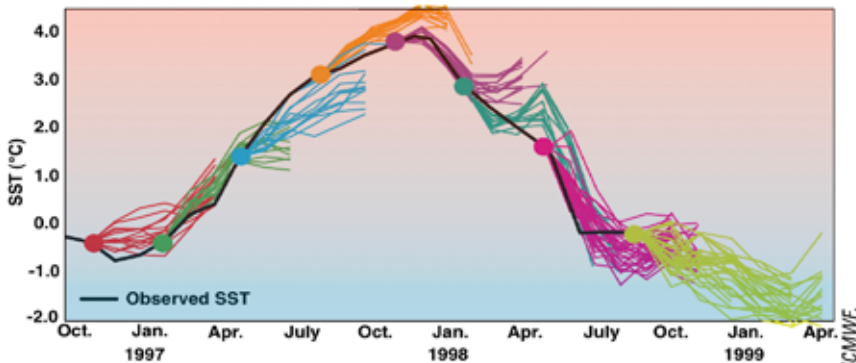
Major Scientific Initiatives

- ✓ **Improving Climate Predictions and Projections**
- ✓ **Attribution and Prediction of Climate Extremes**
- ✓ **Regional Sea Level Variability and Change**
- ✓ **Seasonal-to-Interannual Climate Prediction**
- ✓ **Decadal Climate Predictability**
- ✓ **Atmospheric Chemistry and Climate**
- ✓ **Monsoon Research and Prediction**

WCRP Brand name: Science Agenda Across the Globe



El Niño 1997/1998
Seasonal predictions



**VACS, VAMOS,
PACS, YOTC,
GCOS/GOOS,
CLIVAR, GODAE,
MAHASRI, AMY,
Asia CliC,**

Contributions of Core Projects

- CLIVAR: Epitome of Global Participation with Region-Specific Science Questions and Data Efforts in the Context of Global Climate
- GEWEX: Precipitation, Water, Extremes
- SPARC: Trace Gases, Aerosols, Geoengineering

Facilitating Partnerships

- Earth System Science Partnership – IGBP, IHDP, DIVERSITAS; GCP, CCAFS
- Global Framework for Climate Services
- Oceans and Social Needs – OceanObs 2009, 2019
- Weather, Climate, and Environmental Prediction –Seamless
- Future Earth

Regional Climate Studies

- CORDEX
- AMMA
- LPB – La Plata Basin Experiment
- MedCLIVAR
- HyMeX – Hydrological Cycle in the Mediterranean
- NEESPI – Northern Eurasian Earth Science Partnership Initiative
- BALTEX
- MDB – Murray Darling Basin

CMIP to Global Warming Targets – Temperature, Carbon – Translation to Regional Targets; Fundamental Research for Resilience, Adaptation and Mitigation

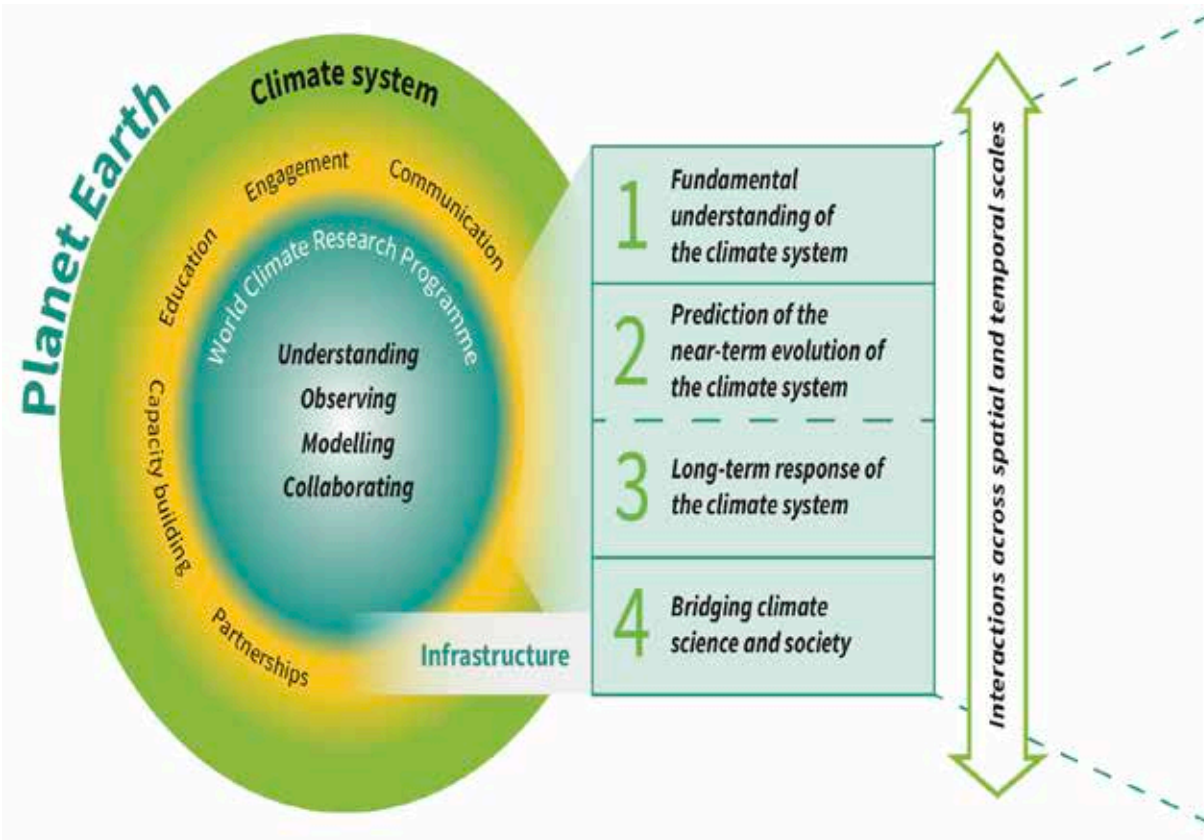
Climate Information for Decision-Makers

- ❖ Climate Assessments
- ❖ Ozone Assessments
- ❖ Cryosphere Assessments in the Arctic
- ❖ GEO- 5: UNEP's Environmental Outlook

Capacity Development

- Supporting Climate Risk Management in the Greater Horn of Africa
- CORDEX Africa and Asia
- Training Activities

Strategic Plan 2019-2028: Four Scientific Objectives



Emphases:

- **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

WCRP Scientific Objectives

1

Fundamental understanding of the climate system

We will support and facilitate the 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.

2

Prediction of the near-term evolution of the climate system

We will push the frontiers of predictions and quantify the associated uncertainties for sub-seasonal to decadal time scales across all climate system components.

3

Long-term response of the climate system

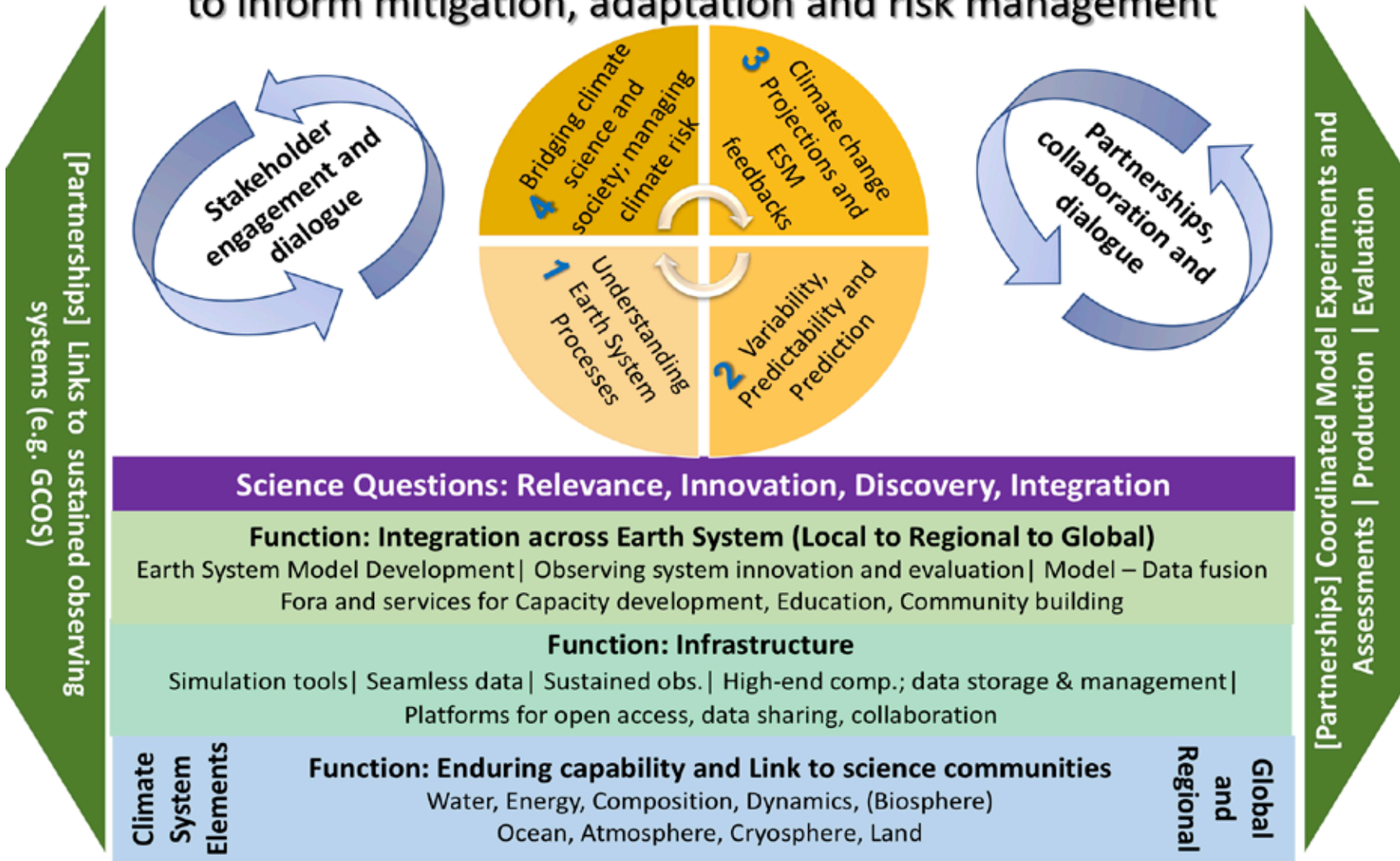
We will quantify the responses, feedbacks, and uncertainties intrinsic to the changing climate system on longer (decadal to centennial) timescales.

4

Bridging climate science and society

We will support innovation in the generation of decision-relevant information and knowledge about the evolving Earth system.

WCRP Mission: Societally-relevant knowledge and information to inform mitigation, adaptation and risk management



WCRP CAPABILITY THEMES

EARTH SYSTEM PROCESSES ACROSS SCALES JOINTLY WITH WWRP

- Energy, Water & Carbon Cycles
- Fundamental Atmospheric Physics (e.g. Convection)
- Land Surface Processes and Land Atmosphere Coupling
- Ocean Processes and Ocean Atmosphere Coupling
- Cryosphere Processes

CLIMATE VARIABILITY, PREDICTABILITY AND PREDICTION

- Ocean, Land, Cryosphere, Atmosphere and Solar Drivers
- Climate Dynamics, Modes of Variability and Teleconnections
- Monthly to Decadal Predictability and Prediction

CLIMATE CHANGE AND EARTH SYSTEM FEEDBACKS JOINTLY WITH AIMES

- Climate Change Forcing and Sensitivity
- Climate Change Attribution
- Climate Change Projections (Global and Regional) for Mitigation and Adaption
- Abrupt Climate Change
- Geoengineering Assessment

WCRP CROSS-CUTTING RESEARCH PROJECTS (ON OCCASIONS WITH WWRP, FUTURE EARTH ...)

Examples: 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 Behavior? // Climate Change and Human Health

WCRP WORKING GROUP ON CLIMATE MODEL DEVELOPMENT JOINTLY WITH WGNE

Identifying Systematic Errors // Improving Climate Models & Building Next Generation Earth System Models // Planning for Exascale Computing

WCRP WORKING GROUP ON CLIMATE INFORMATION FOR REGIONS LINKING WITH FUTURE EARTH

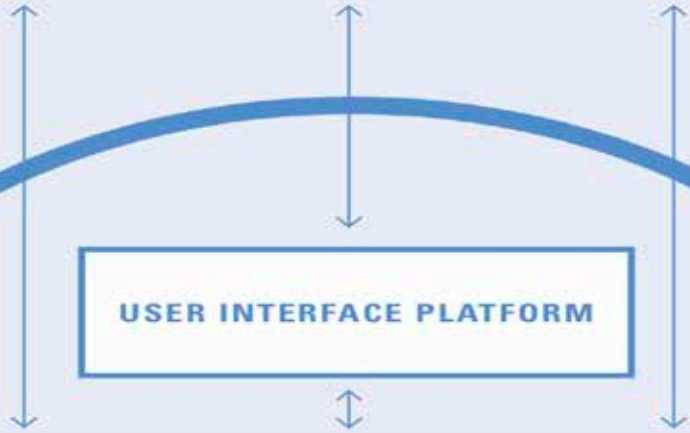
Regional downscaling methods // Application-inspired Climate Science // Transdisciplinary Engagement

WMO/ICSU: GLOBAL ATMOSPHERIC COMPOSITION
 GHG Monitoring // Air Quality Prediction // Atmospheric Chemistry Processes & Modelling

WMO/IOC: GLOBAL CLIMATE OBSERVATIONS, ANALYSES & MONITORING
 ECVs // Climatologies // (Coupled) Global & Regional Reanalyses // Climate Change Detection

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

USERS
Governments, private sector, research, agriculture, water, health, disaster reduction, energy, environment, construction, tourism, transport, etc.



USER INTERFACE PLATFORM

CLIMATE SERVICES INFORMATION SYSTEM

OBSERVATIONS AND MONITORING

**RESEARCH, MODEL-
LING AND PREDICTION**



CAPACITY DEVELOPMENT

**What is WCRP's Role?
Research Arm?
Funding?**