

# ABOUT WATER, ENERGY, & CLIMATE



*Global Energy and Water EXchanges*  
*A Core Project of the*  
*World Climate Research Programme*

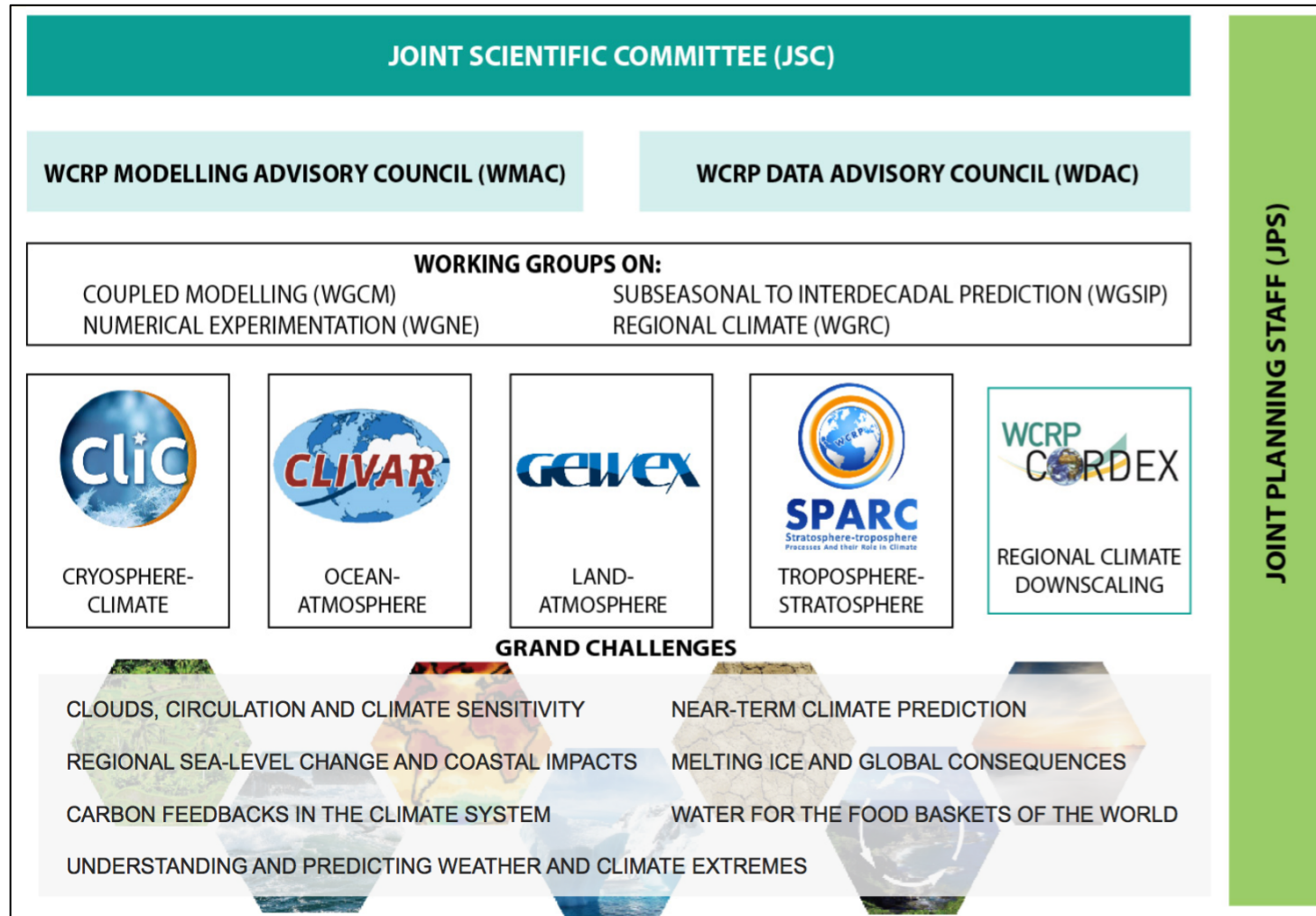
# ABOUT WATER, ENERGY, & CLIMATE

## GEWEX

We as a community part of the World Climate Research Programme initiate, stimulate, facilitate and foster international research collaboration on energy and water cycle related processes in climate and weather science







## CURRENT WCRP STRUCTURE

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**

## ICSU-WMO-IOC Review recommendations (*partial*)

### 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 Strategic Plan 2019-2029 (Draft)

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

### *Future evolution of the climate system*

*We will quantify the responses, feedbacks and uncertainties intrinsic to the changing climate system on longer 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.*

## The GEWEX Approach is

An integrated approach to quantify links between energy & water and critical Earth System feedbacks that result. The approach involves:

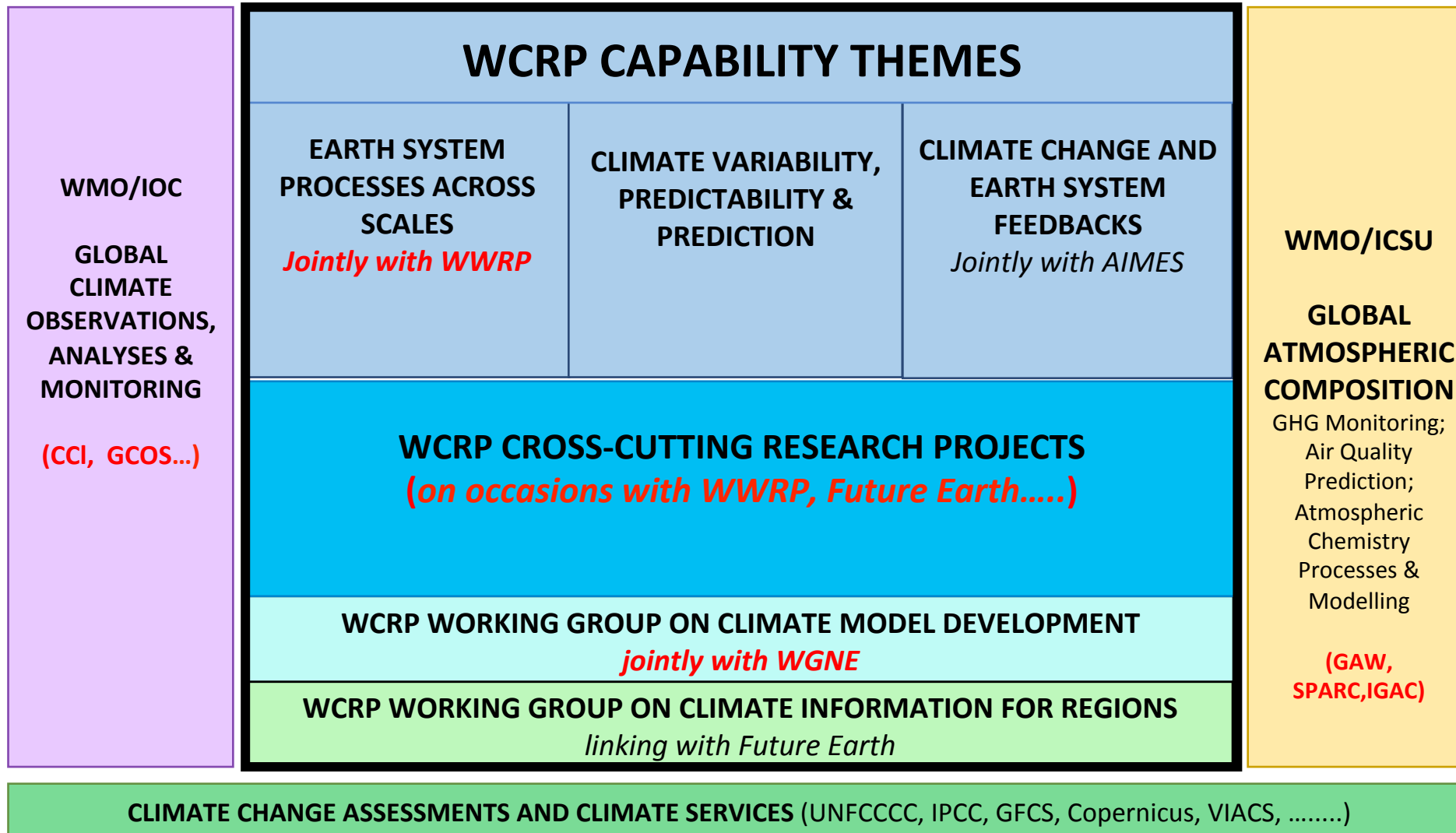
- Stewardship of observations, observing system assessment & definition



- Advance process understanding fundamental to hydrological & hydrometeorological apps and to climate change



- Promote improvement in global, regional and process level modeling, in obs analysis and observing system definition



## Two Big Science Questions that motivate GEWEX & we are encroaching more & more onto a third

- ❑ *Where does the heat go?*
- ❑ *How is the fresh water on the planet changing?*
- ❑ *Where does the carbon go?*

3 fundamental  
'reservoir'  
questions

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- ❑ *How is the fresh water on the planet changing?*
- ❑ *Where does the carbon go?*
- ❑ *How does the weather change with climate?*
- ❑ *How does climate influence the habitability of the Earth and its regions?*

3 fundamental  
'reservoir'  
questions

Seamlessness, basic  
weather system  
research and Earth  
system predictability  
and prediction all  
intimately tied to  
circulation

*from 'Climate research must sharpen its view'*

## WMO New Strategy

- Effectiveness and efficiency
- **Seamless integrated approach (spatial, temporal):**
  - **Earth System approach**
  - **WMO acting as one**
- Wider engagement of Members & national experts
- Agility to uptake new challenges and tasks
- Improved collaboration with partners



# Thank You