#### ABOUT WATER, ENERGY, & CLIMATE

### Global Energy and Water EXchanges



#### co-chair report

- A primer on GEWEX 2020 strategy
- Panels
- **PROES**
- Review of Meetings- 2018 GEWEX OSC





#### REVIEW OF THE WORLD CLIMATE RESEARCH PROGRAMME (WCRP)

To what extent can climate be predicted? Can we quantify the extent of human influence on climate? Excerpts:

Moreover, the Panel is adamant that the core, underpinning climate science which WCRP delivers is needed more than ever, as society seeks solutions to climate change (Paris Agreement), to resilience to disasters (Sendai Agreement), and to sustainable development for the planet (UN Sustainable Development Goals).

Without a strong foundation in climate science and prediction, none of these challenges can be addressed in a robust, costeffective and durable way. However, the Panel is very clear that it is not the role of WCRP to deliver the end products and services, but that it should provide the bedrock knowledge, based on which these can be developed.

Since its inception, the key strength of WCRP has been its focus on cutting-edge physical climate science where international coordination enables scientific advances that would not happen otherwise. This must continue to be its focus....

The Panel stressed that if WCRP does not continue to provide clear leadership, there is a danger of losing the engagement of the scientific community and its funders.



# A proposed WCRP structure

EARTH SYSTEM PROCESSES Across scales Jointly with wwrp	CLIMATE VA RIA BILITY, PREDICTA BILITY AND PREDICTION	CLIMATE CHANGE AND EARTH System Feedbacks Jointly with Aimes	
<ul> <li>Energy, Water &amp; Carbon Cycles</li> <li>Fundamental Atmospheric Physics (e.g. Convection)</li> <li>Land Surface Processes and Land Atmosphere Coupling</li> <li>Ocean Processes and Ocean Atmosphere Coupling</li> <li>Cryosphere Processes</li> </ul>	<ul> <li>Ocean, Land, Cryosphere, Atmosphere and Solar Drivers</li> <li>Climate Dynamics, Modes of Variability and Teleconnections</li> <li>Monthly to Decadal Predictability and Prediction</li> </ul>	-Climate Change Forcing and Sensitivity -Climate Change Attribution -Climate Change Projections (Global and Regional) for Mitigation and Adaption -Abrupt Climate Change -Geoengineering Assessment	
Examples: Regional Sea Level Rise// C	CH PROJECTS (ON OCCASIONS WIT oastal Impacts and Cities // Weather and ( he World // Fate of the Antarctic and Gree uge and Human Health	limate Extremes, now and in the future //	
Examples: Regional Sea Level Rise// C Water Cycle and the Food Baskets of t changing its Behavior? // Climate Chan WCRP WORK ING GROUP ON CLIN JOINTLY WITH WGNE	oastal Impacts and Cities // Weather and C he World // Fate of the Antarctic and Gree Ige and Human Health	Uimate Extremes, now and in the future // nland Icesheets // Isthe Jet Stream	

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

#### 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

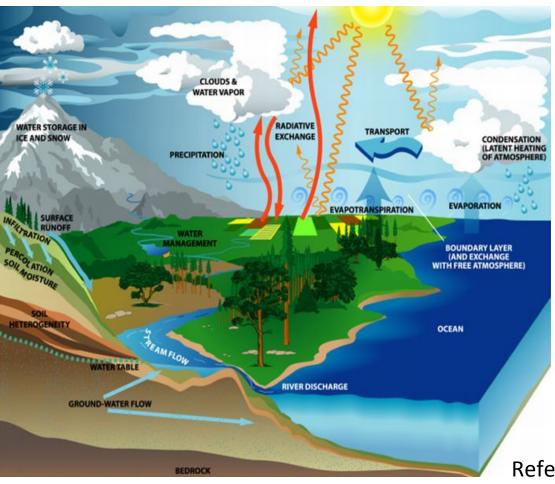


- Advance process understanding fundamental to hydrological applications and to climate change
- Promote improvement in global, regional and process level modeling,

JSC-39, Nanjing, April 2018



The GEWEX fundamentally addresses its goals framed around the activity of its four main core projects and cross-cut projects (like PROES)



GASS: Global Atmospheric System study

GLASS: Global Land System Study

### GDAP: GEWEX Data Analysis Panel

### GHP: GEWEX Hydroclimatology Panel

Refer to Panel co-chair reports for highlight



The GEWEX approach to supporting foundational/ bedrock science is based on process-level science

A unique GEWEX initiative - PROES

The PROES initiative grew out of the obs4mip meeting where it was clear alternative ways of promoting observations were needed. PROES seeks to push use of observations in a less traditional and less rigid model format to probe process understanding. PROES is a bottom-up effort and the projects vary in size, scope and approach



### **Existing PROES activities under GASS:**

1) GEWEX Process Evaluation Study on Upper Tropospheric Clouds and Convection (UTCC PROES)-Stubenrauch

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2) GEWEX Aerosol-Precipitation (GAP) van den Heever/ Stier (& works closely with ACPC)

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re=10-15µm: Over Ocean

Models underpredict cf observations: Range in aerosol response smaller than differences due to the microphysics and/or other model physics

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3) Warm rain process study – Suzuki UofTokyo , and 6 modeling centers

# Other activities/meetings

- Grand challenges
- AgMIP Meeting, San Jose, CR May 23 27
- 11th HyMeX Workshop Lecce, Italy May 29 Jun 2 all-day
- 2nd Baltic Earth Conference Jun 11 Jun 15 all-day
- The 15th BSRN Scientific Review and Workshop Jul 16 Jul 20 all-day
- NASA JPL Center for Climate Sciences Summer School 2018 Aug 27 Aug 31 all-day
- 2nd GEWEX Convection-Permitting Climate Modeling Workshop, Boulder, CO Sept 4 -6
- GHP/ANDEX Workshop Santiago, Chili Oct 22 Oct 26 all-day
- UTCC PROES Workshop Oct 22 @ 9:00 am Oct 23 @ 5:00 pm
- 2018 WCRP Workshop: Toulouse The Earth's Energy Imbalance (EEI) Nov 13 – Nov 16



## Extremes and Water on the Edge

### **2018 GEWEX Science Conference** Canmore, Alberta, Canada | May 6-11, 2018

**Topics included:** Nexus of water, energy, and food **Climate extremes | Extreme** weather | Atmospheric modeling and observations | Land modeling and observations | Global energy and water cycles, Mountain and high-latitude hydrology

> 388 Attendees 44 Countries 200 Oral Pres. 164 Poster Pres. >200 FCRs





### The sponsors:











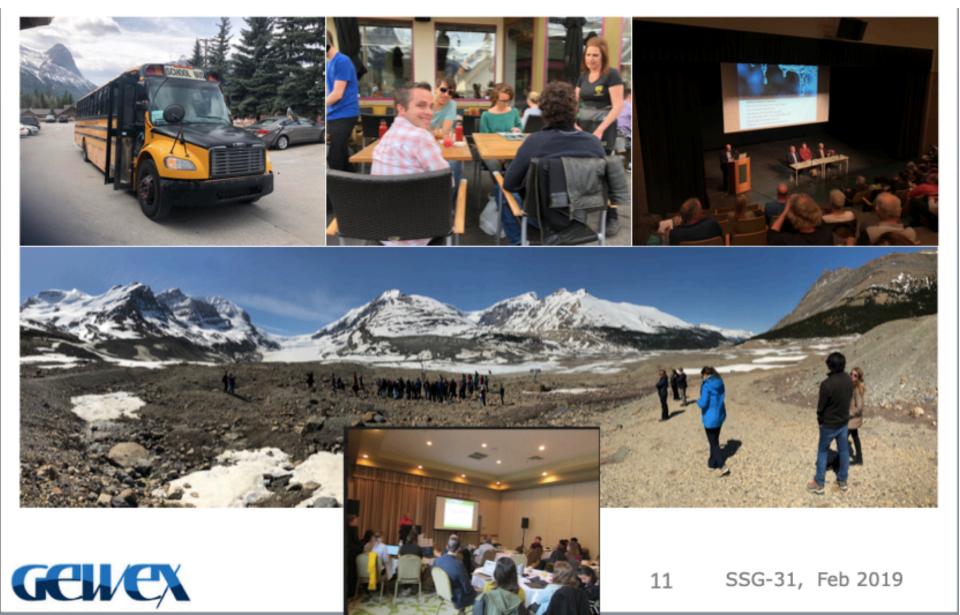
Environment and Climate Change Canada Environnement et Changement climatique Canada







### Before the Conference



# **Conference** Highlights

People





SSG-31, Feb 2019

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# Conference Highlights

Science

- Many great presentations, showcasing fantastic research and results
- High resolution modeling is just one clear theme of the many shown in this conference
- High Mountainous Terrain critical for e.g. regional water supply and access yet it is still a frontier with many unanswered questions, lack of –research- infrastructure!

