

ABOUT
WATER, ENERGY,
& CLIMATE



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

***World Climate Research Programme's
Grand Challenge on Water for the Food Baskets and
the PANNEX and ANDEX
Regional Hydroclimate Projects***

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And many others!

Outline

- ▶ **GEWEX and WCRP Structure & Back Ground**
- ▶ **Water for the Food Baskets of the World**
 - Rationale
 - Proposed Implementation
 - Example Regional Focus Areas (Regional Hydroclimate Projects) – PANNEX, North America Activities and ANDEX

WCRP Structure

Joint Scientific Committee

Joint Planning Staff

Modeling Advisory Council

Data Advisory Council

Working Groups on: Numerical Experimentation (WGNE), Subseasonal to Interdecadal Prediction (WGSIP), Coupled Modeling (WGCM), Regional Climate (WGRC)

CLiC

CLIVAR

GEWEX

SPARC

CORDEX

Cryosphere

Ocean-
Atmosphere

Land-
Atmosphere

Troposphere -
Stratosphere

Regional
Climate
Downscaling



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Melting Ice & Global Consequences

Regional Sea Level & Coastal Impacts

Water for Food Baskets

Weather & Climate Extremes

Clouds, Circulation & Climate Sensitivity

Near-Term Prediction (Decadal)

Carbon & Climate



The Challenges for GEWEX and Climate Sciences more generally over the next 10 years:

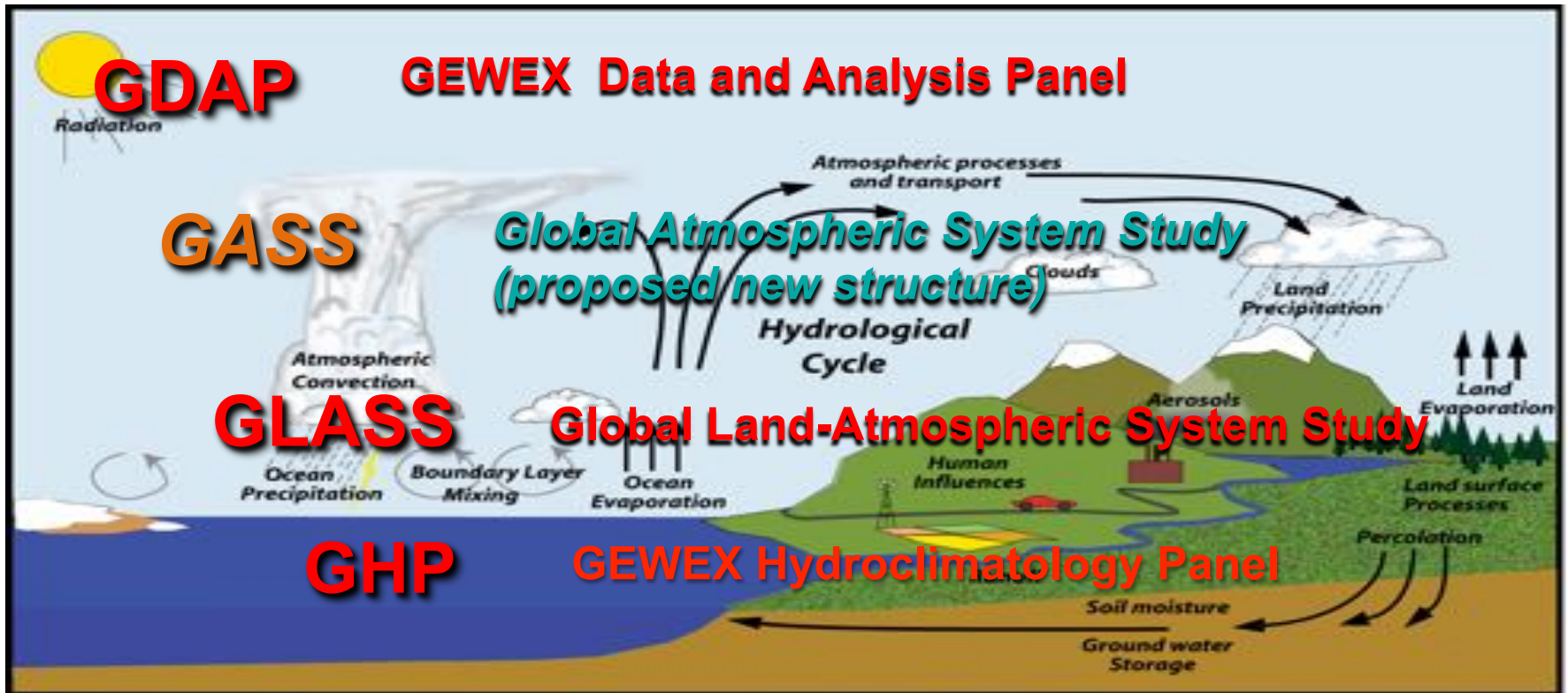
- Explain the Past*
- Understand the Present*
- Predict the Future*

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

GEWEX: Major components



Four GEWEX Science Questions

For the next 5 to 10 years

- 1 Observations and Predictions of Precipitation
- 2 Global Water Resource Systems
- 3 Changes in Extremes
- 4 Water and Energy Cycles and Processes

GEWEX Imperatives

Datasets

1

Applications

5

Analysis

2

Technology Transfer

6

Processes

3

Capacity Building

7

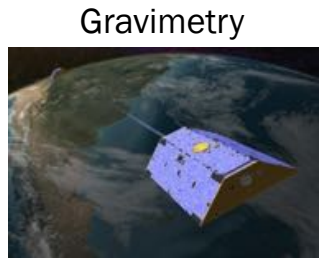
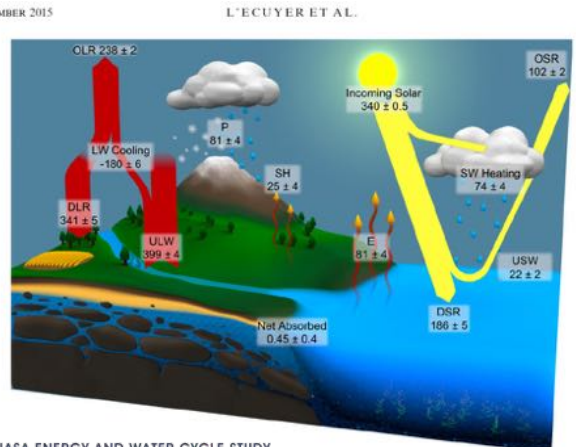
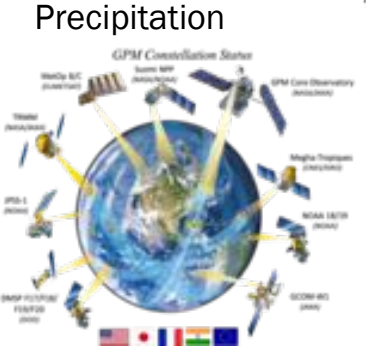
Modeling

4

The GEWEX Approach

Consistency as a way of life

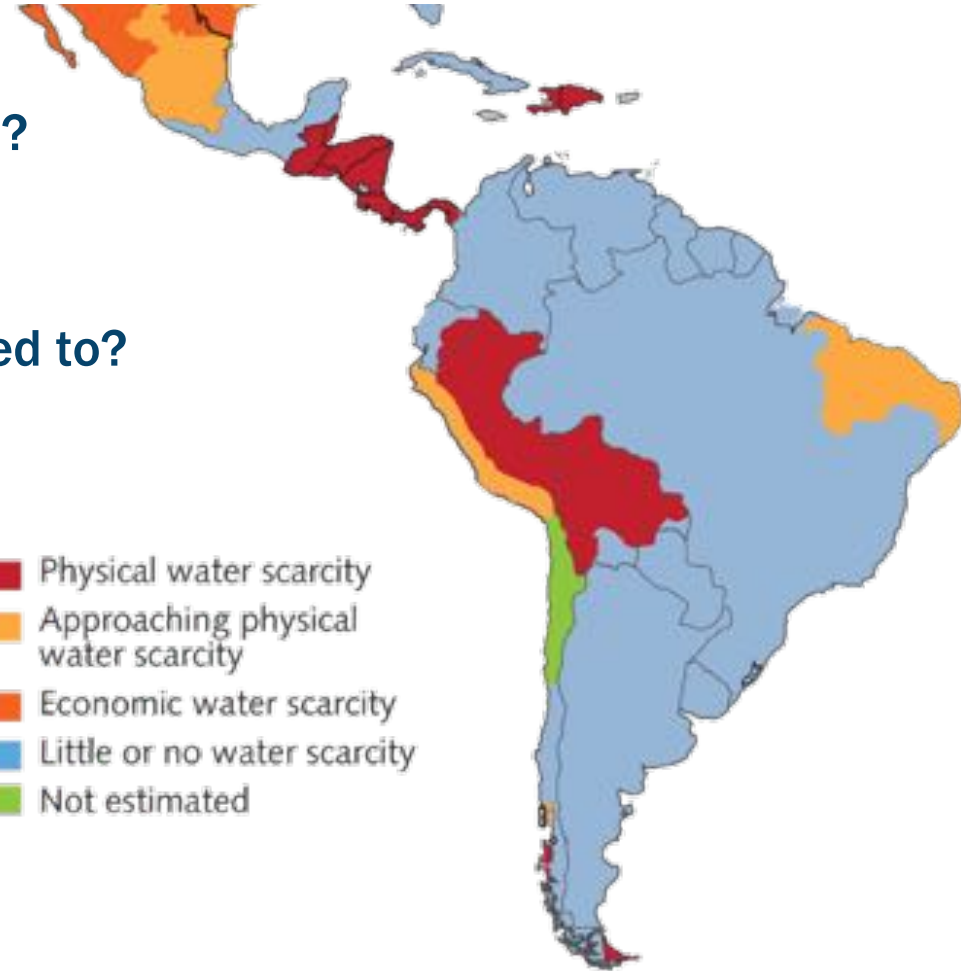
- An integrated approach to quantify links between energy & water
- Stewardship of observations
 - Advancement in process understanding
 - Global and regional modeling



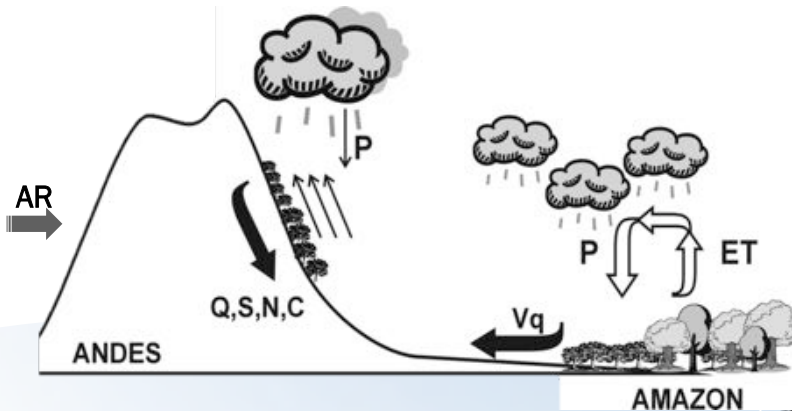
Water Scarcity in Latin-America

ANDEX a proposed RHP

- ▶ How stable under climate change?
- ▶ How could it change?
- ▶ What is it that needs to be adapted to?
- ▶ What can be mitigated?



- Physical water scarcity
- Approaching physical water scarcity
- Economic water scarcity
- Little or no water scarcity
- Not estimated



Essential link to agricultural modeling

- ▶ The human dimension has many aspects. In this GC we focus on the aspects directly related to food and water
- ▶ The link between water and agriculture is highly non-linear, how to model at weather and climate scales beyond the watershed (regional to global)
- ▶ Much more than just irrigation, ground water extraction and reservoir management!
- ▶ Linking convection-permitting models (high res < 4km) to agronomy/ag. models

WCRP GC on Water and UN SDGs ✓



Acknowledgement

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**MORE INFORMATION ON:
[HTTP://WWW.GEWEX.ORG](http://www.gewex.org)**

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