
GHP and RHP History **(not comprehensive)**

GHP - GEWEX Hydroclimatology Panel

RHP - Regional Hydroclimatology Project

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GHP Science

GHP is the major GEWEX effort aimed at advancing progress on the scientific theme which relates to assisting GEWEX to demonstrate skill in predicting variabilities in water resources and soil moisture on time scales up to seasonal and annual as an element of WCRP's prediction goals for the climate system.

GCIP

It was originally envisioned (1990) that one regional effort would be conducted and that the results from it would be applied globally.

That project was the GEWEX Continental-Scale Project (GCIP) and it took place over the data-rich central United States.



In other regions...

- However, several other efforts (Asia/GAME, Baltic Sea/BALTEX, Amazon/LBA, Canada/MAGS):
 - mobilized the necessary research capabilities
 - developed the required infrastructure
 - secured sufficient funding
 - They started before the application to global scales from GCIP alone was realized.
 - Water and energy cycles were being examined simultaneously over several regions of the world within the first phase of the GHP strategy
 - Their presence also represented a basis for some aspects of global application.
 - A new initiative, the Coupling of the Tropical Atmosphere and Hydrological Cycle (CATCH), was expected to soon be initiated in West Africa.
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1995 GEWEX SSG

- Initial meeting was held between representatives of these regional experiments to lay the groundwork for a combined effort
- The formal establishment of this group, to be known as the GEWEX Hydrometeorology Panel (GHP)*, was subsequently approved by the Joint Scientific Committee of WCRP
- International Satellite Land Surface Climatology Project (ISLSCP), Global Runoff Data Centre (GRDC), and Global Precipitation Climatology Centre (GPCC) were included

Some time after 1995 - Argentina (LPB), Australia (MDB) and Africa (CATCH/AMMA)
GCIP evolved into GAPP and then CPPA

* *Now: GEWEX Hydroclimatology Panel*

Overarching Issues

Premise for GHP:

The prediction of regional precipitation and runoff anomalies will be improved with a better understanding of water cycle processes.

Issues Include:

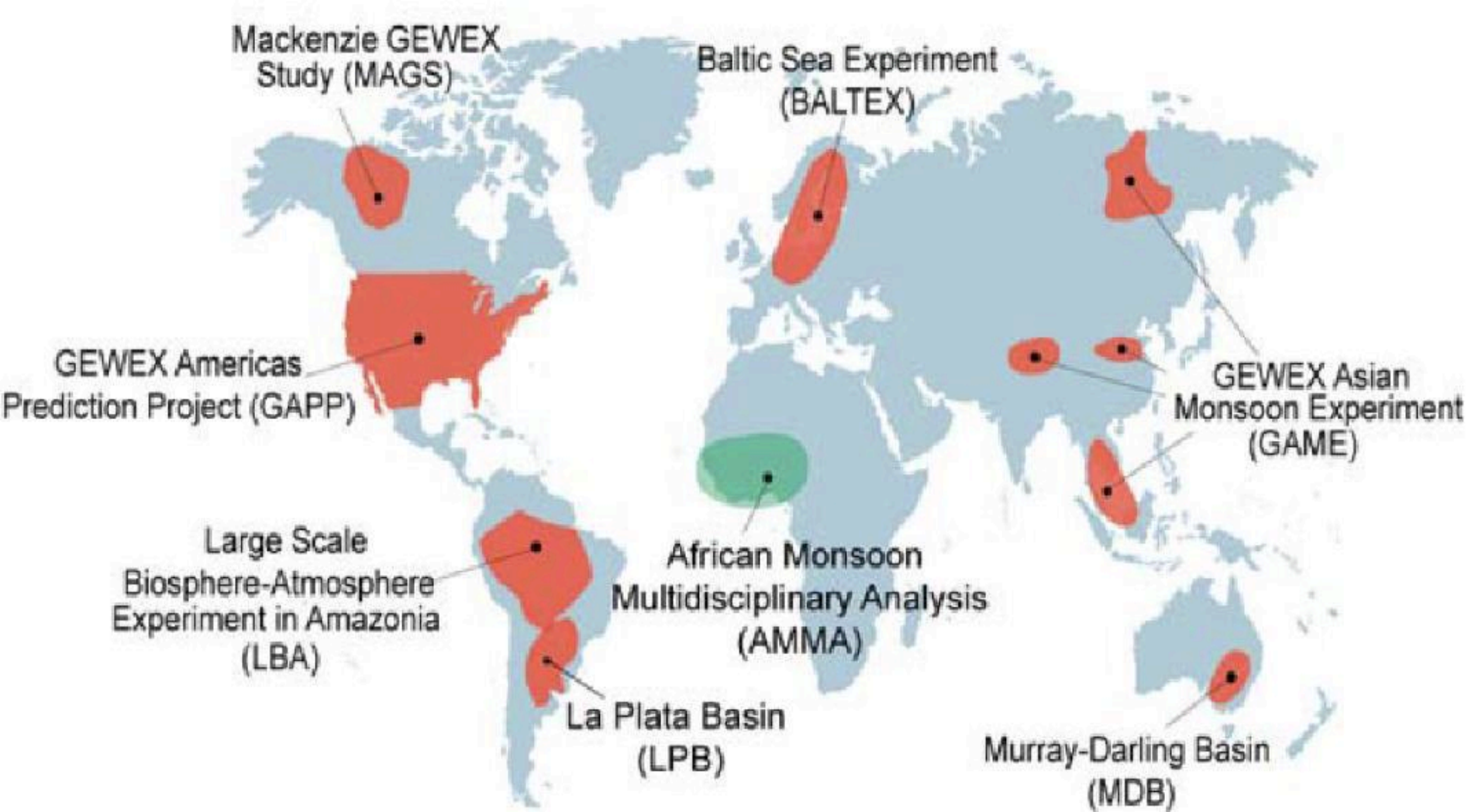
- What is the relative influence of local and non-local controls on precipitation over land?
 - How do local controls vary from region-to-region?
 - What are the feedback mechanisms in the water cycle and to what degree do they affect wet and dry spells?
 - What can be done to improve collaboration with water resources agencies on how to better use improved information?
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Building Blocks

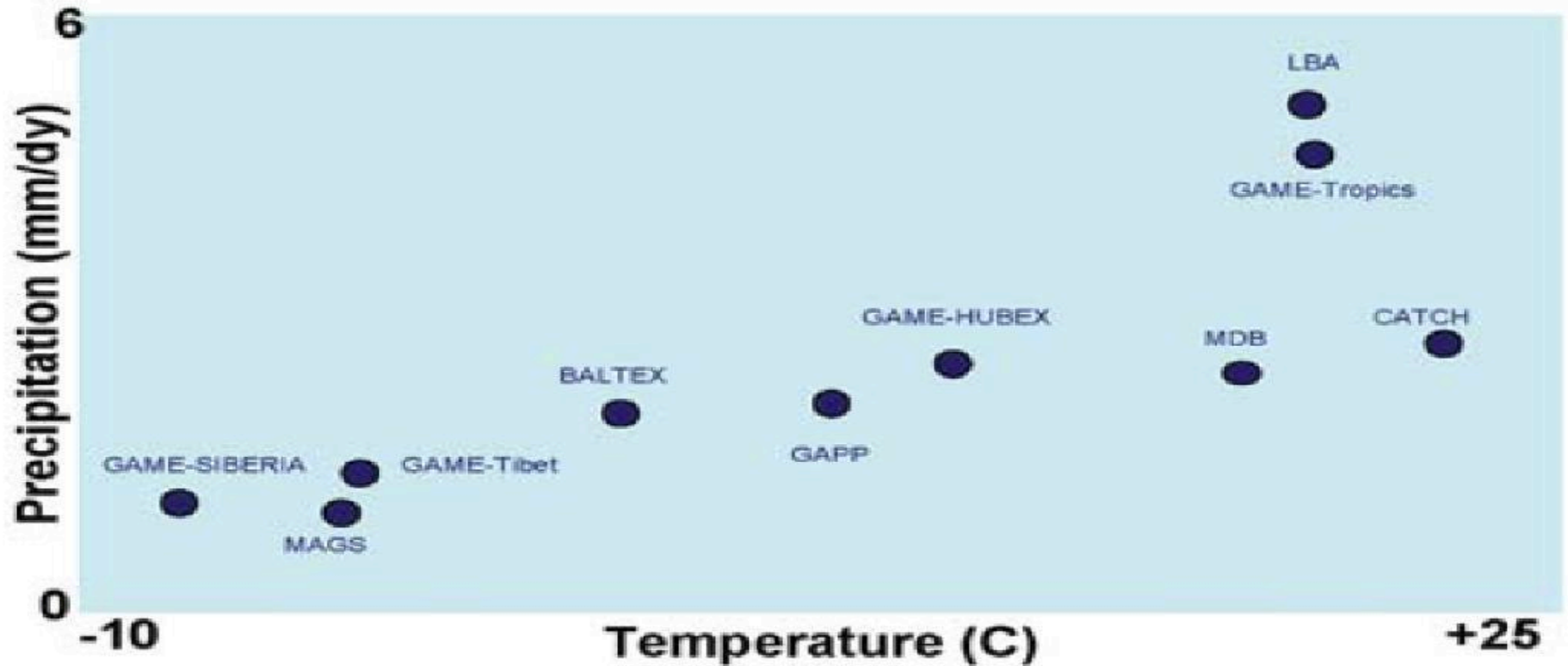
CSEs (RHPs) have served as regional building blocks for GHP's global initiatives

CSE - Continental Scale Experiment

RHP - Regional Hydroclimatology Project



Global Science with Regional Foci



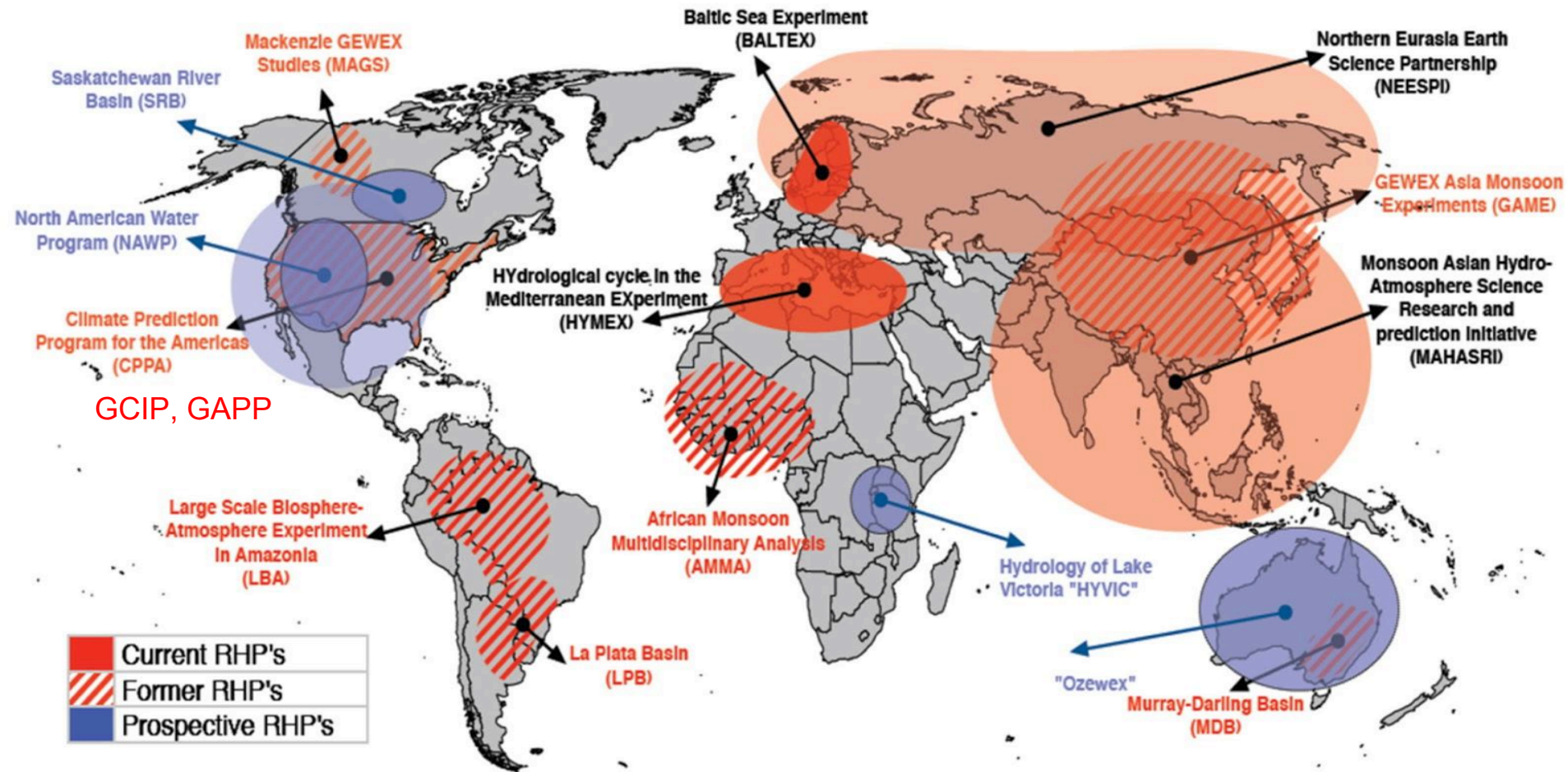
Regional efforts were initiated elsewhere

Asia (Tropical to Mid-Latitude)

Mediterranean

Northern Eurasia

GEWEX REGIONAL HYDROCLIMATE PROJECTS



GHP Strategy Steps

1. Ensure proper characterization of surfaces and a knowledge of discharge.
 2. Ensure access to observations of key parameters and model information within the CSEs and other regions as necessary.
 3. Carry out detailed water and energy cycle observations and modelling over a few selected areas around the world.
 4. Concentrate on needed process, diagnostic and remote sensing studies
 5. Develop and validate appropriate large scale hydrological-surface models that will be coupled with atmospheric ones.
 6. Conduct transferability-validation model studies within and beyond the CSEs.
 7. Conduct predictability studies within and beyond the CSEs.
 8. Inform others of the progress within GHP.
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Critical Components 1999 Assessments

TECHNICAL/LOGISTICAL CRITERIA	GICIP	MAGS	LBA	GAME	BALTEX	CATCH
1.) NWP centre atmospheric and surface data assimilation and estimates of hydro-meteorological properties.	F	F	F	F	F	P
2.) Suitable atmospheric-hydrological models and numerical experimentation and climate change studies.	F	F	I-F	F	F	P
P - planning I - Implementing F - Functioning						
3.) Mechanism for collecting and managing adequate hydrometeorological data sets.	F	I-F	I-F	I-F	F	P
4.) Participate in the open international exchange of scientific information and data.	F	I-F	F	I-F	F	P
5.) Interactions with water resource agencies and related groups to address the assessment of impacts on regional water resources.	I-F	I-F	I-F	I-F	I-F	P
6.) Evaluation of GEWEX global data products.	I	I	I-F	I	I	N/A-Not applied
7.) Contributions to CEOP and transferability data bases.	P	P	P	P	P	N/A

	GCIP	MAGS	LBA	GAME	BALTEX	CATCH
SCIENTIFIC CRITERIA						
1.) Simulate the diurnal, seasonal, annual and interannual cycles.	Pr	Pr	Pr	Pr	Pr	N/A
2.) Close water and energy budgets.	Pr	B	B	B	Pr	N/A
3.) Determine and understand climate system variability and critical feedbacks.	Pr	Pr	Pr	Pr	Pr	N/A
4.) Demonstrate improvements in predictions of water-related climate parameters.	B	B	Pr	B	B	N/A
5.) Demonstrate the applicability of techniques and models to other regions.	B-Pr	B	B	B	B-Pr	B

B - Beginning Pr - Progressing

GHP Process/Coordinated Studies

Over the years, many GHP/CSE studies were proposed and/or carried out including:

- water and energy budgets (WEBS)
- outreach (WRAP)
- hydrologic modelling/prediction (MOPEX ...)
- orographic precipitation (HAP)
- extremes (droughts DIG/GDIS...)
- isotopes for tracking moisture flow and cycling (SCW, SWING)
- transferability working group (TWG) and predictability working group (PWG)
- Coordinated Enhanced Observing Period (CEOP) (transferability, simultaneity, etc.)

as well as:

- clouds and aerosols
 - soil wetness, soil freezing/thawing
 - data management
 - ...
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WEBS (Water and Energy Budget Study)

Initial description of WEBS:

A critical initiative within GHP is the characterization and quantification of water and energy budgets over land areas.

These issues will be addressed in part through a collective manner and will end up in the realization of some of the key GHP milestones involving our capabilities to close these budgets over various spatial and temporal scales.

To make significant progress within reasonable time frames, it is suggested that a two-pronged approach be followed.

- 1. Characterization of Regional Climate Systems**
 - 2. Quantification of regional water and energy budgets and cycles**
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Challenges

GHP has always faced challenges including:

- Most funding is regional/national and it is not always possible to fund projects between regions
 - Summarizing and synthesizing its own accomplishments
BAMS (2004) for GHP
although: many CSE/RHP articles, WEBS, etc.
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Concluding Remarks

GHP and the RHPs (CSEs) have:

- a history going back 20 years (with GCIP, 24 years)
- sparked 'regional' coordinated research over many areas of the world
- carried out process, modelling and transferability activities
 - w/e budgets, hydrologic modelling, outreach, data management ...
- been a foundation for other activities (HEPEX, CORDEX, GDIS...)
- brought together communities (hydrology/atmosphere/surface/users/...)
 - 100s of participants/10s of countries

GHP now is:

- well positioned to move forward (RHPs, cross-cuts ...)
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Acronyms

- CEOP - Coordinated Enhanced Observing Period
(Coordinated Energy and Water-Cycle Observations Project)
 - CORDEX - Coordinated Regional Downscaling Experiment
 - DIG - Drought Interest Group
 - GDIS - Global Drought Information System
 - HAP- High Altitude Precipitation
 - HEPEX- Hydrologic Ensemble Prediction Experiment
 - MOPEX - Model Parameter Estimation Experiment
 - SCW - Sources and Cycling of Water
 - SWING - Stable Water Isotope Intercomparison Group
 - WEBS - Water and Energy Budget Study
 - WRAP - Water Resources Application Project
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