





The La Plata Basin (LPB) A CLIVAR/GEWEX Continental Scale Experiment

E. Hugo Berbery, co-chair for CLIVAR M. Assuncao Silva Dias, co-chair for GEWEX

Implementation Steering Group (ISG)







Outline

- 1. Motivations for LPB
- 2. LPB priority areas
- 3. Implementation of activities
 - Data collection
 - Monitoring
 - Field Experiment
 - Modeling activities

4. Future steps



La Plata Basin (LPB) main science questions:

• What climatological and hydrological factors determine the frequency of occurrence and spatial extent of floods and droughts?

• How **predictable** is the regional weather and climate variability and its impact on hydrological, agricultural and social systems of the basin?

•What are the impacts of global climate change and land use change on regional weather, climate, hydrology and agriculture? Can their impacts be predicted, at least in part?

> La Plata Basin (LPB) science plan available at: www.atmos.umd.edu/~berbery/lpb

La Plata Basin Priority areas



Main research areas

- * Improvement of models' representation of land surfaceatmosphere interactions
- * Land surface contributions to predictability
- * Develop coupled models at adequate resolutions for hydrologic purposes
- * Better estimates of MCS precipitation
- * Climate change scenarios
- * Impacts on the system's hydrology

Image: Second state of the La Plata Basin Countries (CIC) Second state of the La Plata Basin Countries (CIC) WWW.cicplata.org

*draft available at: www.atmos.umd.edu/~berbery/lpb

Intergovernmental Coordinating Committee of the La Plata Basin Countries - CIC

Framework Program Objective

To assist the governments of Argentina, Bolivia, Brazil, Paraguay and Uruguay in the integrated management of the water resources of the La Plata Basin in relation to variability and climate change effects, aiming at the economic development of the region with a sustainable environment

Countries:

Argentina, Bolivia, Brazil, Paraguay and Uruguay

Funds:

Global Environmental Facility (GEF) Funds

Implementation Agency:

United Nations Environment Programme - UNEP

Executing Agency:

Organization of American States - OAS

Local Executing Agency :

Intergovernmental Coordinating Committee of the La Plata Basin Countries - CIC

Implementation Plan

PART A: The International Program on the La Plata Basin (LPB)

PART B: Current status of research and applications (obs, atmos and hydro modeling)

PART C: Implementation of LPB CSE

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5. Data rescue efforts

6. Hydroclimatic monitoring activities
6.1 A supersite
6.3 In-situ soil moisture measurements
6.4 Flux Towers
6.5 Satellite information

7. Field Experiment (PLATEX)

9. Modeling activities

10. Predictability and climate change assessments 10.1 Land cover/Land use 10.2 Climate change scenarios and regional downscaling

Flux towers



Working on establishing a supersite



Raingauge Meso-network Soil moisture measurements Radar Flux Tower Aerosols Rawindsonde Wind profiler

LPB Timeline (2005-2015)



Objectives of this meeting

 To provide a background for and <u>launch the</u> <u>implementation plan</u> of the La Plata Basin Continental Scale Experiment - LPB-CSE.

 To <u>articulate the paths to integrate modeling</u>, <u>observational and operational activities</u> that are expected to take place during the LPB Program.

3. Develop <u>recommendations on LPB observing system</u> <u>components.</u>

Specific Issues

- 1. A plan for soil moisture measurements
- 2. Choice of 1-3 flux towers that can represent LPB in CEOP.
- 3. Identification and establishing a supersite
- 4. Dates for the field experiment
- 5. A plan for data management
- Working questions to consider

Planned activities

<u>Datasets</u>

Field experiment & Enhanced monitoring

Land surface effects And LDAS

Hydrologic modeling



Sources: Hamilton - Tucci



A VAZANTE

e os rios voltam a seus leitos, milhões de peixes ficam aprisionados nas lagoas. É um banquet para aves, jacarés a ariranhas

Os pastos, renovados pela matéria orgânica trazida pela água, crescem verdes atraindo cervos, capivara: e outros animais que convivem com o gado

No topo da cadeia alimentar estão as onças e jaguatiricas The LPB Implementation Steering Group was formed in April 2005

Co-chair for VAMOS/CLIVAR: E. Hugo Berbery, University of Maryland Co-chair for GHP/GEWEX: M. Assuncao Silva Dias, CPTEC



Research areas covered by the ISG:

Remote sensing Radar meteorology Surface processes/flux towers Mesoscale modeling Mesoscale meteorology Hydrologic modeling Climate variability Climate change scenarios Flood risk and vulnerability Water resources management

Scientific Motivations for the LPB Continental Scale Experiment

- Strong interannual and interdecadal climate and streamflow variations and trends
- Confounding effects of <u>land use change</u>: deforestation, intensive agriculture trends and urbanization
- Unknown effect of aerosols advection from <u>biomas burning</u> from tropical areas
- Strong role of <u>Mesoscale Convective Systems</u> in total precipitation
- Potential for <u>better predictability</u>
- <u>Climate change</u> vulnerability

Scientific Motivations

Extreme events

Trends

Predictability

Climate Change Scenarios

Flux towers in Pantanal and Parana State





Micrometeorological observations in the Pantanal Area-Central Brazil

Fazenda São Bento- MS (19° 33' S; 57° 54' W)





Sensors at instrument tower (21 meters high) Air temperature profile (5 levels) H2O concentration profile (5 levels) op canopy temperature (Infra-red sensor) Wind velocity profile 5 levels) Wind direction Air pressure Precipitation Incoming and outgoing solar radiation (short wave radiation) Incoming and outgoing terrestrial radiation (long wave radiation) Incoming photosynthetically active radiation (PAR) Turbulence measurements above forest canopy High frequency (10.4 Hz) three wind components, air temperature, H2O and CC Concentration (Sensible and latent heat flux and CO2 flux) Soil measurements Soil heat flux (2 plates at depth of 1 cm and 10 cm, respectively) 2 five-level profiles of soil humidity, electric conductivity and temperature (sensors at depths of 1, 5, 10, 20, and 40 cm) Methane concentration

Additional instrumentation: Radiosonde station Tethered balloon



Flux towers in Sao Paulo State

Project funded by FAPESP (Dr. Humberto Rocha)



Agronomic Institute of Campinas and UNICAMP experience on crop physiology will also be needed

