



VAMOS TO THE FUTURE: Emerging priorities in American monsoon research

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Co-chairs

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Officer Members

And Panel Members

Carlos Ereño
ICPO



Variability of the American Monsoon Systems (2008-present)

Science programs

- VAMOS Ocean Cloud Atmosphere Land Study (**VOCALS**)
- Intra-Americas Study of Climate Processes (**IASCLIP**)
- La Plata Basin Regional Hydroclimate Project (**LPB**)
(endorsed by CLIVAR and GEWEX)

Cross-cuts

- Modeling
- Extremes
- Climate Change

Ongoing plans for new research themes



24–28 October 2011, Denver, Colorado, USA
www.wcrp-climate.org/conference2011

WCRP
World Climate Research Programme



ICSU
International Council for Science



VAMOS

Ocean Clouds Atmosphere Land Study

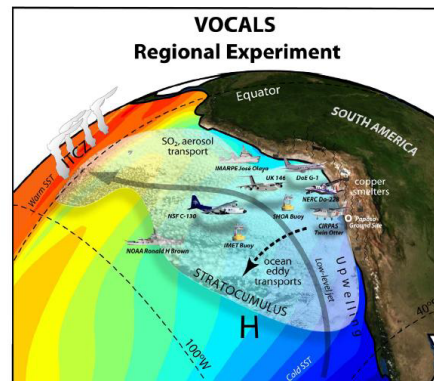
Chair: Roberto Mechoso



VOCALS Goals:

Elimination of CGCM systematic errors in the SEP, and improved model simulations of the coupled system in the region and global impacts of its variability.

Improved understanding and regional/global model representation of aerosol indirect effects over the SEP.





VAMOS

Ocean Clouds Atmosphere Land Study



VOCALS Hypotheses

Improvement of CGCMs performance in the Eastern Tropical Pacific is key to successful simulation of ITCZ/SPCZ, which will also benefit simulation of other regions.

A significant improvement can be achieved by better representing the **effects of stratocumulus clouds on the underlying surface fluxes** and the of oceanic mesoscale eddies in the transport of heat.

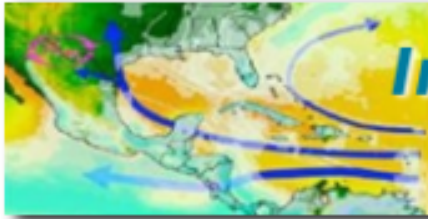
Oceanic mesoscale eddies play a major role in the transport of heat and fresh water from coastally upwelled water to regions further offshore.

VOCALS research supports the validity of this hypothesis.

The research is also providing insight into the structure of oceanic mesoscale eddies in the region. In addition, a physically consistent paradigm has emerged on how CGCMs with low resolutions misinterpret the regional heat budget in the VOCALS region.

VOCALS – Plans for 2011/2012

- **AGU Fall Meeting Session.**
- **Complete science overview paper for submission to BAMS, expected end of 2011**
- **Second year of CPTs using VOCALS data and process modeling experience**
- **Groups submitting proposals for funding to support continued analysis of VOCALS data and modeling activities.**



Intra-Americas Study of Climate Processes

Chair: Art Douglas

WCRP/CLIVAR VAMOS Program

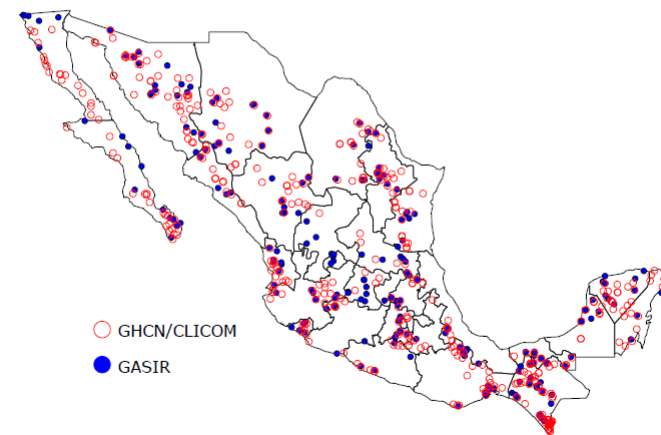
IASCLIP Hypothesis 1

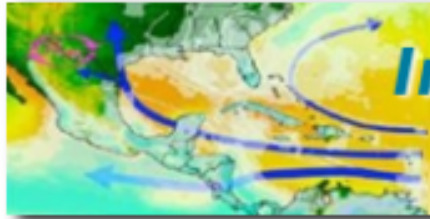
Improving and expanding the observational network across the IASCLIP region will benefit early warning systems and long term climate monitoring of the Americas

IASCLIP

A white paper for monitoring the Intra-Americas Sea.
January 2011

Station Distribution and Data Sources for the 25 Climate Divisions in Mexico
380 CLICOM and 214 GASIR Stations





Intra-Americas Study of Climate Processes

WCRP/CLIVAR VAMOS Program

IASCLIP Hypothesis 2

A better understanding of the climate processes within the IASCLIP region will improve operational and research modeling efforts across the Americas.

Breaking News



CLIMATE PROGRAM OFFICE

Understanding climate variability and change to enhance society's ability to plan and respond

Modeling, Analysis, Predictions, and Projections Program (MAPP) announcement of opportunity

Modeling of Intra-Americas Sea climate processes associated with extremes over North America - improving climate model simulation and prediction of extremes over North America focusing on processes in the Intra-Americas Sea region

The VAMOS Modeling Plan: Implementation

(Ben Kirtman, Celeste Saulo et al)

2010: Joint session of VAMOS and WGSIP (Buenos Aires)

- **VAMOS Modeling Survey**
- **VAMOS Modeling Workshop has go ahead for 2012 (Petropolis, BR)**
[Science presentations, student presentations, planning]

- **Leveraging**
 - WGSIP
 - CHFP, CMIP5, VOCALS, IASCLIP, NAME, MESA, LPB, CLARIS-LPB, CORDEX ...
- **Enabling/Facilitating Collaborative Science?**
 - Exchange of Ideas

VAMOS Extremes Working Group

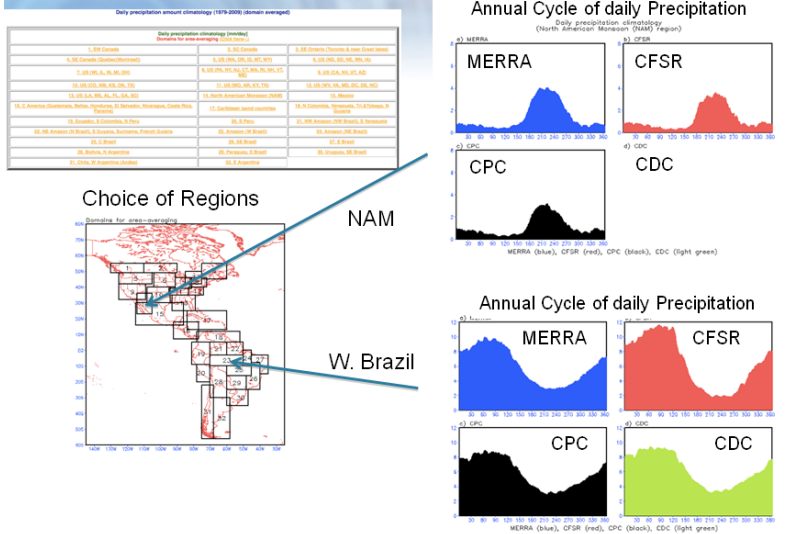
Siegfried Schubert and Iracema Cavalcanti
(cochairs)

<http://gmao.gsfc.nasa.gov/research/subseasonal/atlas/Extremes.html>

The overall focus is on improving our understanding of the mechanisms and predictability of warm season extremes over the Americas

- *Develop atlas* of warm-season extremes over the Americas
- *Evaluate* existing and planned simulations
- *New model runs* to address *mechanisms and predictability of extremes*

Climatology – Annual Cycle of Daily Precipitation



- Basic climatologies
- Precipitation extremes
- SPI time series and maps
- Precipitation return values based on GEV fits, including impact of ENSO
- Various temperature extremes – latest



La Plata Basin (LPB) Regional Hydroclimate Project



Funding sources

CLARIS – LPB: A Europe-South America Network for Climate Change Assessment and Impact Studies in La Plata Basin (2008-2012)

IAI: Integrated research projects on land use in the La Plata basin (2008-2012)

CIC/GEF: Framework Program: Sustainable Management of the Water Resources of the La Plata Basin with respect to the Effects of Climate Variability and Change (2011-...)

Regional funding agencies: Over 20 contributing projects



La Plata Basin Regional Hydroclimate Project (LPB)

GEWEX science interests (selected)

- Land surface processes and land-atmosphere feedbacks
- Hydrological variability and extremes, water resources

(IAI, CLARIS-LPB, GEF)

CLIVAR science interests (selected)

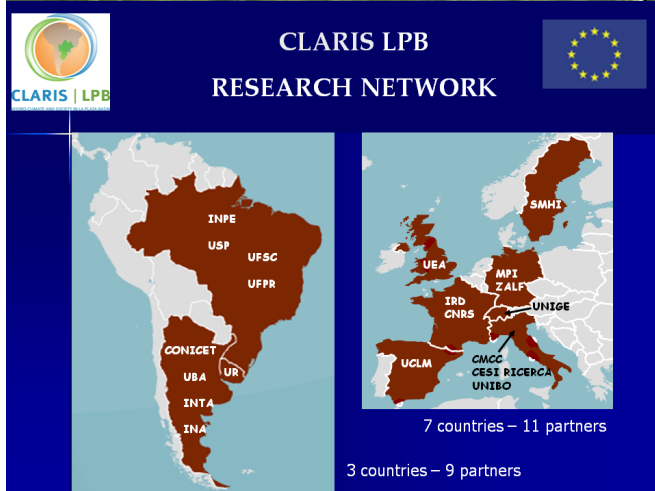
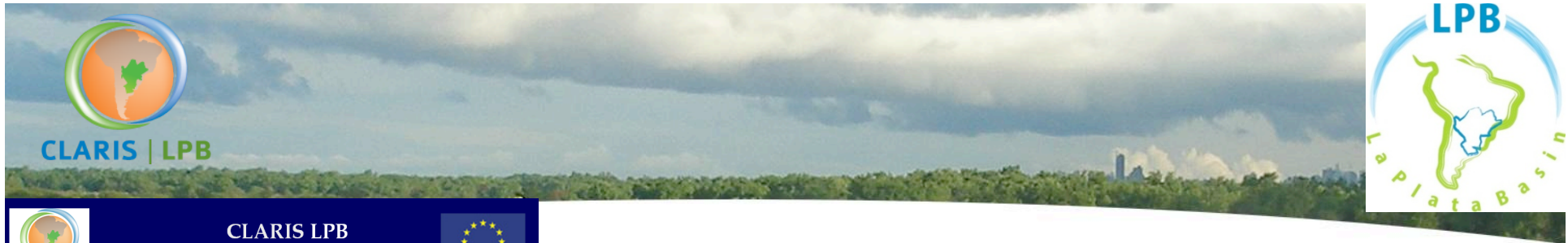
- Role of oceans on interannual to decadal variability in LPB
- Role of oceans on LPB extremes (floods, droughts, heat waves)
- Climate shifts and trends

(CLARIS-LPB)

Other themes

- Ecosystems
- Land use and rural development
- Agriculture
- Adaptation
- Human Dimensions

(IAI, CLARIS-LPB)



Courtesy of Anna Sorensen

CLARIS LPB

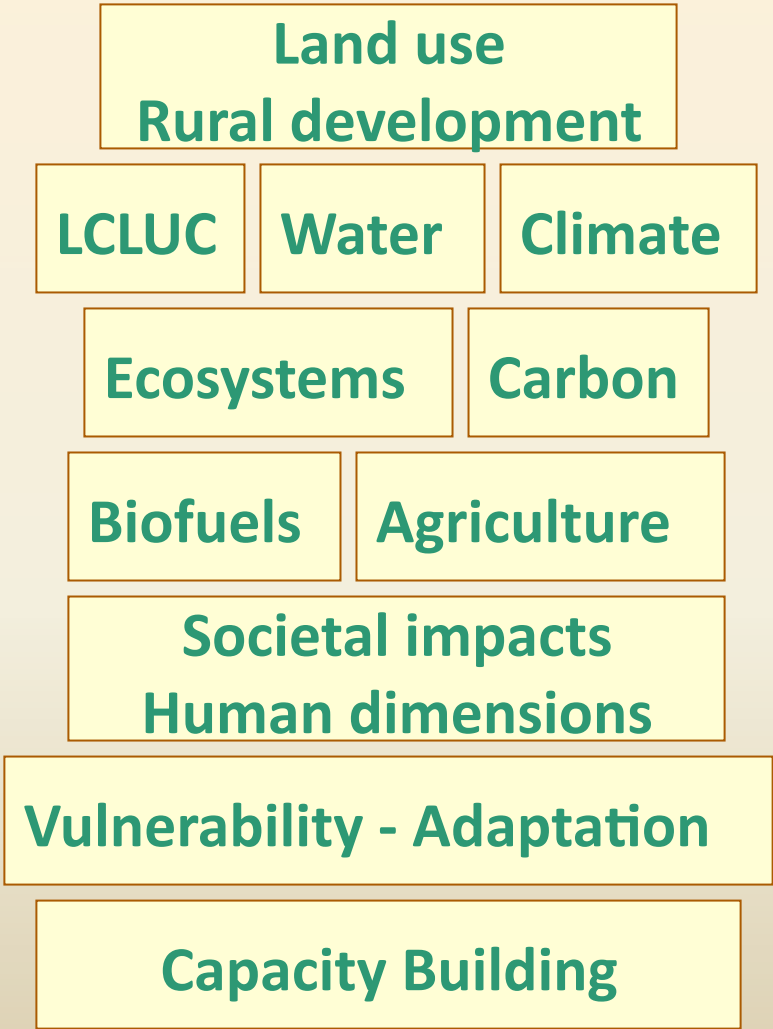
- 10 countries, 20 institutions
- Coordinator: J.-P. Boulanger

- WP3: Improving our description of recent past climate variability in La Plata Basin
- WP4: Hydroclimate past and future low-frequency variability, trends and shifts
- WP5: Regional Climate Change assessments for La Plata Basin
- WP6: Processes and future evolution of extreme climate events in La Plata Basin

- WP8: Land use, agriculture and socio-economic implications
- WP9: Water resources in La Plata Basin in the context of climate change



IAI on LPB: research themes (about 10 projects)



IAI Synthesis Meeting in Asunción, Paraguay (4-7 April, 2011)

How can we unify approaches and refine our knowledge of what drives land use change and transitions? (agent based models, stochastic techniques and scenarios)

How do LCLUCs interact with climate, Carbon balances, radiation effects, hydrological impacts and overall energy balance? Can the science of those processes be presented in a systematic way?

How did the interdisciplinary collaboration between natural and human sciences contribute to significant advances in knowledge and what did we learn in the process?



La Plata Basin (LPB) Regional Hydroclimate Project

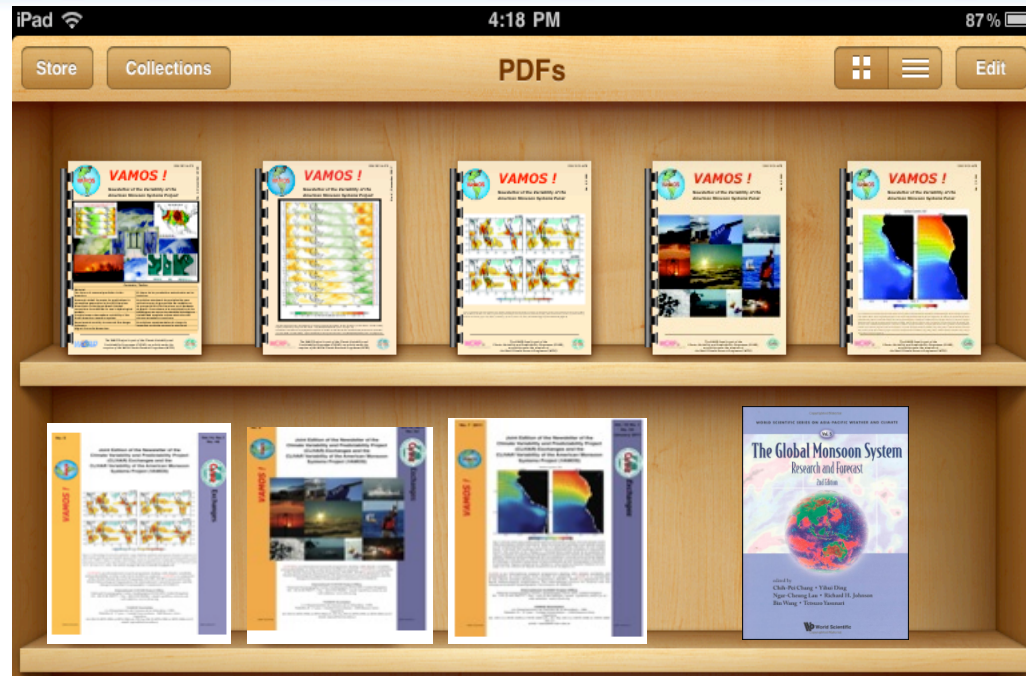


World Climate Research Programme



Meetings/Capacity Building

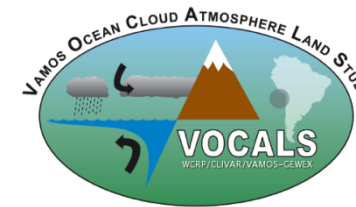
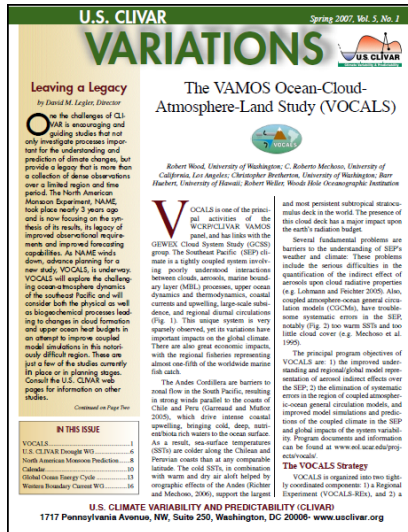
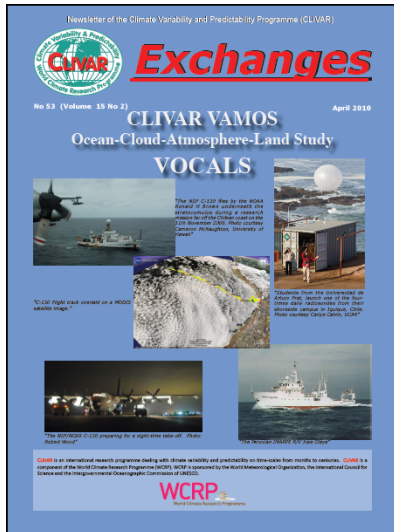
Dissemination activities



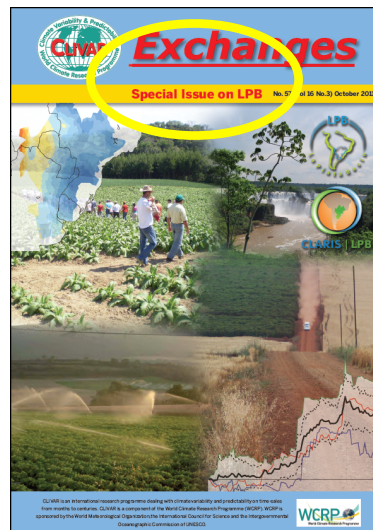
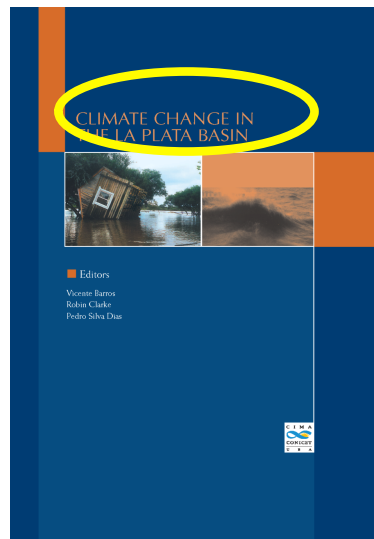
*VAMOS
Newsletter
(bilingual)*

***VAMOS contributes regularly to CLIVAR Exchanges:
Recent issues of the VAMOS Newsletter are published jointly with
CLIVAR Exchanges***


Dissemination activities



PUBLICATIONS: VOCALS Special Issue in Atmospheric Chemistry and Physics (EGU Journal)
~30 papers; 60-70 total.



LPB
Book and special issue of Exchanges
Planned special issues in EU journals



Emerging activities and science questions

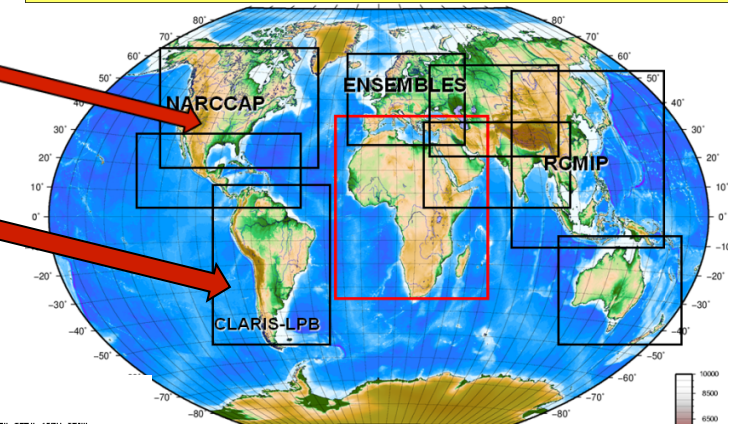


CLARIS | LPB

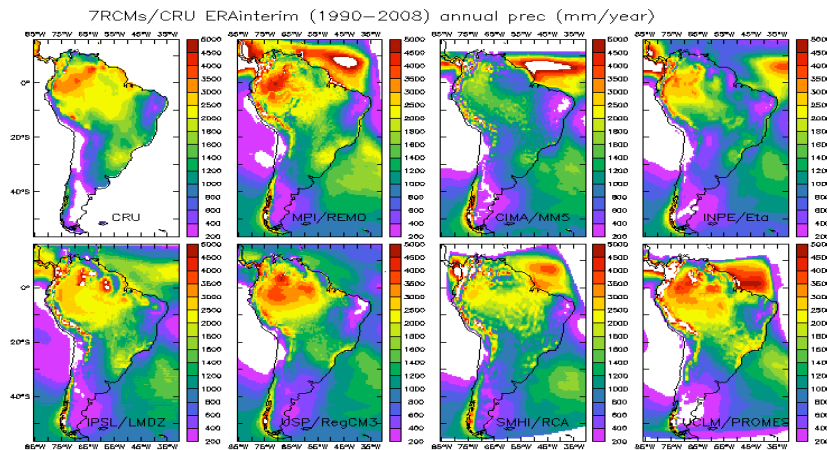
CLARIS-LPB/NARCCAP and CORDEX

CORDEX domains

**ERA-Interim simulations
with 8 regional models
completed**



	ERAinterim
Model/Institution	1990-2008
MM5/CIMA	X
RCA/SHMI	X
RegCM3/USP	X
REMO/MPI	X
PROMES/UCLM	X
LMDZ/IPSL	X
Eta/INPE	X



These simulations are being used to force hydrological models over sub-basins of LPB

<http://www.claris-eu.org/>

Emerging science priorities in VAMOS

1. American monsoons/extremes

Observational studies

1. What are the observed multidecadal variability and trends in the Monsoon's lifecycle? (onset, demise, duration)
2. What is the influence of multidecadal variability on extremes?
3. Are there trends in floods, droughts, heat waves?

Model studies

1. How will the monsoon lifecycle change in a warming climate?
2. Will there be changes in extremes and their frequency over the Americas in a warming world?
3. How will warming tropical oceans affect the signal of low frequency modes (e.g., ENSO, MJO) on the Americas precipitation?

Emerging science priorities in VAMOS

2. IASCLIP

Although IASCLIP had a slow start, it has been progressing steadily particularly in the area of operational observations and monitoring.

The recent announcement of opportunity from MAPP/CPO/NOAA opens a new opportunity to accelerate the IASCLIP modeling strategy

3. LPB

Will the long awaited and finally started GEF/CIC program facilitate new LPB activities beyond the end of 2012?

Emerging science priorities in VAMOS

4. A recent VAMOS/AIP workshop in Miami discussed the possibility of **developing a science project with field campaign in the Atlantic Ocean.**

A science team, encouraged by the results, has presented a **proposal to US-CLIVAR to synthesize upper-ocean heat budget for the eastern equatorial Pacific and Atlantic Oceans**, particular focus on the impact of mesoscale Eddies

VAMOS feels that this proposal has potential good synergy with existing VAMOS and International CLIVAR activities, and therefore is supportive of the initiative.

VAMOS at the WCRP OSC

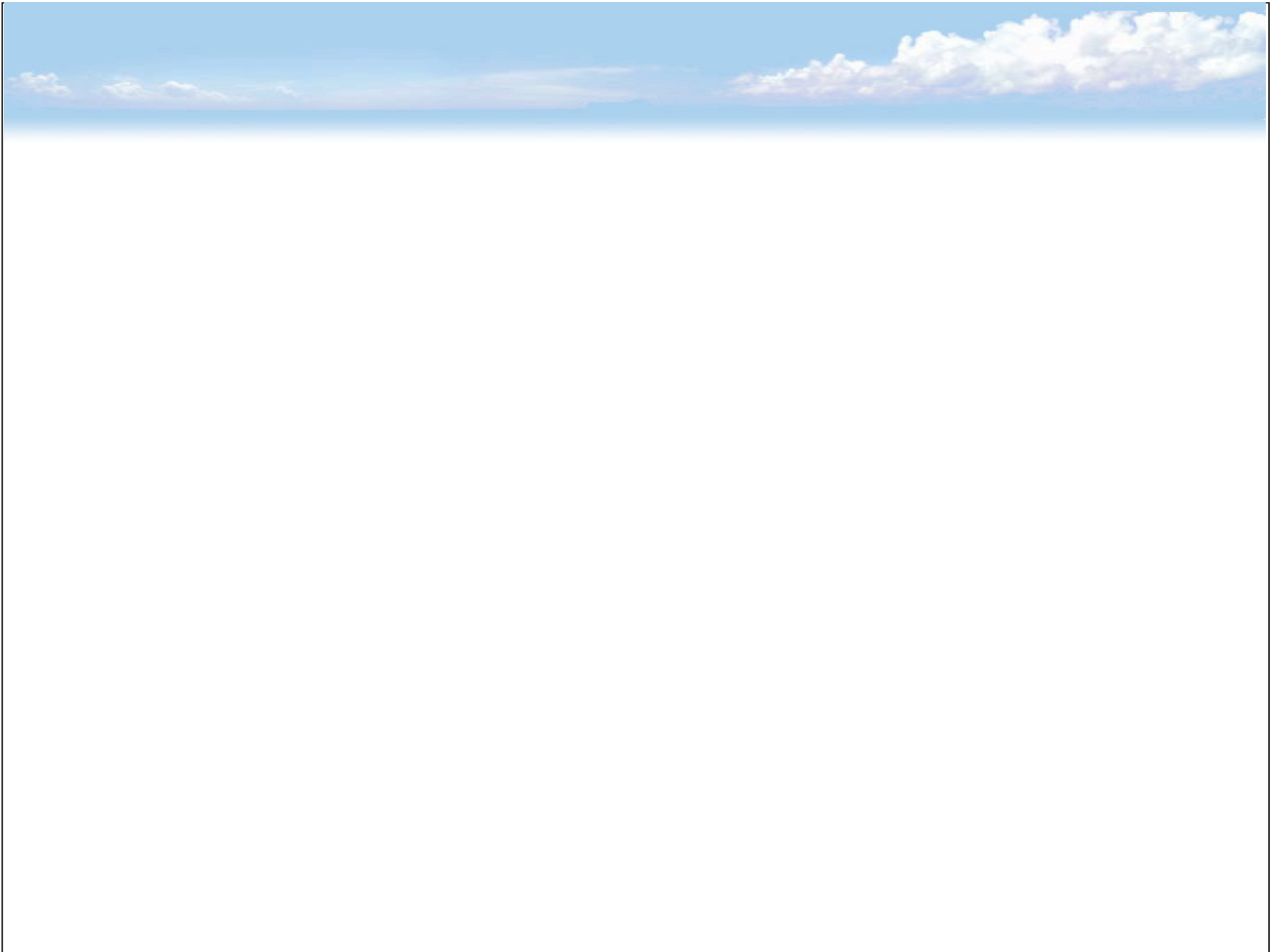


Contributing as co-conveners
Oral presentations
Cluster Posters

Thank you



VAMOS, still going...



LPB Science Highlights of interest to GEWEX



Land cover changes:

- Expansion of agriculture within LPB has an effect on the precipitation and surface temperature patterns. Study of effects on hydrological variables (R, SM, EVT) is in progress.
- Realistic LPB land surface states (as represented by ecosystems) lead to a reduction of summer precipitation biases in models. Study of impacts on hydrological variables is in progress.

Hydrology:

- Use of downscaled simulations (CLARIS-LPB/CORDEX) for impacts of climate change on the hydrology of LPB. Ongoing.
- Characterization of decadal variability of river discharges for hydropower production in the basin.

Capacity Building:

International Summer School on Land Cover Change in La Plata Basin. The school gathered students from different disciplines and countries and followed an interdisciplinary approach to the study the hydroclimate of the La Plata basin.