

# La Plata Basin: CLIVAR/GEWEX CSE

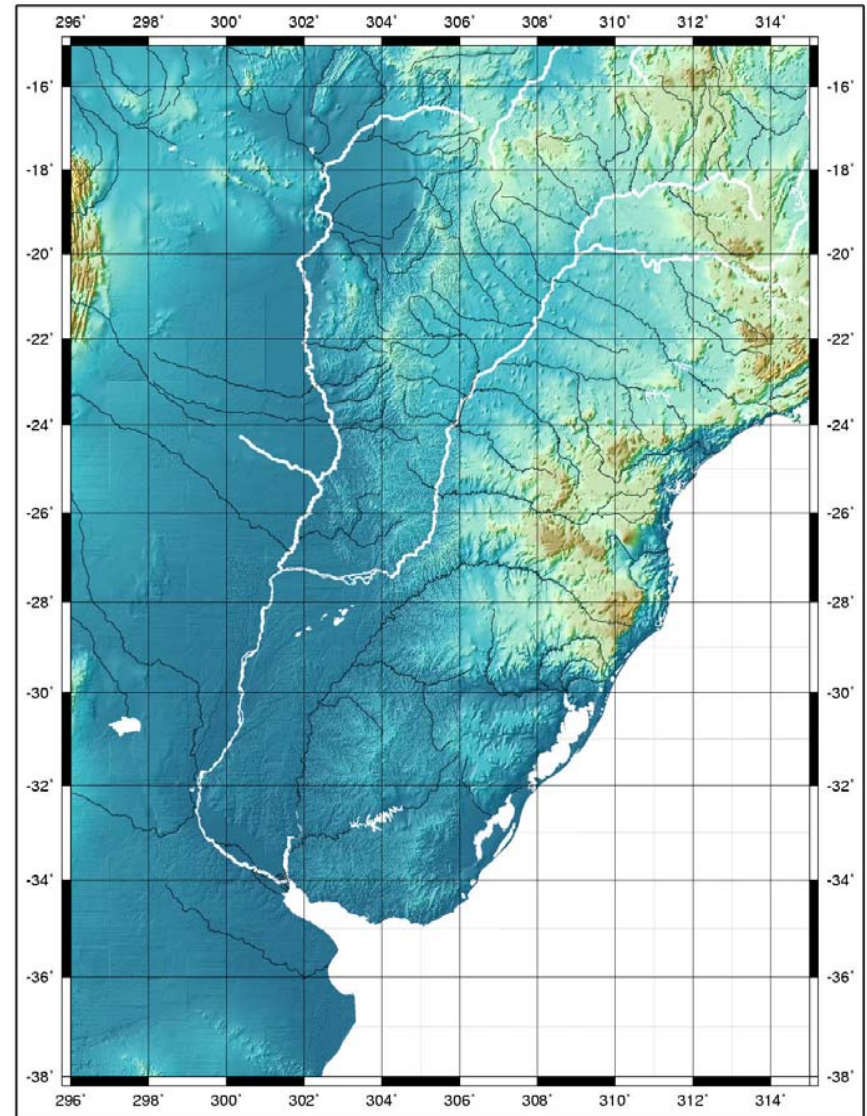
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TIFF (LZW) decompressor  
are needed to see this picture.

# La Plata Basin Climate and Hydrology Project

The LPB project aims to improve understanding and prediction of the basin's climate and hydrology based on their unique sensitivity to the remote climates, regional geographic features and connections with the large Amazon basin.

The project is coordinated by the PLATIN Science Study Group, which was formed by GEWEX/GHP and CLIVAR/VAMOS.

C. R. Mechoso, P. Silva Dias Co-chairs



# Key Points

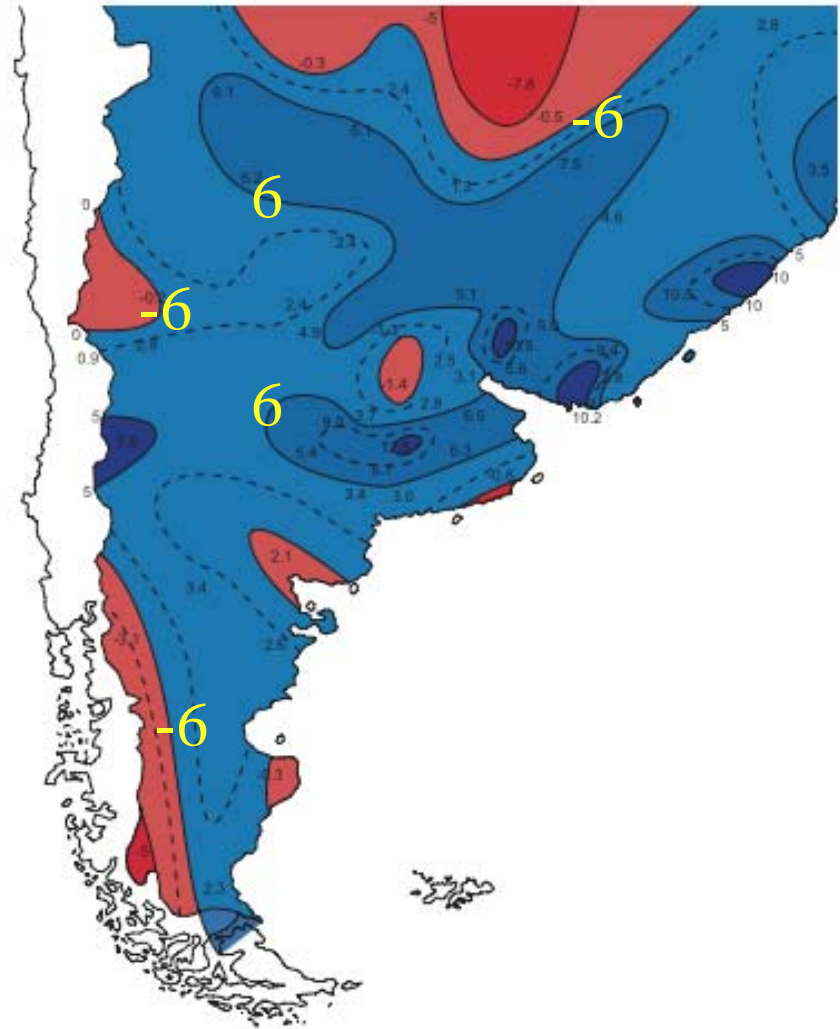
- Unique basin, climate/hydrology interactions
- Unique funding opportunity: The GEF Framework program for La Plata Basin.
- Highly committed regional research community engaged in planning funded by the GEF project.
- In the meantime, database is being populated and study groups are meeting.
- LPB is a strong CEOP supporter and will contribute to the program's Phase II.
- The CLIVAR Challenge: An oceanic site?

# Remote Influences on LPB hydroclimate have been demonstrated

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**There has been  
a significant  
Climate Change  
In  
South America  
After the 1970's**

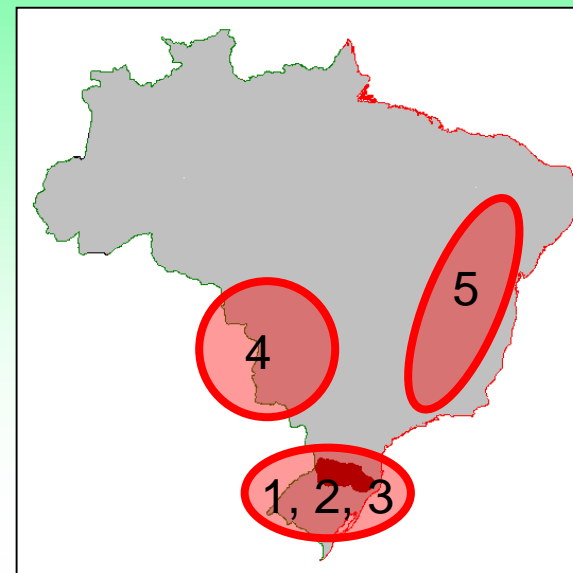
**Precipitation:  
Linear Trends  
1956 – 1991  
(mm/year)**



## *Applications of*

### **DISTRIBUTED HIDROLOGY MODEL (DHM)**

1. Taquari River Basin: DMH coupled to water quality model to assess the impact of new dams. (Area ~ 30,000 sq. km.)
2. Uruguay River Basin: DMH coupled to CPTEC AGCM for long-term (1-5 month) predictions. Encouraging results were obtained, with an estimated reduction of the standard monthly and trimester errors of 34% and 54%, respectively. (Area ~ 75,000 sq km.)
3. Uruguay River Basin, Machadinho dam: DHM coupled to meteorology model for 48-hour forecasts. (Area ~ 32,000 sq km.)
4. Upper Paraguay River Basin. DMH adapted to the region (Area ~ 250.000 km<sup>2</sup>). The Pantanal will be included next (additional 140.000 sq km.)

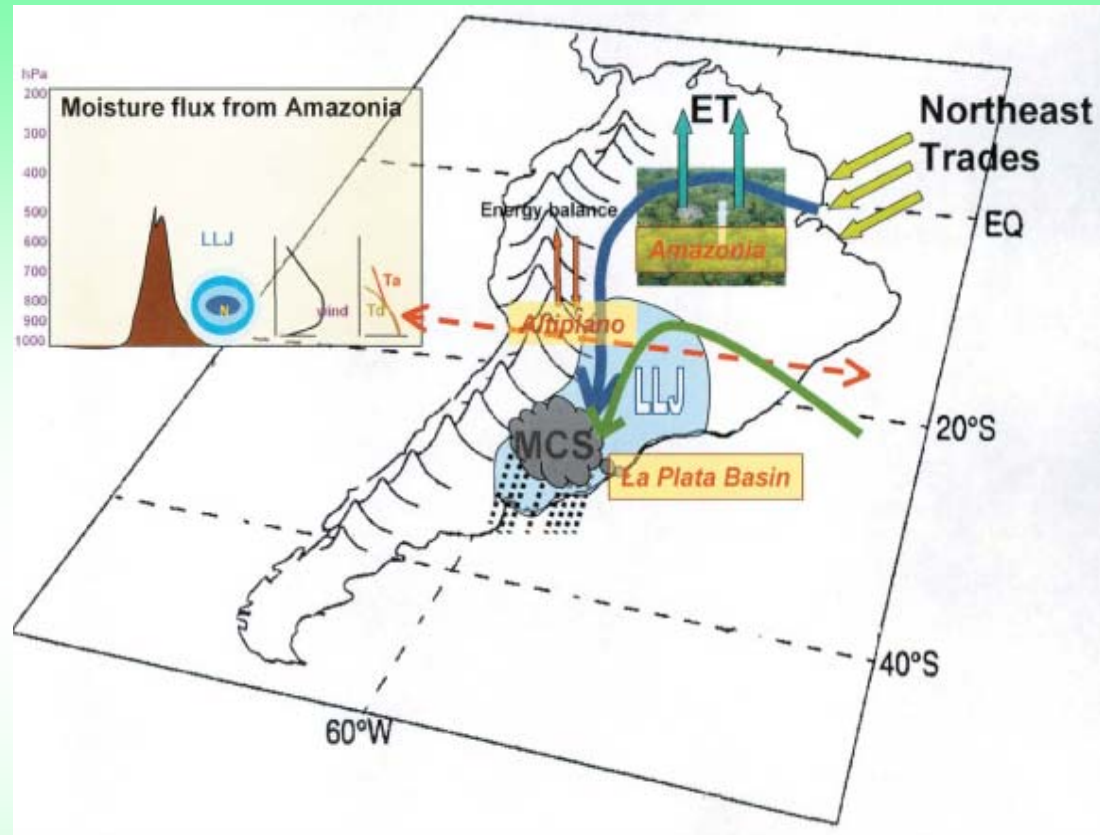


5. São Francisco River Basin: DHM coupled to RAMS and ETA for long-range prediction. On-going project. (Area ~ 600.000 sq km.)

**Courtesy: Carlos Tucci.**

The South American low-level jet (SALLJ) flows southward along the lee of the Andes.

SALLJ plays key roles in moisture and energy exchange between the tropics and extratropics and related aspects of regional hydrology, climate and climate variability



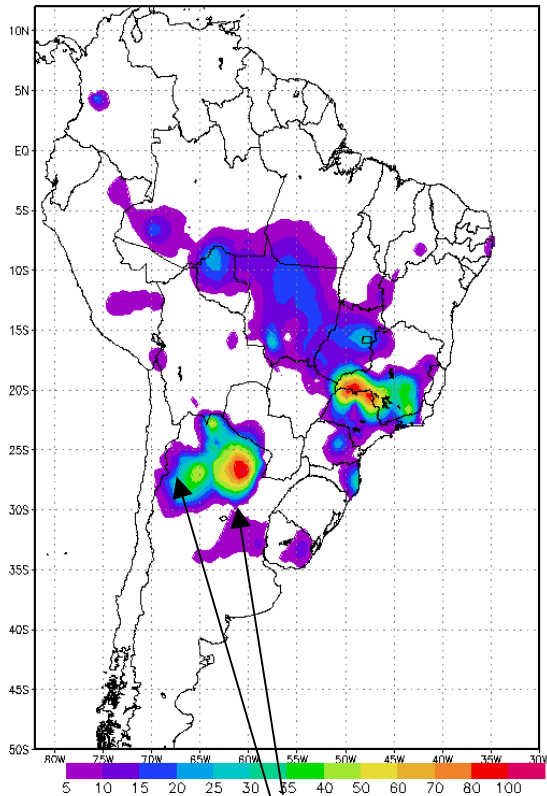
# PRECIPITATION FORECAST WITH THE REGIONAL ETA MODEL WITH SALLJEX DATA -CPTEC (24h)

OBSERVED

NCEP INITIAL DATA

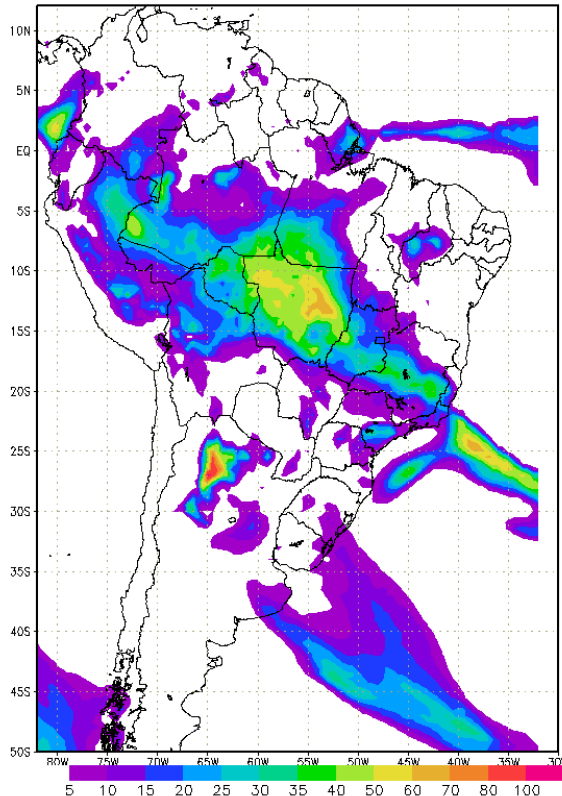
PSAS WITH SALLJEX

Synop - 2003/01/18 12z

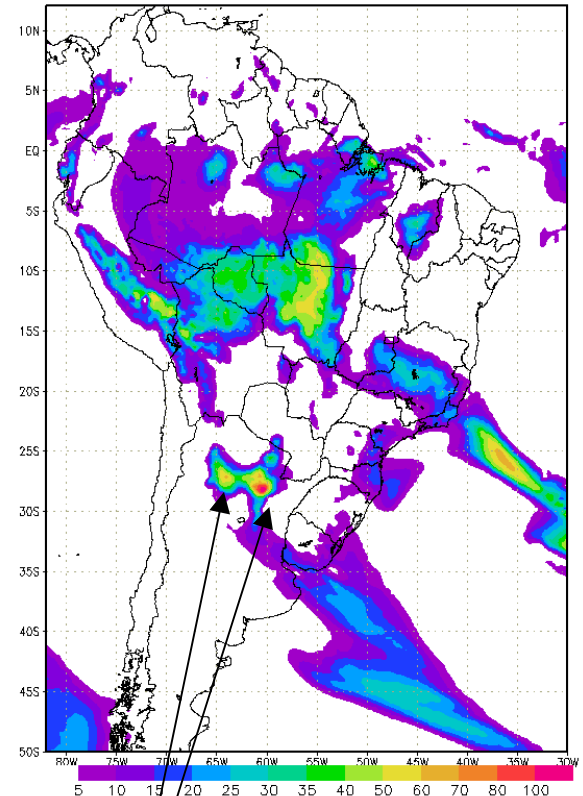


2 centers

FCT-24h valido para 2003/01/18 12z  
NCEP



FCT-24h valido para 2003/01/18 12z  
SALLJEX



2 centers



Science

Data Access

Data Policy

Links

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Documents

Maps

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Science Study Group



## La Plata Basin Project (PLATIN)



### Overview

\* CLIVAR/VAMOS identified the *Río La Plata* Basin as a climate-hydrology system with components that are potentially predictable with useful skill from seasons in advance, and whose variability has important impacts on human activities.

\* PLATIN provides a framework for integration of regional projects leading to improved predictions of the climate and hydrology system, and the coordination of those projects at the highest international level (WMO/WCRP)

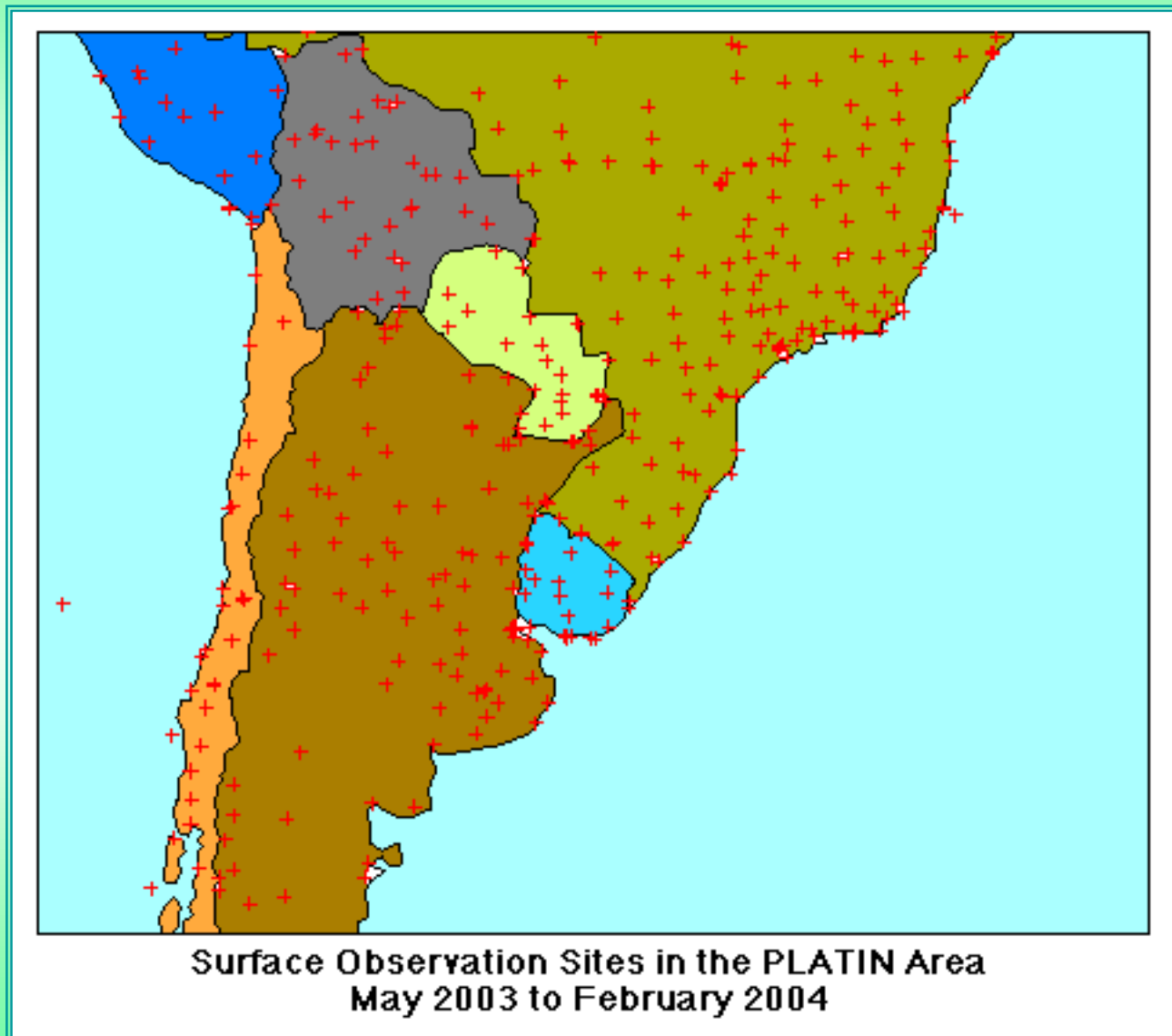
\* PLATIN can act as an advocacy group to agencies that provide funding for science projects and the strengthening of the scientific infrastructure.

\* PLATIN aims to enhance the scientific infrastructure in the Plata Basin in agreement with producers and users of climate information.



[www.joss.ucar.edu/platin](http://www.joss.ucar.edu/platin)

## Information on LPB database (example)



# A Framework Strategic Action Plan for La Plata Basin

Requesting Agency:	United Nations Environment Programme (UNEP)
Local Executing Agency:	Intergovernmental Coordinating Committee for La Plata Basin (CIC), in co-operation with water agencies of Argentina, Bolivia, Brazil, Paraguay, and Uruguay
Executing Agency:	Organization of American States (OAS)
Funding Agency:	Global Environment Facility (GEF)
Current Status:	Preparation phase 11/1/03-4/30/05
Preparation Cost:	US \$1,376,100 (US \$700K GEF Block B; \$676K Other Sources, including WMO)
Project Total Cost:	GEF has placed \$15M on Reserve; Countries and Other Sources may contribute 2:1 for a potential total of US \$45M.

# PLATIN in LPB Framework Project - GEF (Activity 2a and Activity 2b)

- **SURVEYS OF LPB CLIMATE AND HYDROLOGY**

**Completed 7/30/04**

Theme 1: Climate and hydrology review

Theme 2: Numerical prediction models

Theme 3: Climate and hidrology extremes

Theme 4: Technical bases and instrumentation

- **IMPLEMENTATION OF A CLIMATE AND HIDROLOGY PREDICTION SYSTEM FOR LPB**

**In progress; completion 6/01/05**

Theme 1: Climate change scenarios

Theme 2: Impacts of changes in soil conditions

Theme 3: Climate prediction system

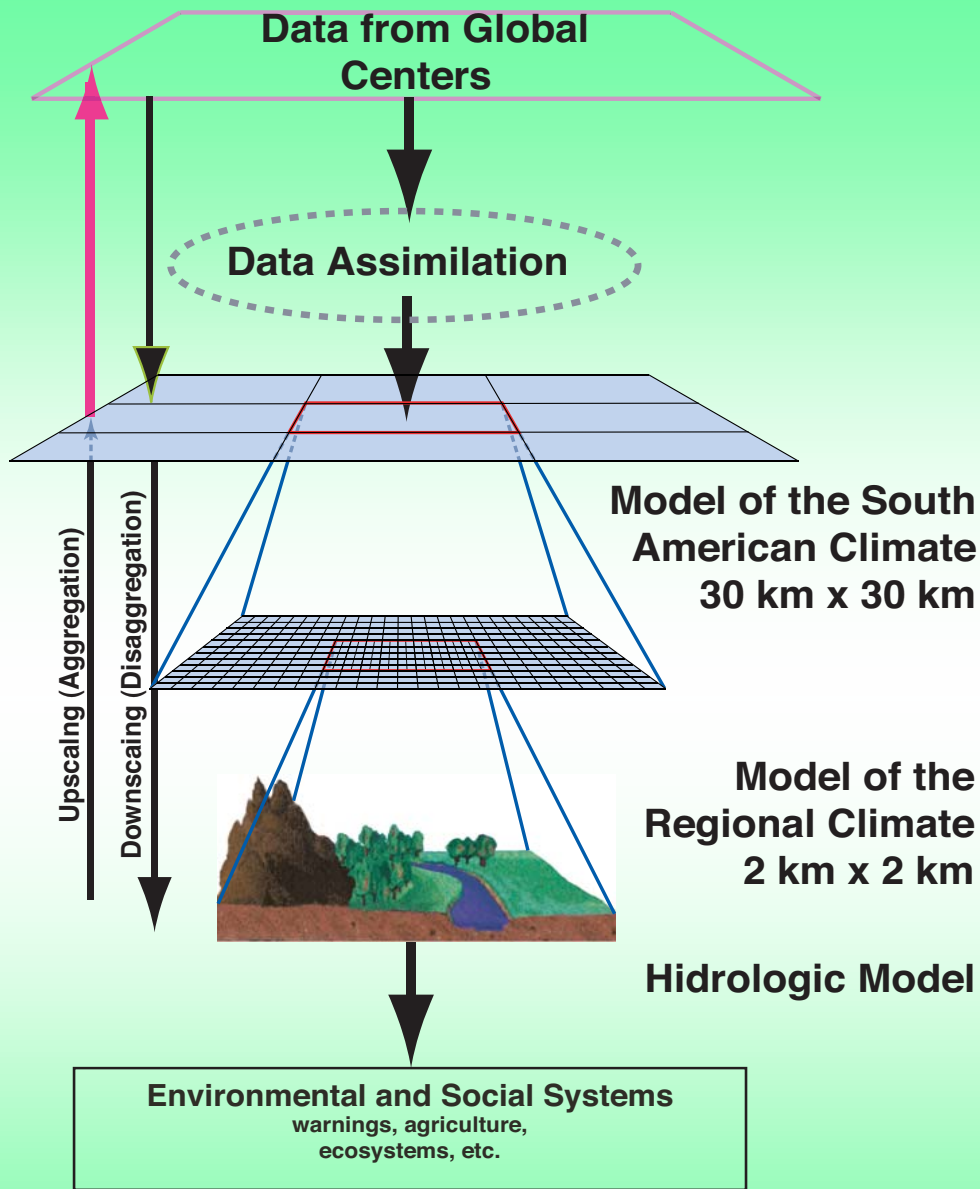
Theme 4: Hydrology prediction systems

# Example of survey during Activity 2a:

## Numerical models used in LPB

Institución	Carácter Principal	Modelo	Dominio	Tiempo pronóstico	Resolución Km	Frecuencia	Condiciones Iniciales/ Borde	Asimilac. Datos
INMET	Servicio Nacional	DWD regional	S. América	78hr	25	00 y 12	DWD	No
CHBN	Operaciones Marianas	DWD regional	Este de S. América	60hr	25	00 y 12	DWD	No
CPTEC	Operaciones./ investigación	Global/ CPTEC	Global	12 días	100	00 y 12	NCEP GPSAS	No Sí
CPTEC	Operaciones./ investigación	ETA/ CPTEC	S. América	7 días	40/20	00 y 12	CPTEC/ GLOBAL RPSAS	No Sí
UFRJ	Semi-op/ investigación	MM5	SE S. Brasil América	5 días	30,10	00 y 12	AVN/NCEP	No
MASTER USP	Semi-op Investigación	BRAMS	S. América Central/SE	72hr	20	00 y 12	CPTEC NCEP	Sólo datos de superficie
SIMEPAR	Semi-op Investigación	BRAMS ARPS	SE/S Brasil N. Arg.	60hr	64,16	00 y 12	CPTEC NCEP	Sólo datos de superficie
UFSC	Op. Irregular Investigación	ARPS	SE/S Brasil N. Arg	60hr	36,12,4	00 y 12	NCEP	No (posible)
UFRGS	Semi-op Investigación	BRAMS	S/Brasill/ N. Arg	60hr	64,16.4	00 y 12	NCEP	No
CIMA	Semi-op Investigación	LAHM	S S. América	72hr	65	00 y 12	NCEP	No
UMD	Semi-op Investigación	ETA	S. América/ Cuenca del Plata	72hr	80 22	00	NCEP	No
CATO LNCC	Semi-op Investigación	ETA	S. E. Brasil	72hr	17,10	00	NCEP	No

Tabla 1. Características básicas de los modelos ejecutados regularmente por instituciones que proveen datos a los usuarios



A model  
for LPB's  
climate  
and  
hydrology

# A Field Experiment in LPB: **PLATEX**

## **Motivation**

- Flood impacts on cities and huge plains; hydropower production and navigation sensitivity to streamflow variations.

## **Selected Scientific Issues**

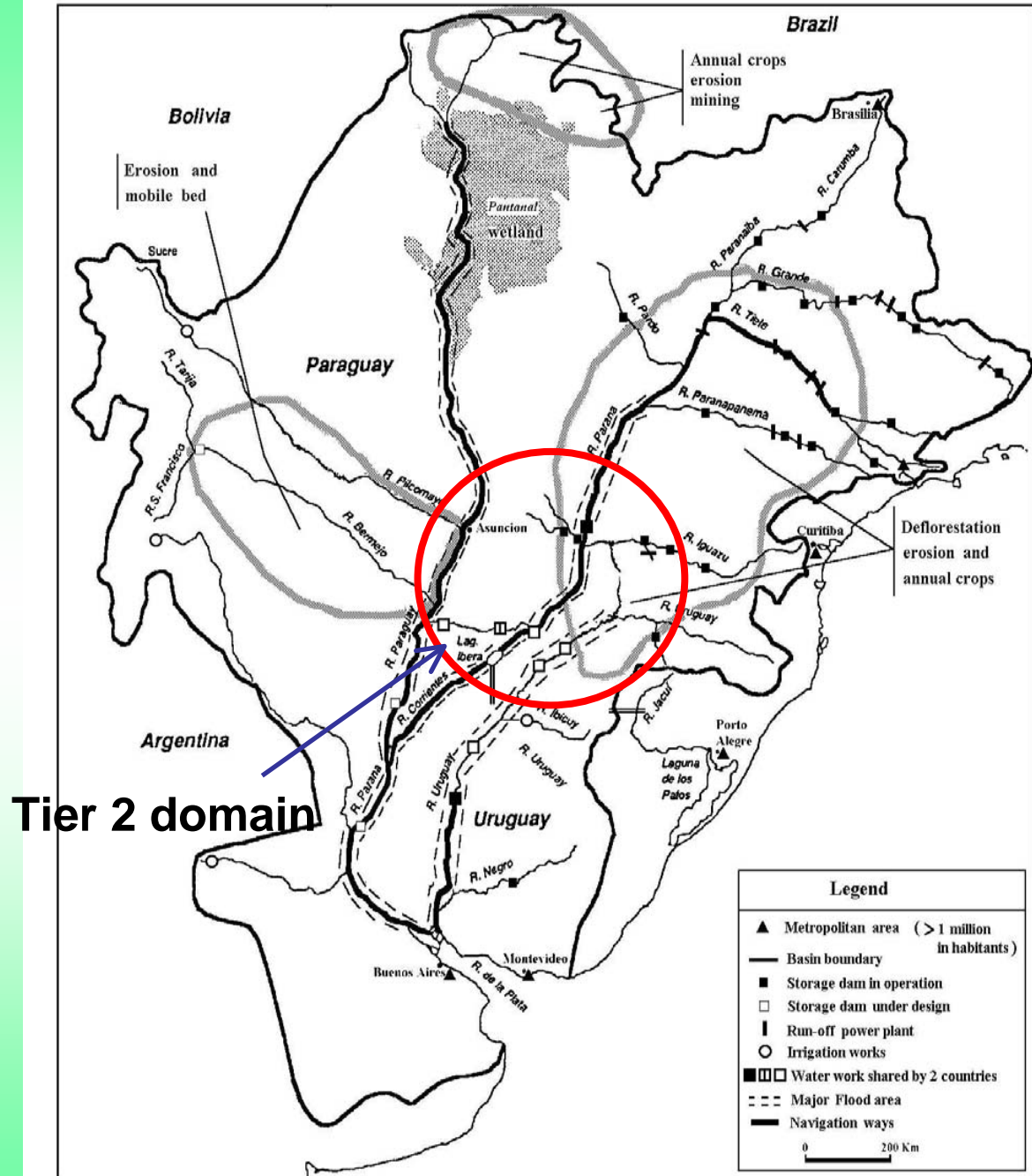
- Relative contributions to variability of climate and land use change are not well known.
- Effects of aerosols advection from biomass burning from tropical areas are largely unknown.

## **Design Issues**

- Design strategy based on catchments with increased complexity and geographical extent.
- Other potential linkages – satellite missions in proposed time frame (2007-2010): GPM (potential for PLATEX as verification site), SMOS, EOS/Terra and Aqua, others...

A highly suitable location for Tier 2 of PLATEX would be an area in the SALLJ path with maximum (mean and extreme) rainfall.

The Mid-Parana basin is one such location. The basin is a major source of runoff in the largest floods, and has experienced major changes in land use (e.g. from forest to agriculture).

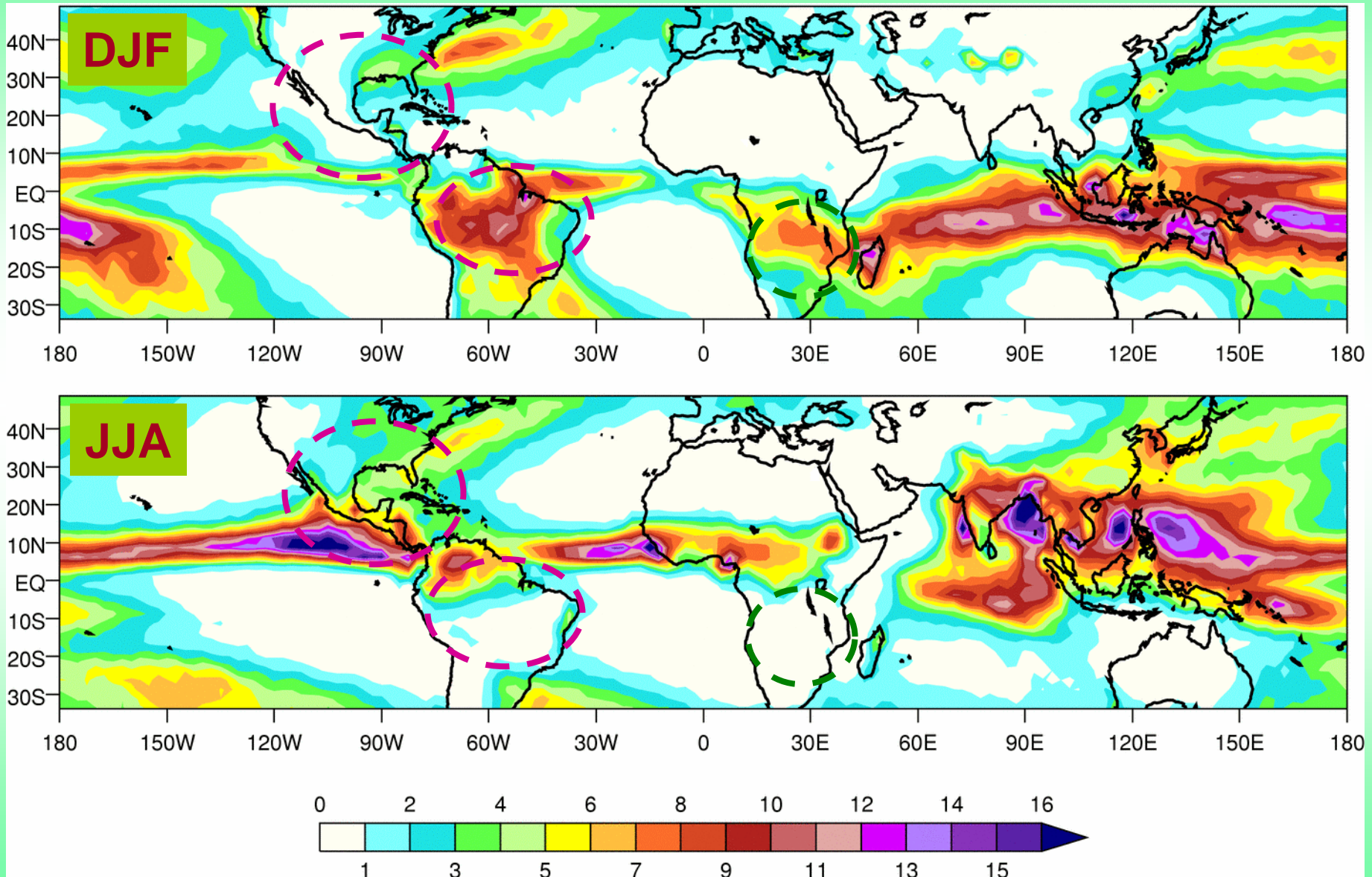




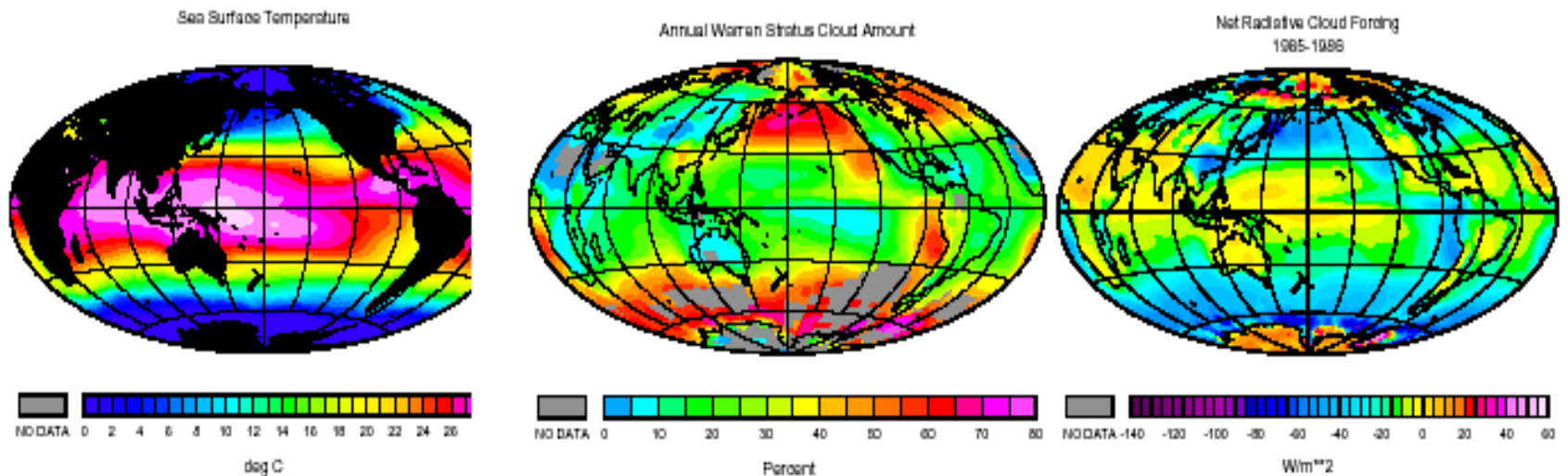
# Summary

- The LPB offers a unique blend of large and regional scale climate and hydrology issues, with impacts on society.
- There is also a unique partnership by countries in the basin with international funding by GEF
- The GEF Program generated surveys of the LPB's hydroclimate, including the systems used for its prediction and monitoring.
- The PLATIN-related activities in the same program are focusing on the development of plans on different aspects of the LPB's hydroclimate.
- These plans are the basis for the LPB CSE's implementation plan.

# Rainfall (mm/day)

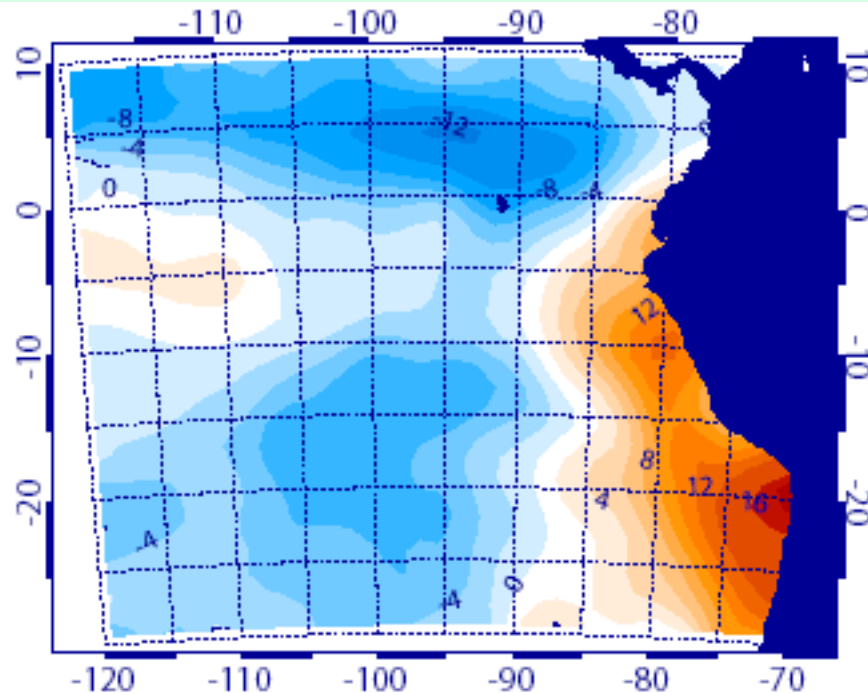


# The marine stratocumulus issue

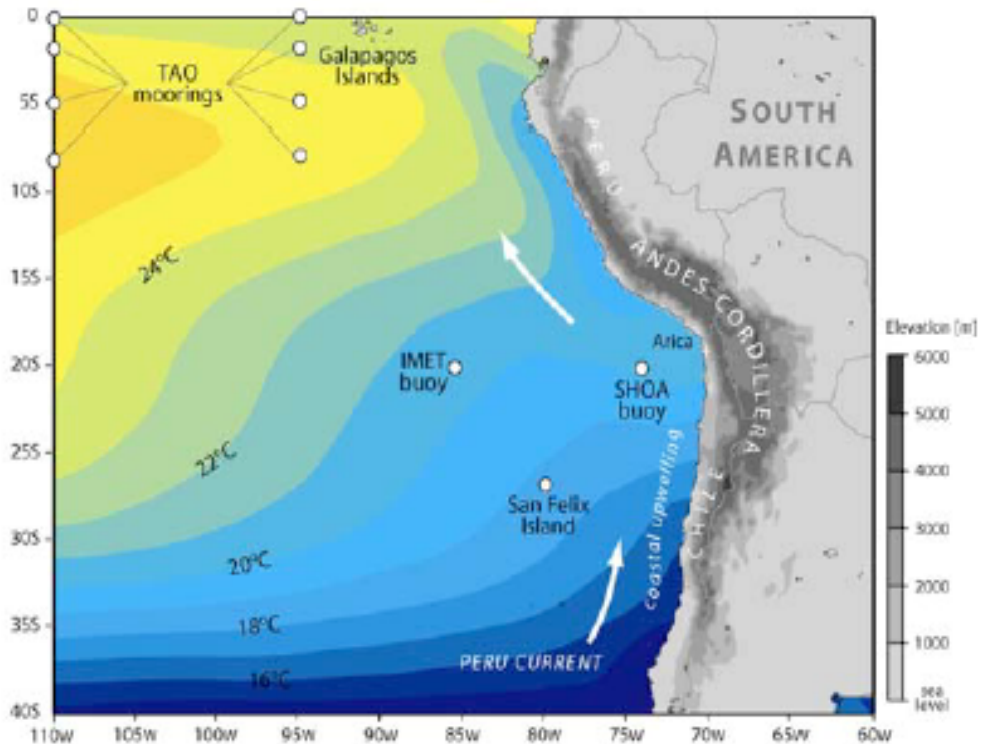


*Figure 1 : Annual-mean climatological SST (left), stratus cloud amount from ship observations (middle), and ERBE-derived TOA net cloud radiative forcing (right).*

# Impact of variations in cloud properties



*Fig 6: Component of Sept.-Oct. 2000 SEP shortwave cloud forcing [ $W m^{-2}$ ] due to geographic variations in cloud droplet effective radius, inferred from MODIS (Rob Wood).*



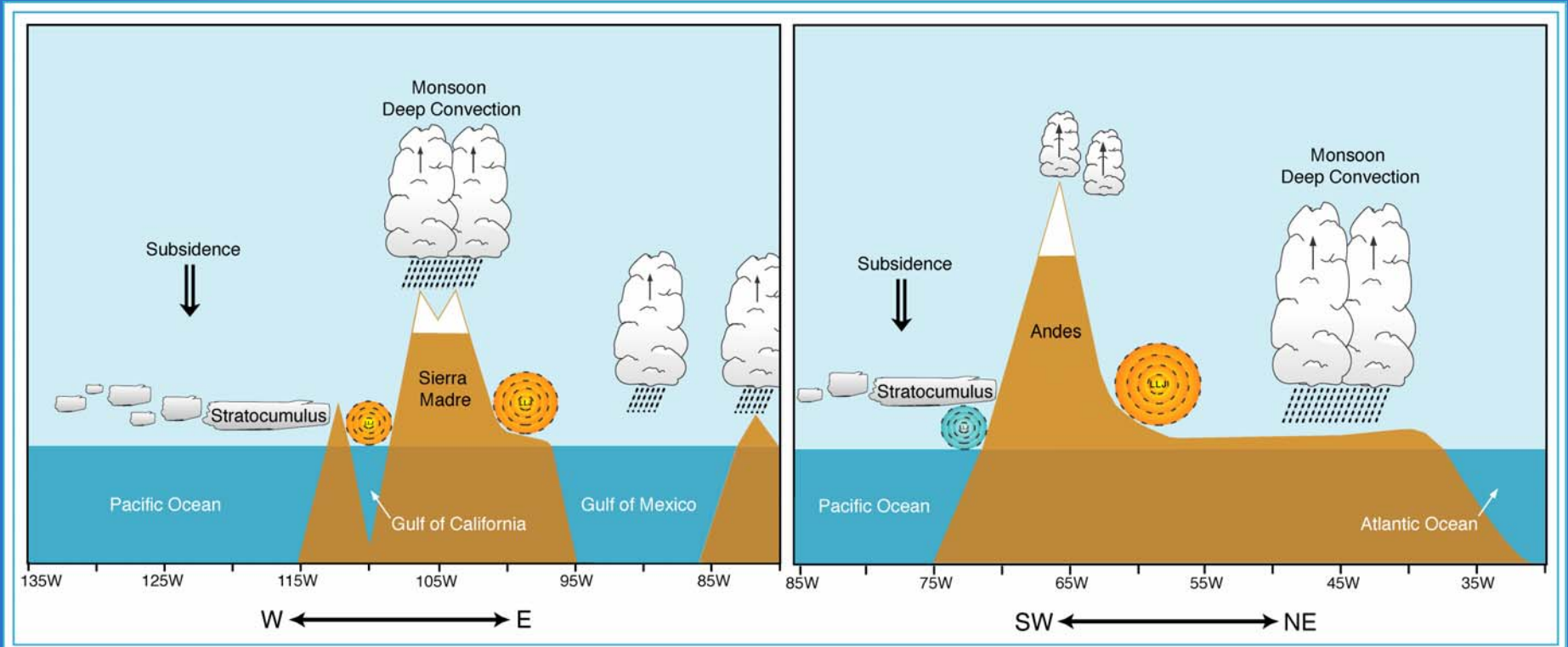
*Fig. 7: Map of the SEP showing important VOCALS sites, overlaid on mean annual SST.*

### **IMET WHOI Data**

1. Barometric Pressure
2. Sea Surface Temperature
3. Relative Humidity/Air Temperature
4. Air Temperature (Static or Aspirated)
5. Wind Speed and Direction
6. Precipitation
7. Longwave Radiation (incoming)
8. Shortwave Radiation (incoming)

# Ascent to the east - Descent to the west

## A unifying aspect of monsoons



# A CEOP Site in the Peruvian stratocumulus region?

- Appealing science questions
- “Anchored” by IMET WHIO buoy
- Data from EPIC and VOCAL campaigns
- Heavy use of satellite data
- Others....Under the SACZ?

THE

END