



South America Low Level Jet field EXperiment

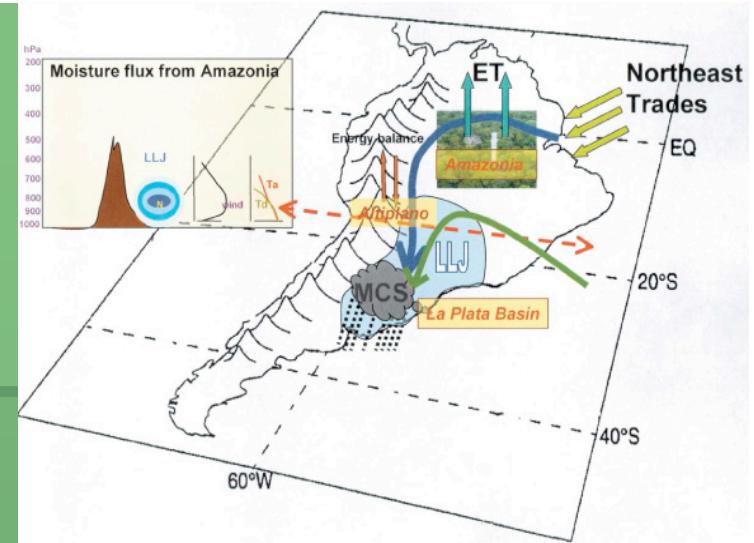
SALLJEX legacy and main findings

Celeste Saulo
LPB Meeting, Buenos Aires, March 2007

Outline

- SALLJ Scientific Goals and Specific Objectives
- SALLJEX Components - Participant Countries
- SALLJEX observations and data sets
- Main results

VAMOS/SALLJ Program Specific objectives

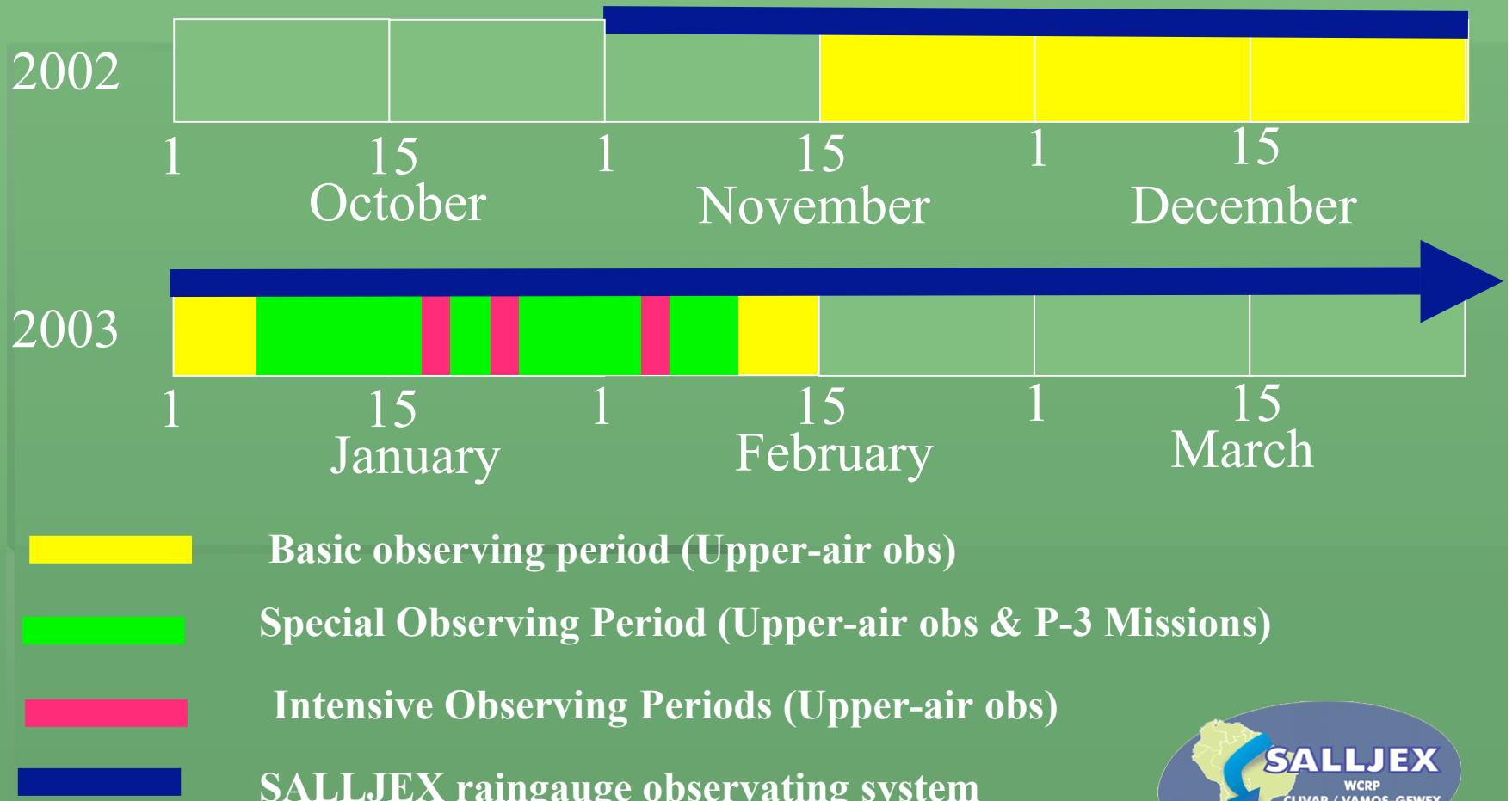


- obtain an improved description of the temporal and spatial structure of the SALLJ based on expanded monitoring activities and special field experiments,
- evaluate the veracity of numerical representation (forecasts and analyses) of SALLJ against special observations and,
- determine improvements of initial state representation and model parameterizations required to improve prediction.

Salljex: Partners and Field Components

- Participant countries: Argentina, Bolivia, Brazil, Chile, USA, Paraguay, Perú
- Main funding sources: NOAA/OGP and NSF (USA), FAPESP (Brazil), ANPCyT (Argentina)
- Upper-air network enhancement
- Daily precipitation network enhancement
- NOAA/P-3 Missions
- Modeling
- NOAA/OGP Educational and outreach Program:
 - ↳ Teachers in the field

SALLJEX Timeline



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SALLJEX observational components: Upper air

- 4504 Pilot balloon observations in 26 stations
- 279 extra Radiosondes over Argentina, 200 over Bolivia and Paraguay and 120 over Brazil



Approximately
between 4 and 6
observers at each site

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SALLJEX Upper Air Network During the SOP

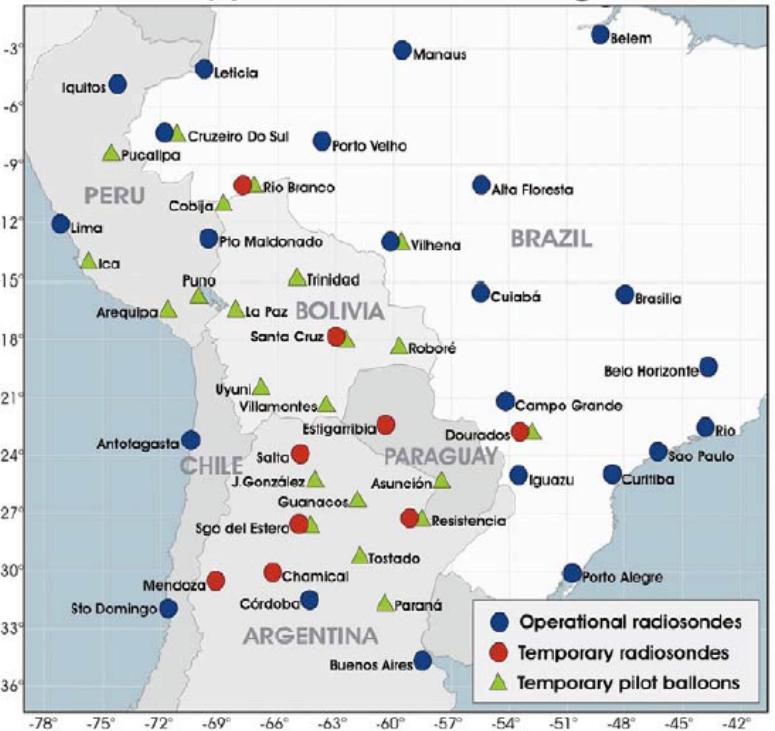
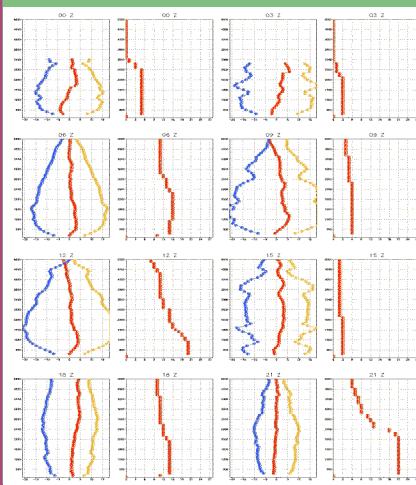


FIG. 4. Radiosonde and pilot balloon networks of SALLJEX.

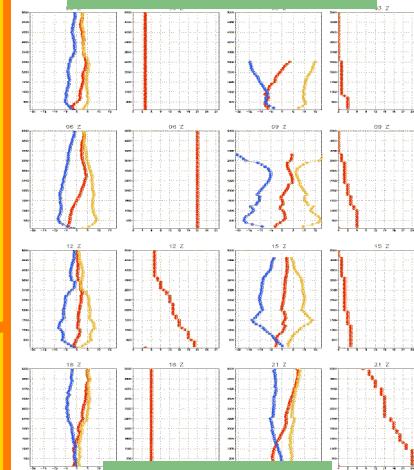
~140
extra
observers

Wind Profiles and quantity of observations at some stations over SALLJEX area

Mariscal Estigarribia



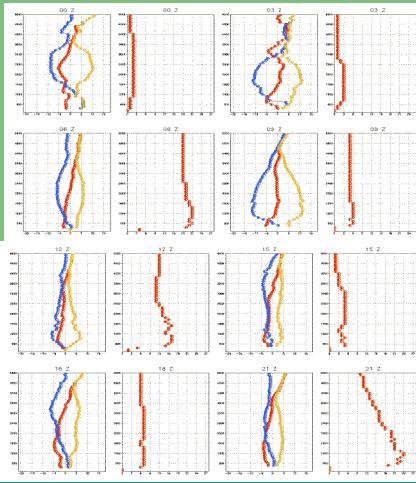
Resistencia



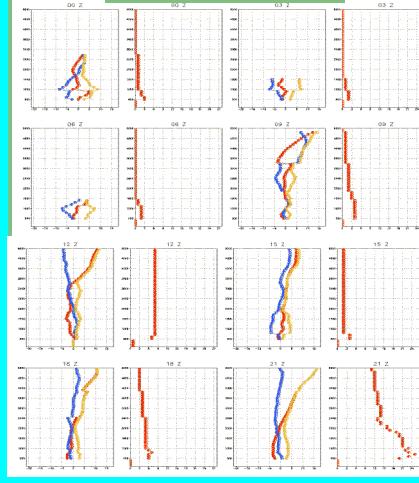
UTC times

00	03
06	09
12	15
18	21

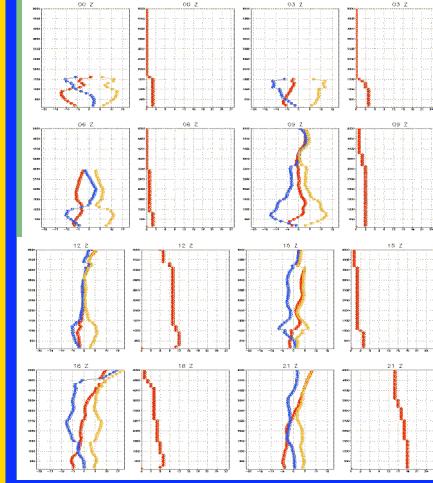
Santiago del Estero



Córdoba



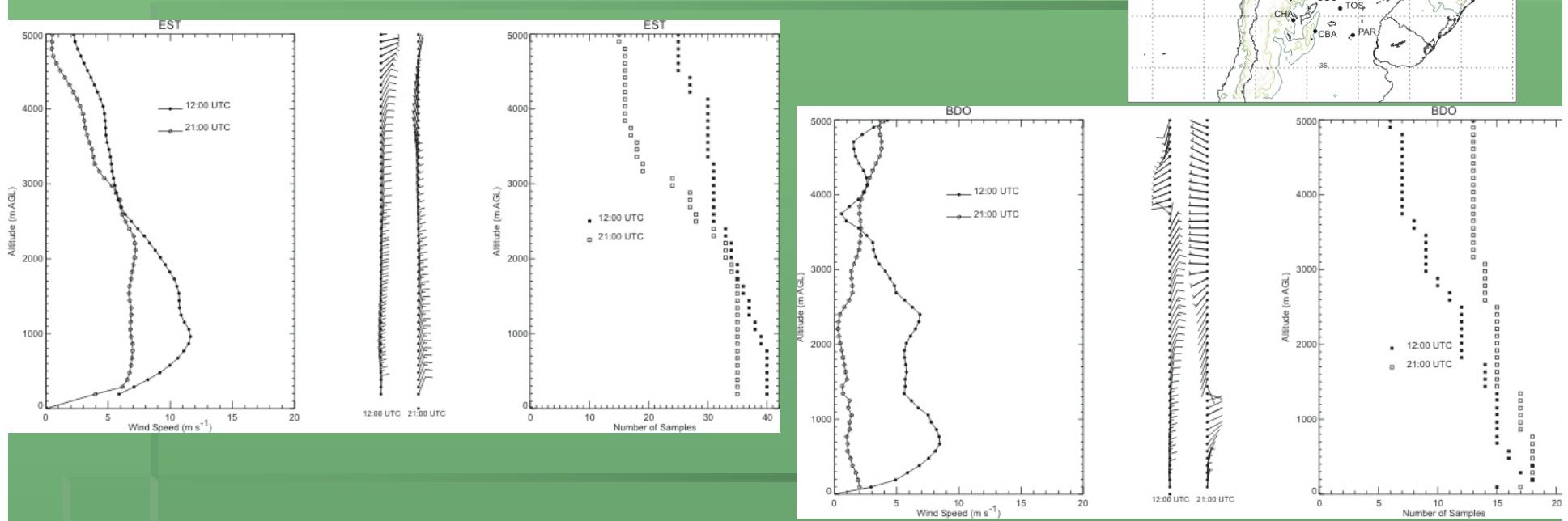
Tostado



Nicolini et al,
2004

PACS web page

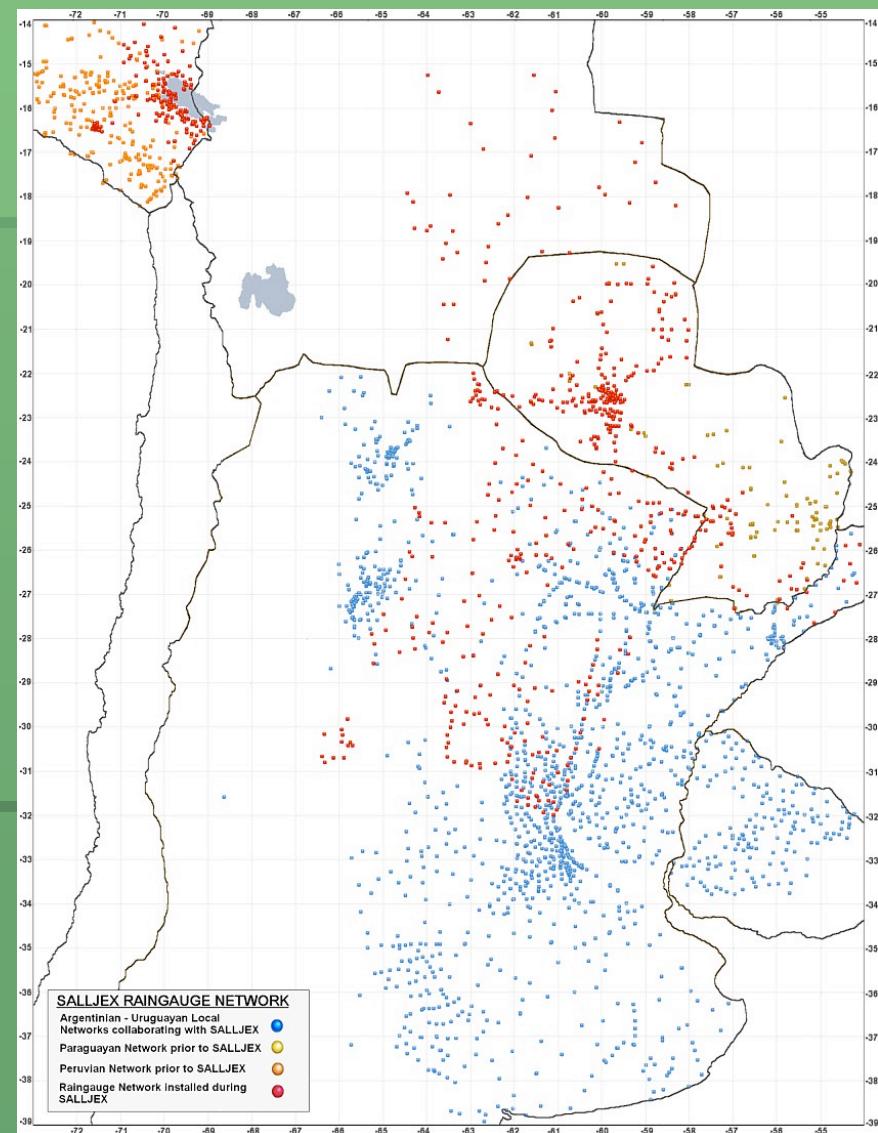
<http://www.nssl.noaa.gov/projects/pacs/web/html/salljex.html>



- Average wind from pibals during SALLJEX experiment. These values were calculated during LLJ events

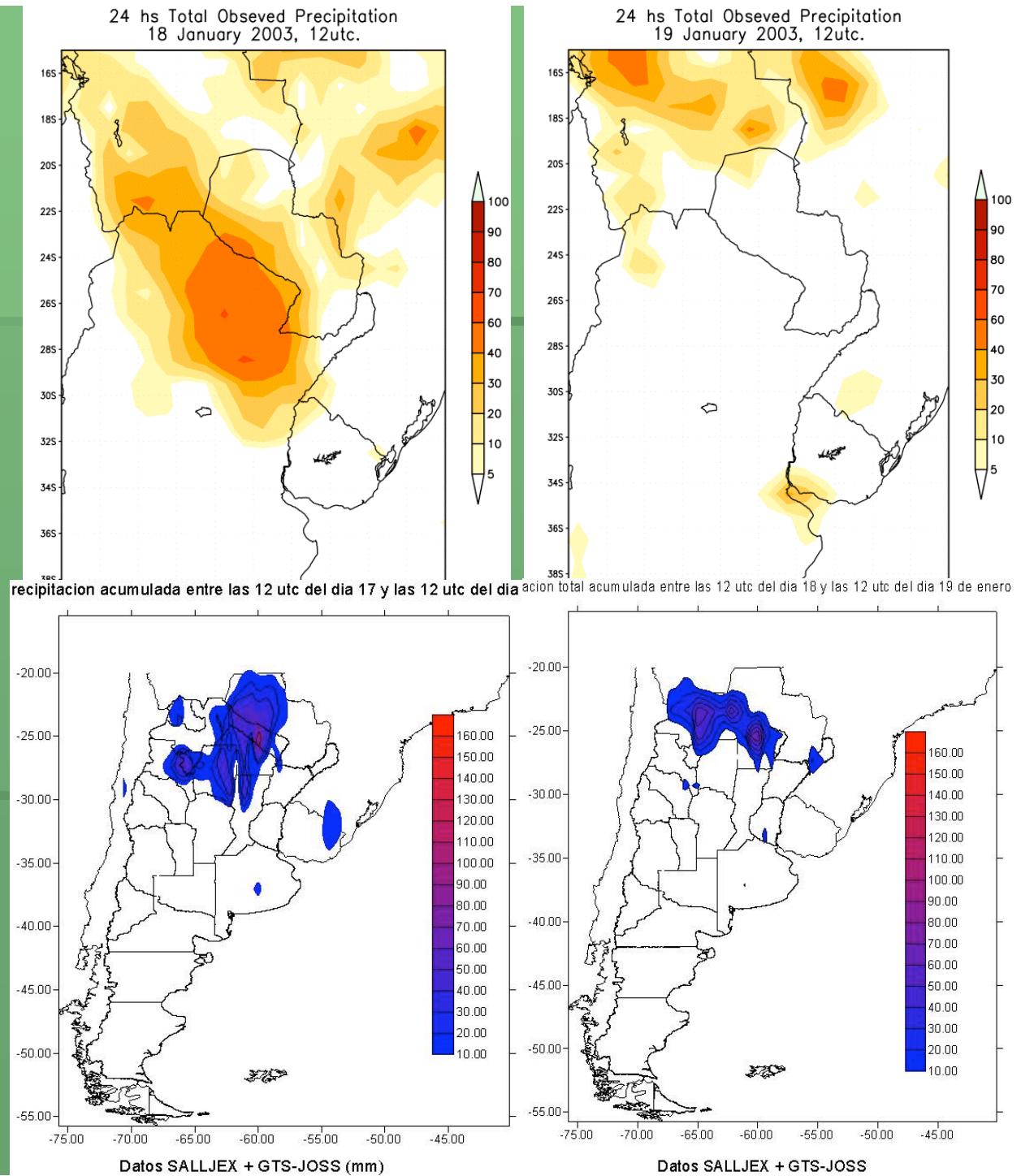
SALLJEX observational components: Raingauges

- **795** installed raingauges
- More than **1500** raingauges were made available



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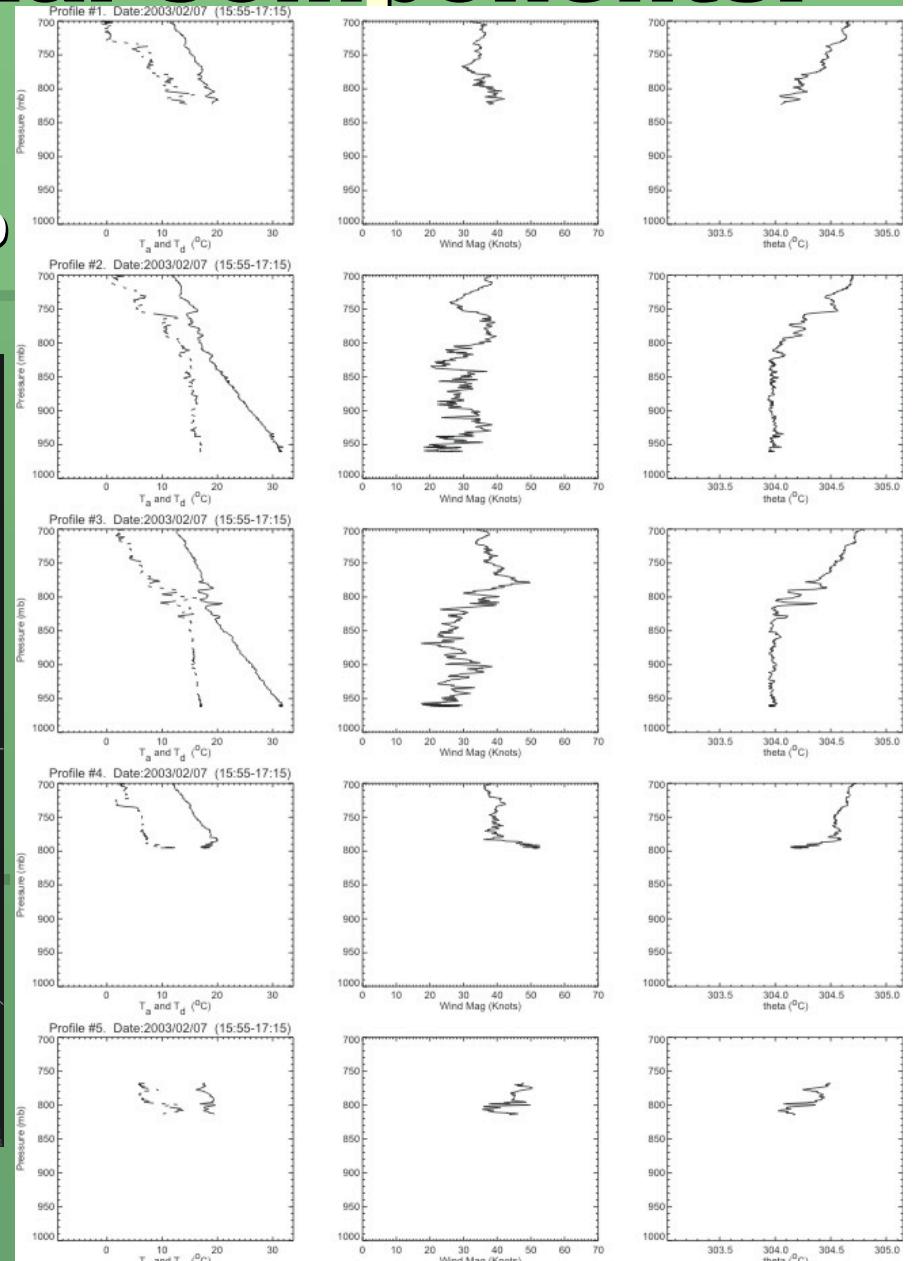
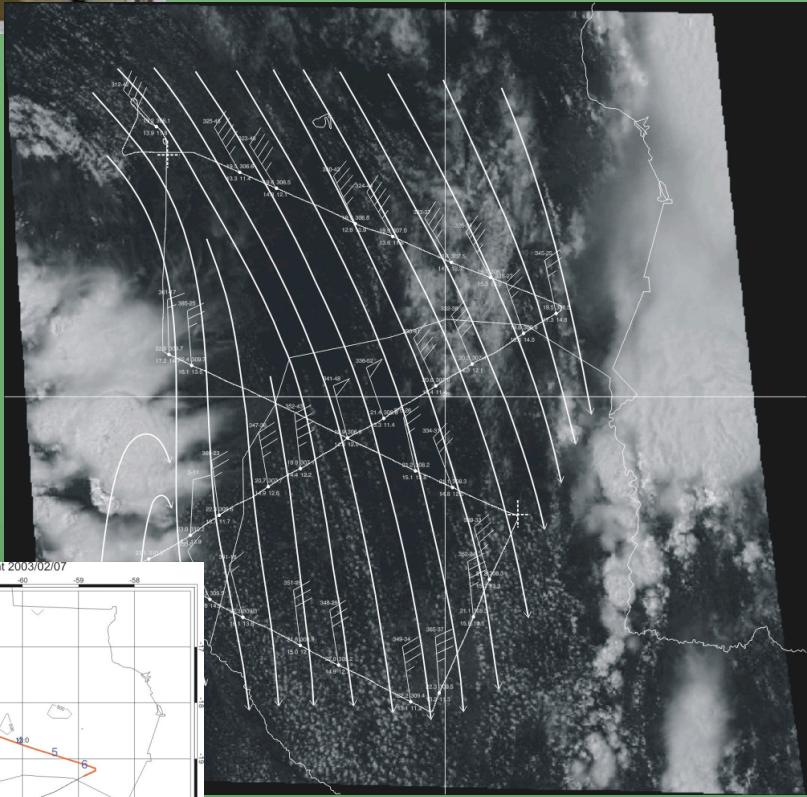
Evaluate the veracity of numerical representation (forecasts and analyses) of SALLJ related patterns against special observations





Observational components: NOAA P3

- 99.1 flight hours to cover 13 missions



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The SALLJEX web page

SALLJEX at NCAR/EOL - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

WEBMAIL - CIMA Impacto de la estructura y dinámica de los ... SALLJEX at NCAR/EOL

 SALLJEX WCRP CLIVAR / VAMOS-DENEX Field Campaign Santa Cruz, Bolivia Jan-Feb 2003

South American Low-Level Jet Experiment

General Information

- [BAMS article on SALLJEX Campaign](#) UPDATED
- [NOAA OGP Teacher-in-the-Field Program for SALLJEX](#)
- [SALLJEX Project Office](#)
- [SALLJEX Operations Plan](#)
- [SALLJEX Page at the National Severe Storms Lab](#)

Data Management

- [SALLJEX Data Management page](#)
- [SALLJEX Field Catalog](#)
- [SALLJEX Data Workshop \(includes presentations\)](#)
(Dec 10-12, 2003- Buenos Aires, Argentina)
- [Numerical Models links page](#) at Univ of Buenos Aires
- [Regional Weather Products](#) at University of São Paulo

Science Planning

- [Science Working Group](#)
- [South American Low level Jet International Conference](#)
(Feb 2002, Sta Cruz, Bolivia)
- [Implementation Plan for the American Low-Level Jet Systems](#) (U Utah)

Logistics and Support

- [List of Project Participants](#)
- [Agenda of Operations coordination meeting](#)
Buenos Aires, AR--July 24-26, 2002
- [Buganvillas Hotel](#) Sta Cruz, Bolivia
(SALLJEX Operations Center site)

- <http://www.eol.ucar.edu/projects/salljex/>

Salljex publications

- CLIVAR/Exchanges SALLJEX Special Issue, March 2004.
- The South American Low Level Jet experiment, Vera et al., BAMS 2006

SALLJEX components: Modeling Groups from Argentina, Brazil, Chile and US issued daily weather forecasts

- NOGAPS model Analysis
- University of Utah Model Analysis
- ETA/CPTEC 40 km res., 00 and 12 UTC FC
- ETA/CPTEC 20 km res., 12 UTC FC
- ETA/UMD 80 km res., 00 UTC FC
- LAHM/CIMA 60 km res., 00 UTC FC
- NCEP/AVN 100 km res., 00 UTC FC
- RAMS/UBA 20 km res., 00 UTC FC
- RAMS/USP 25 km res., 00 and 12 UTC FC
- U of Chile MM5 30 km res., 12 UTC FC

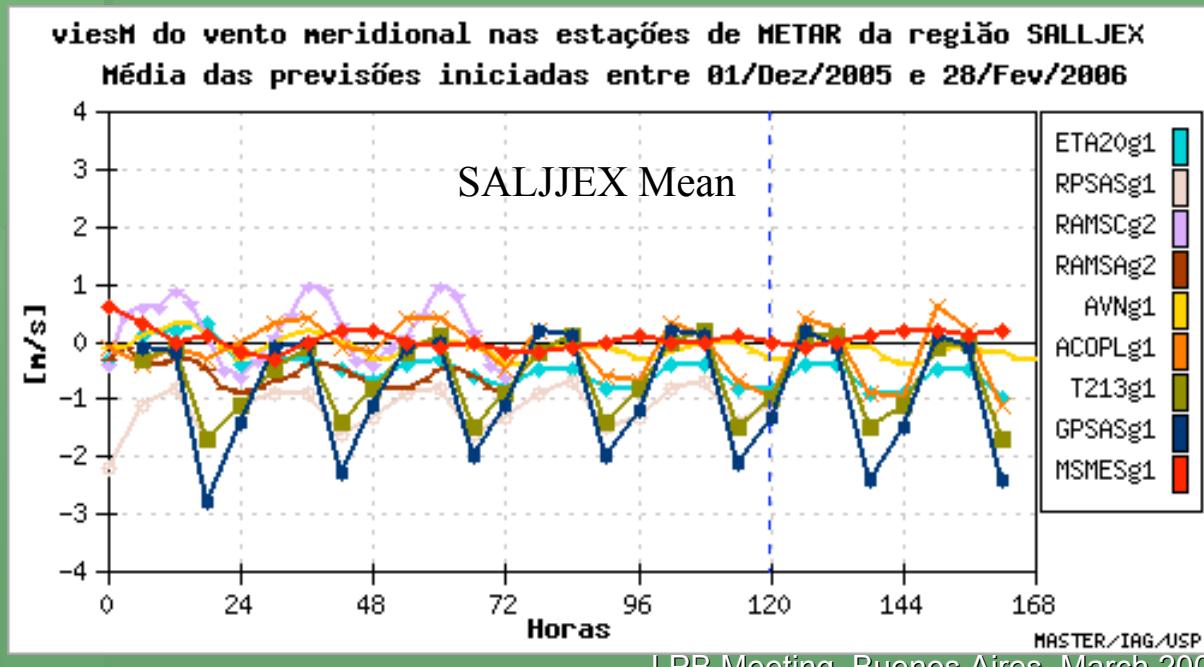
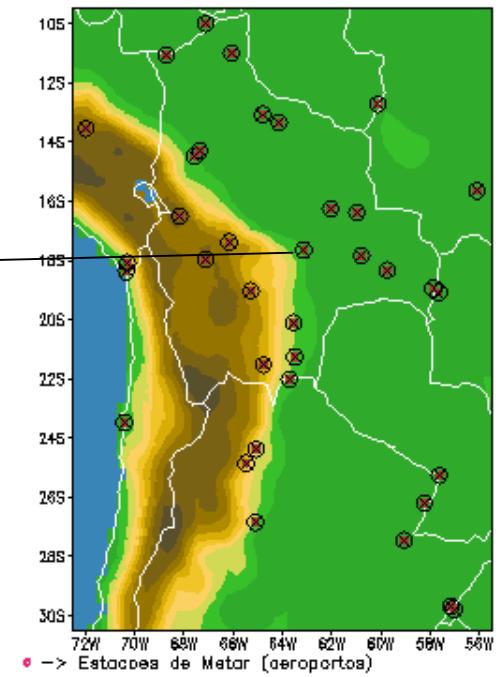
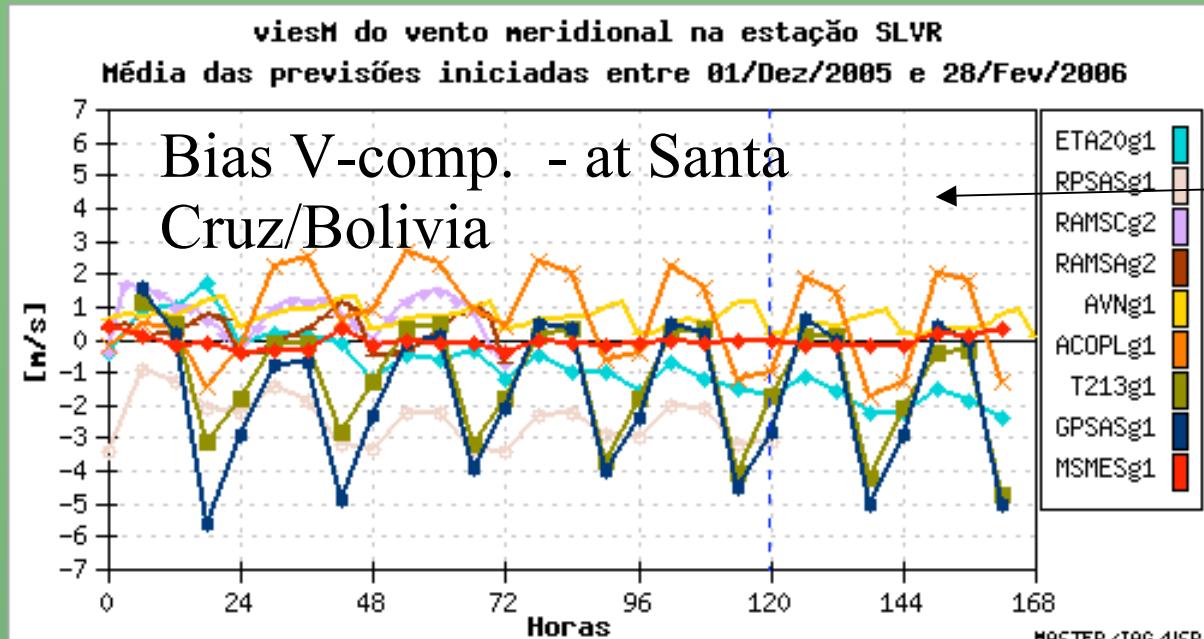
The SALLJEX coordinated numerical model experiment was the starting point to the development of a regional super-ensemble

Integration of models: Concept of Super Model Ensemble

<http://www.master.iag.usp.br/>

- Several models are available:
 - global, (CPTEC, NCEP, ECMWF, UKMO,...) aprox. 12;
 - Regional models in S. America: CPTEC (ETA, BRAMS), INMET (DWD regional model), MASTER (BRAMS), SIMEPAR (ARPS, BRAMS), UFRJ (MM5, WRF, RAMS), FURGS (BRAMS), EPAGRI (BRAMS), LNCC (ETA), CIMA/UBA (WRF), aprox. 26 models !...

Differences in physical processes parameterization, data assimilation, data source ...



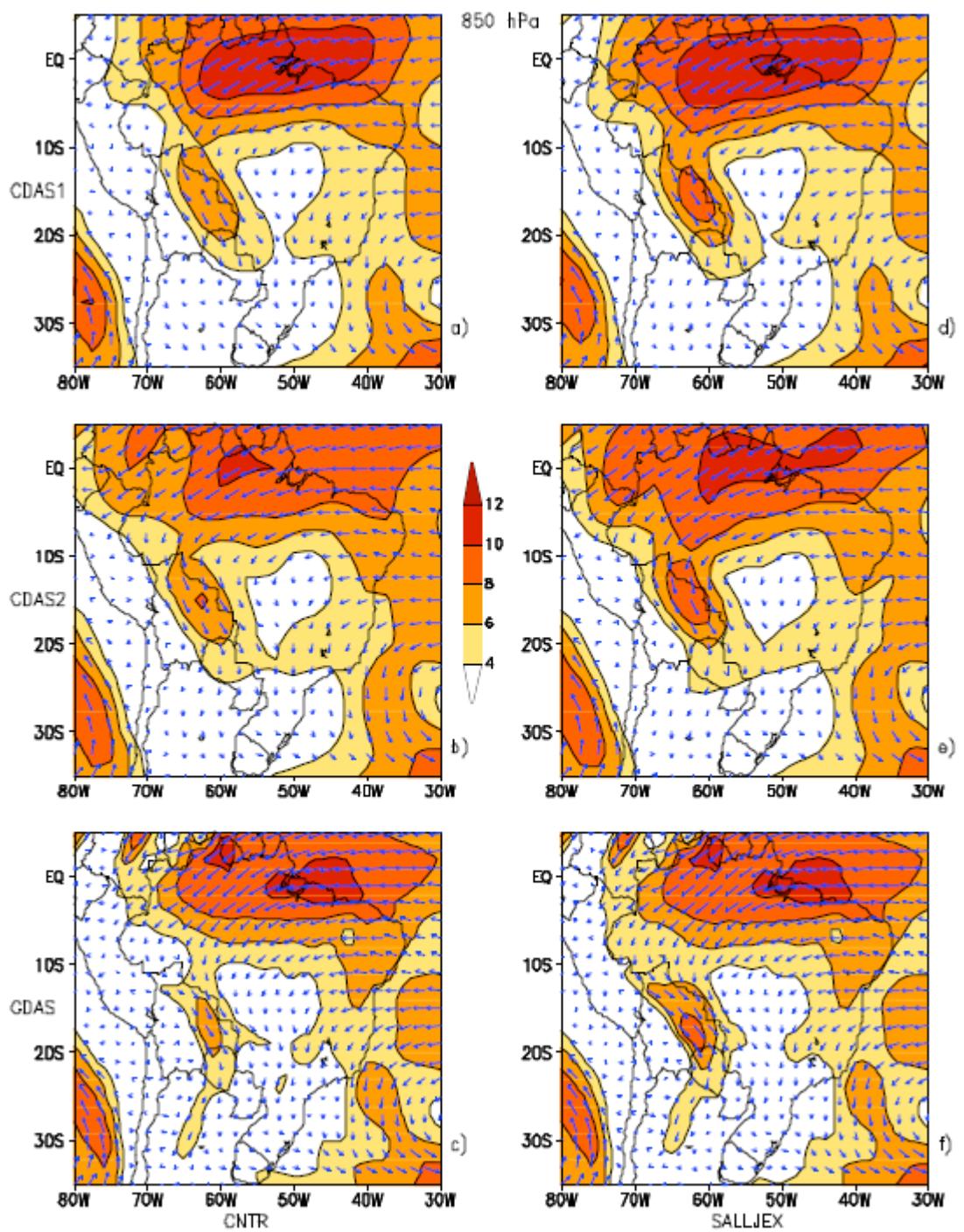
Meridional Wind Component Bias up to 7days forecast
MESMES is the optimal statistical combination of all available forecasts (near zero bias)

The reanalysis using SALLJEX data

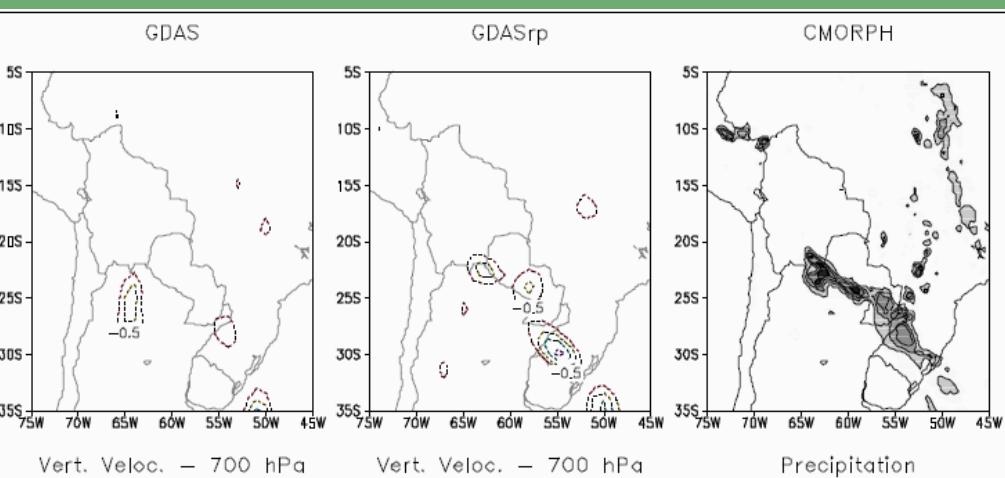
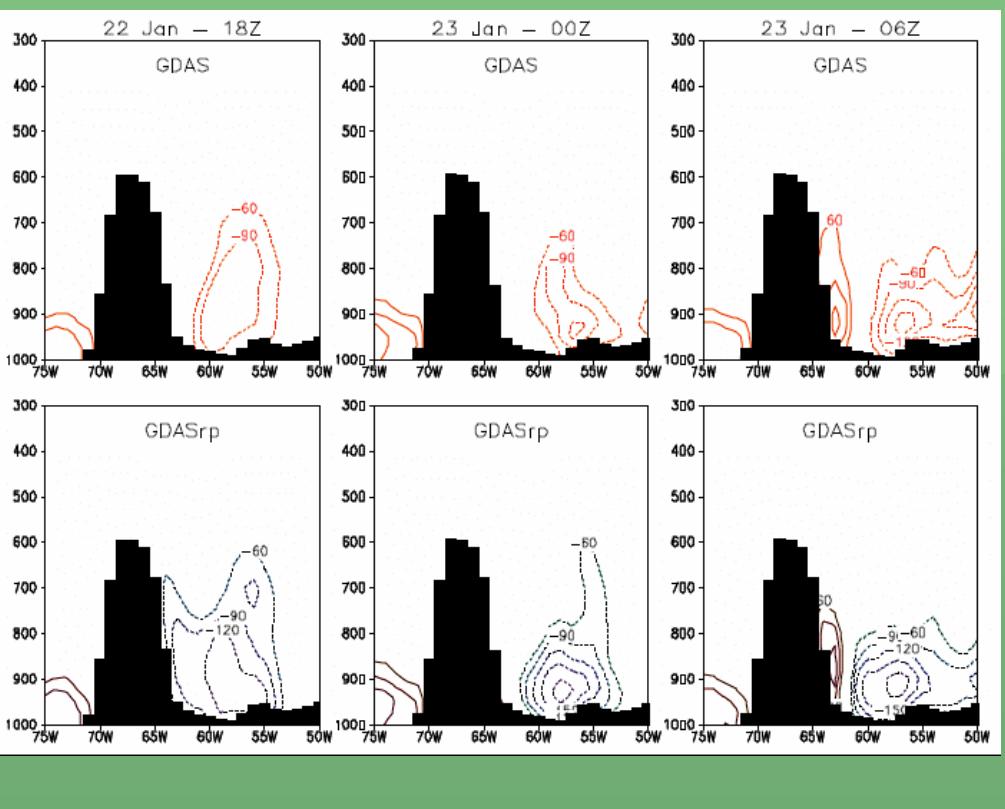
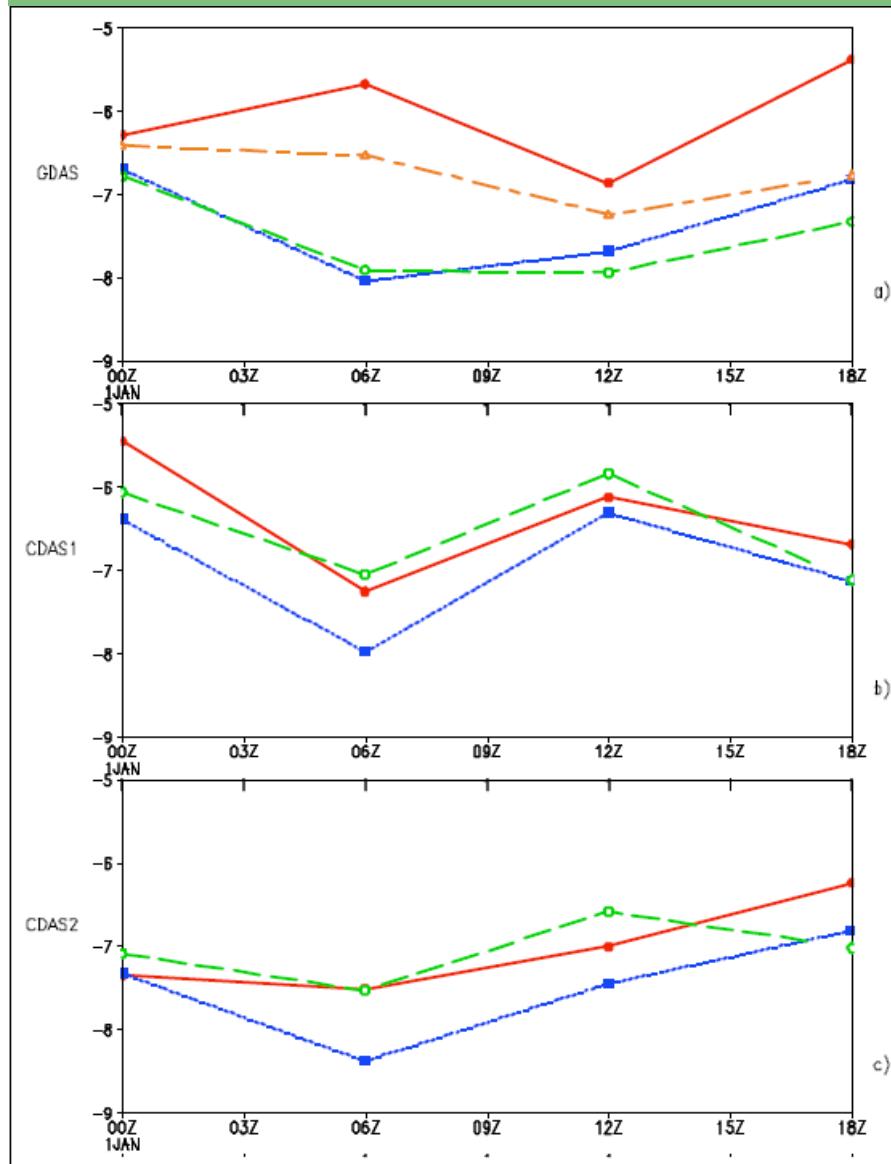
Herdies et al, J. Clim 2007

- Local impact:
Mean low level
wind at 850
hPa

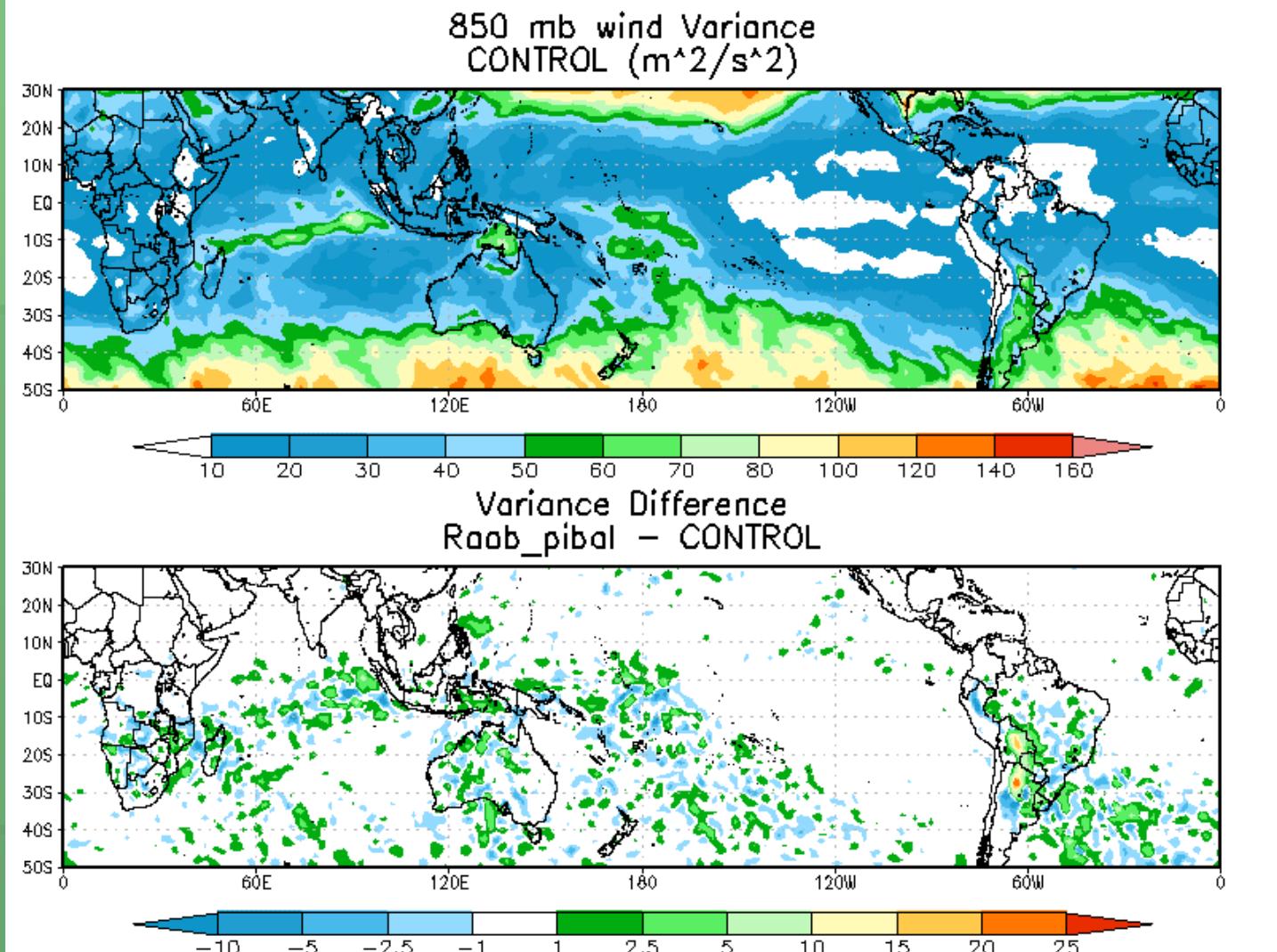
LPB N



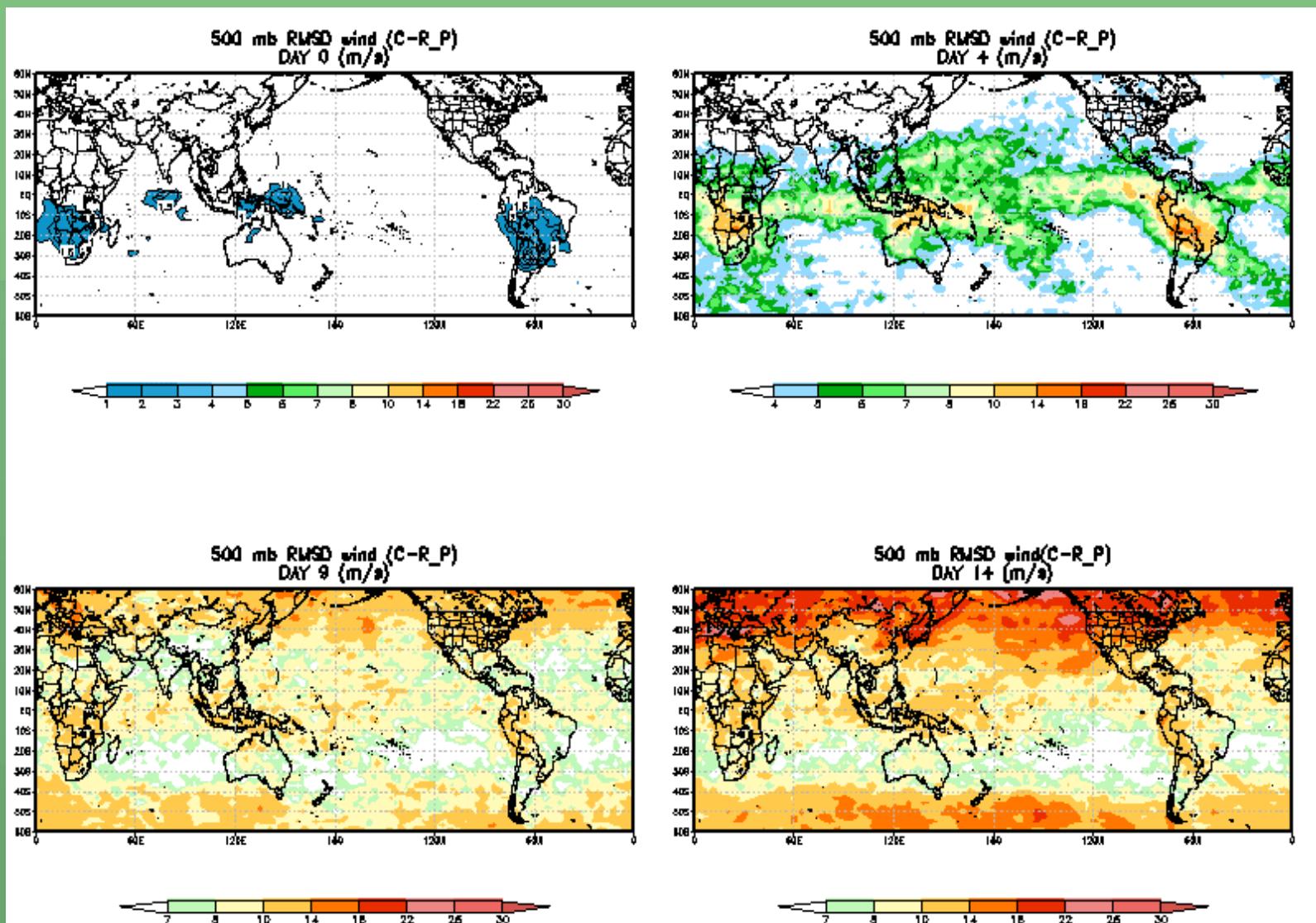
Mean low level wind at Santa Cruz



Global impact



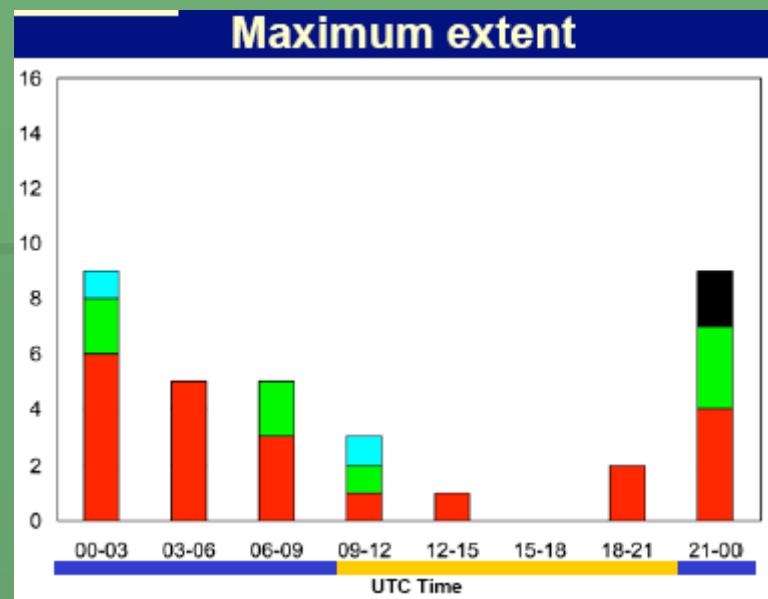
- From Nogués Paegle and Saulo, AGU meeting 2006



- Impact on medium range forecasts with the Utah Global model
From Paegle et al., 2007

MCS and LLJ during SALLJEX

	SALLJEX Days	Number of MCS	Number of MCS south of 23S	Convection not meeting the MCS criteria	No convection south of 20S
CJE	45	61	22	15	3
NCJE	16	31	8	2	2
LLJ-ARG	14	18	2	12	2
NO-LLJ	17	29	2	4	9



Nicolini et al.,
2004

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Summary

- Enhanced data sets:
 - Upper air: soundings over regions where there was no possibility to describe vertical structure
 - Precipitation: large area coverage. Good for calibration of derived precip data sets
- Enhanced re-analysis
- Recommendations for Long Term Monitoring can be done
- Modeling: Super-ensemble
- Hypothesis testing: many case studies
- Collaboration: valuable links between institutions and researchers
- Training, capacity building, outreach programs
- Enormous advantage: to have many people looking at the same phenomena by the same time!!!