

EVALUATION AND SENSITIVITY STUDIES OF SALLJ NUMERICAL SIMULATIONS

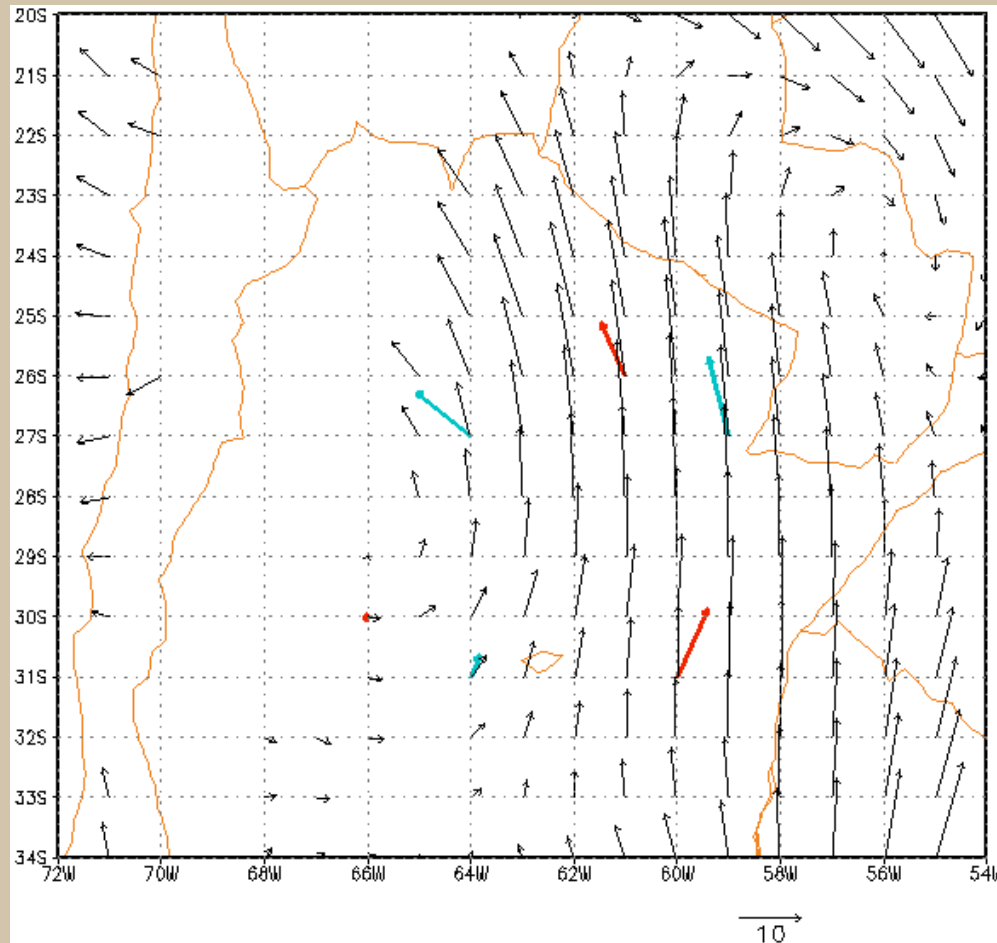
- Analysis Impact
- Model Validation
- Forecast Impact

EVALUATION AND SENSITIVITY STUDIES OF SALLJ NUMERICAL SIMULATIONS

- Analysis Impact
(Demaria and Herdies et al.)
- Model Validation
- Forecast Impact



**925 mb winds January 23rd (12 UTC), 2003.
NCEP-NCAR (black), pibals (red), radiosondes (green)**



GOALS

BACKGROUND

DATA & METHODOLOGY

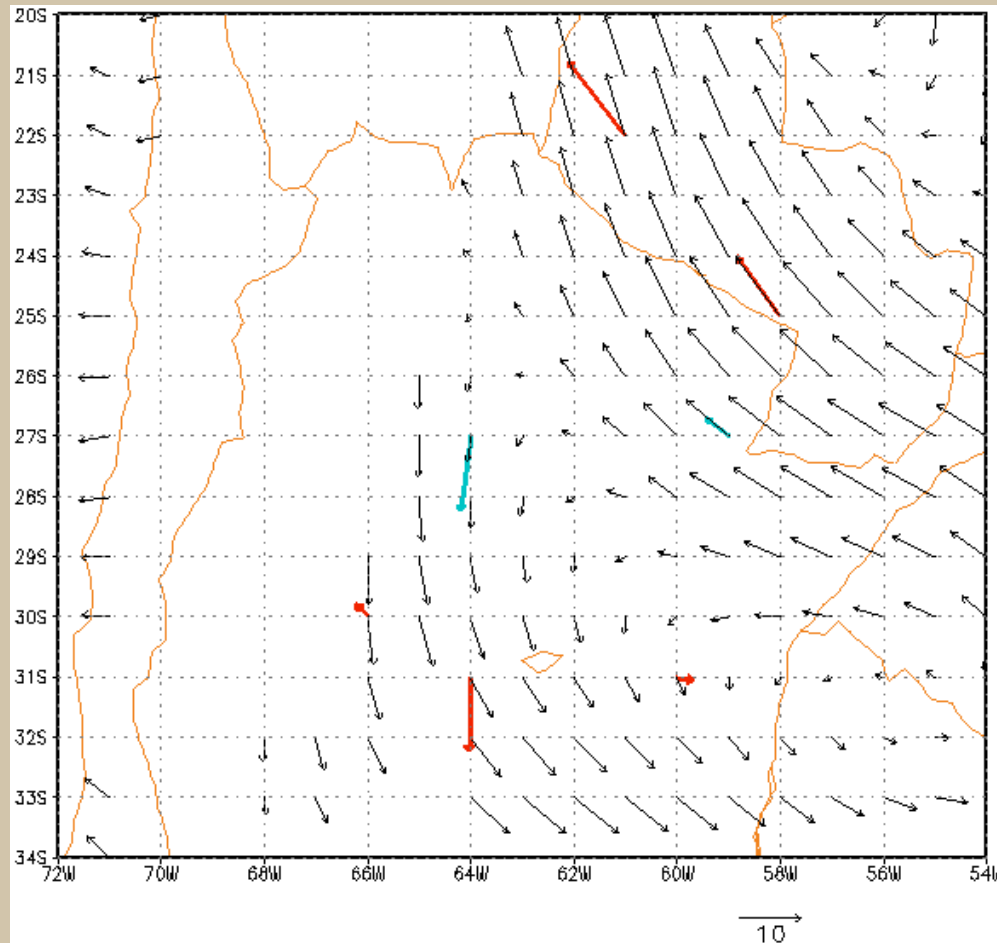
RESULTS

CONCLUSIONS

AN OBSERVATIONAL EVALUATION OF GRIDDED DATA ANALYSES OVER SOUTH AMERICA



**925 mb winds January 24th (12 UTC), 2003.
NCEP-NCAR (black), pibals (red), radiosondes (green)**



GOALS

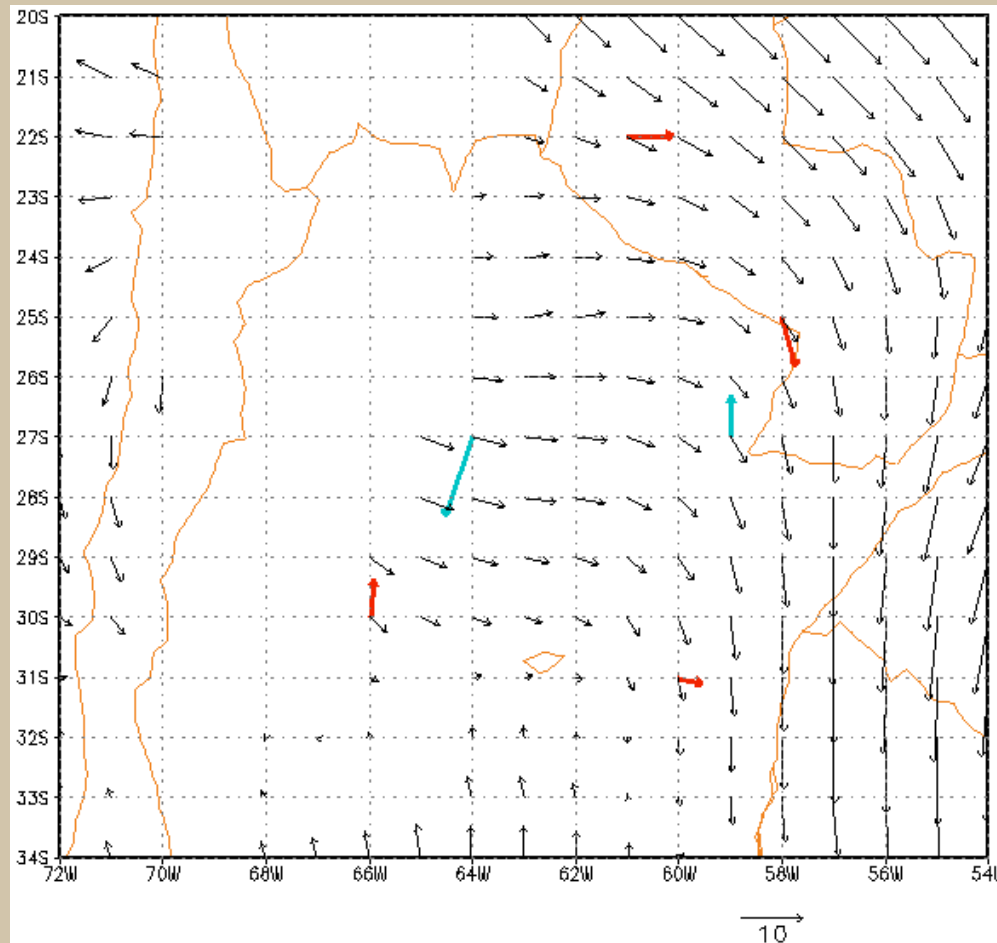
BACKGROUND

DATA & METHODOLOGY

RESULTS

CONCLUSIONS

AN OBSERVATIONAL EVALUATION OF GRIDDED DATA ANALYSES OVER SOUTH AMERICA



GOALS

BACKGROUND

DATA & METHODOLOGY

RESULTS

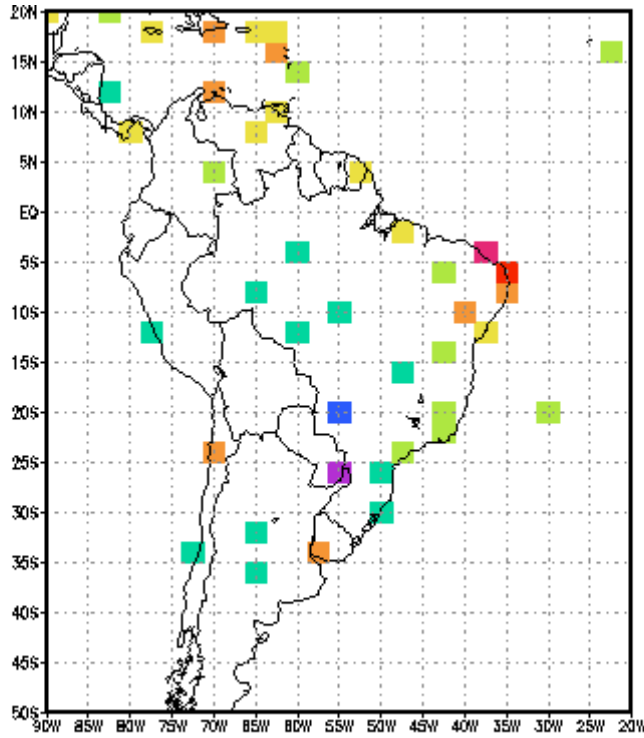
CONCLUSIONS

AN OBSERVATIONAL EVALUATION OF GRIDDED DATA ANALYSES OVER SOUTH AMERICA

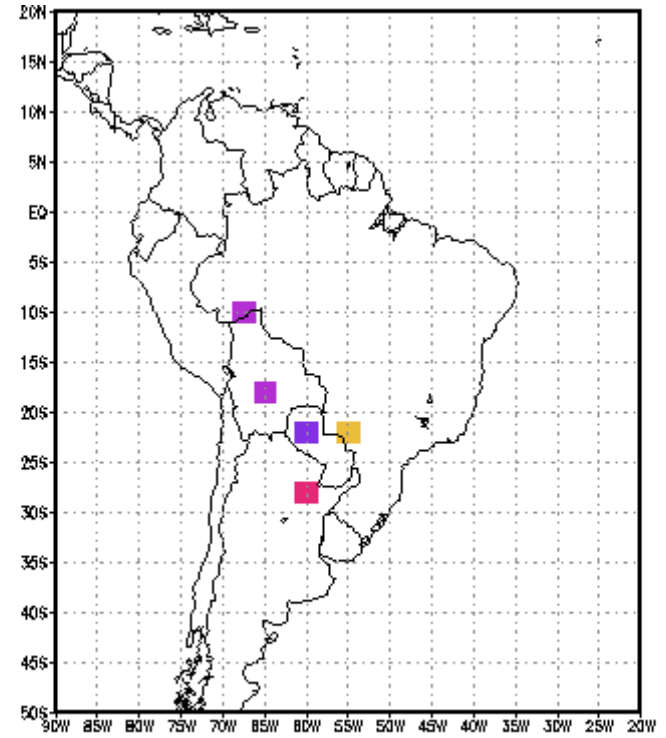
Inference

Structure near topography not well resolved in reanalysis (Evidence of same problems with GDAS, shown later)

GTS Dataset



SALLJEX Dataset

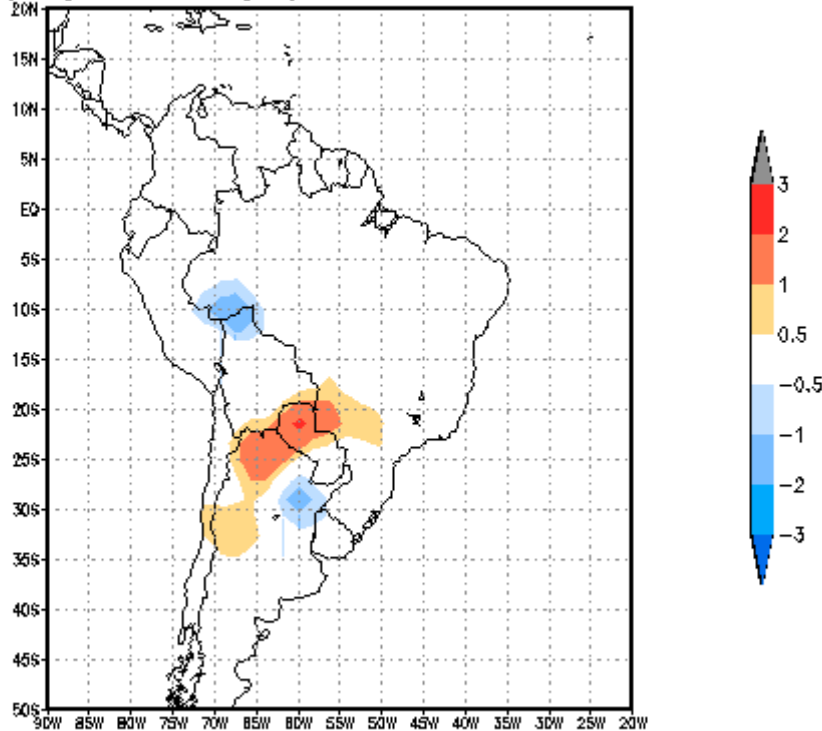


The Figure shows the data that was used from the GTS and the SALLJEX for the simulations presented in the previous slide.

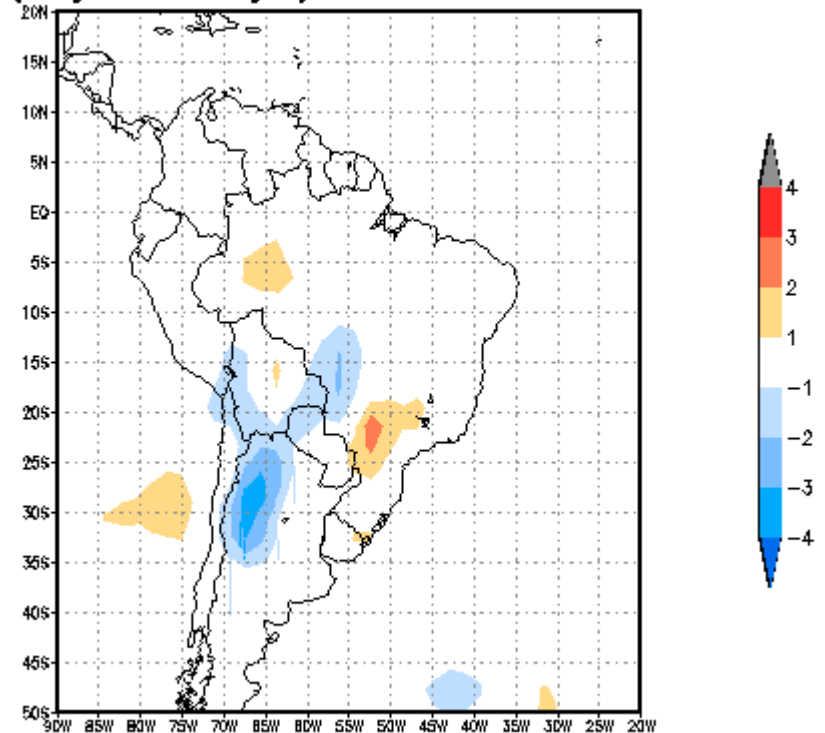
Experiments with the SALLJEX dataset using CPTEC Global Model

Dirceu L.Herdies, J.A. Aravéquia, J. Marengo, I. Cavalcanti
and R. Cintra

q (salljex - nsalljex) 850 hPa 20030118 06Z



v (salljex - nsalljex) 850 hPa 20030118 06Z



Results from experiments using SALLJEX data assimilated for q and v (differences). For January 18 2003 (when an intense MCC was detected over Paraguay) the assimilation resulted on an increase of moisture at 850 hPa and on the meridional component of the wind over the region. Experiments were made using the CPTEC GCM T062L28 (~200kmX200km).

Inference

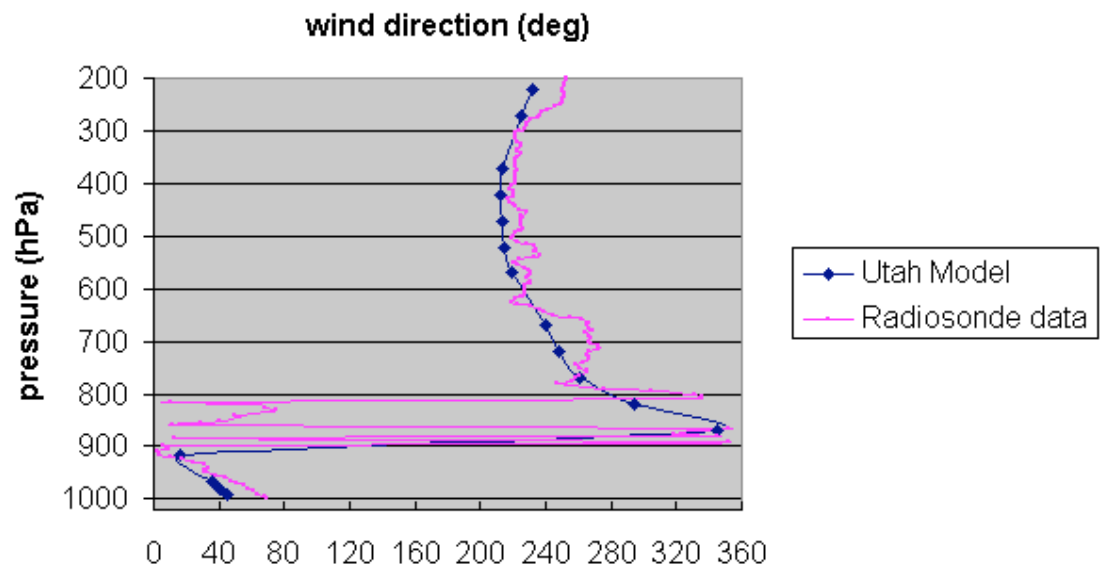
SALLJEX data have up to 5 m/s effect on analysis. This is evident over regions with scales on the order of 3,000 kms.

Later will be shown the impact of initial state changes over such regions.

EVALUATION AND SENSITIVITY STUDIES OF SALLJ NUMERICAL SIMULATIONS

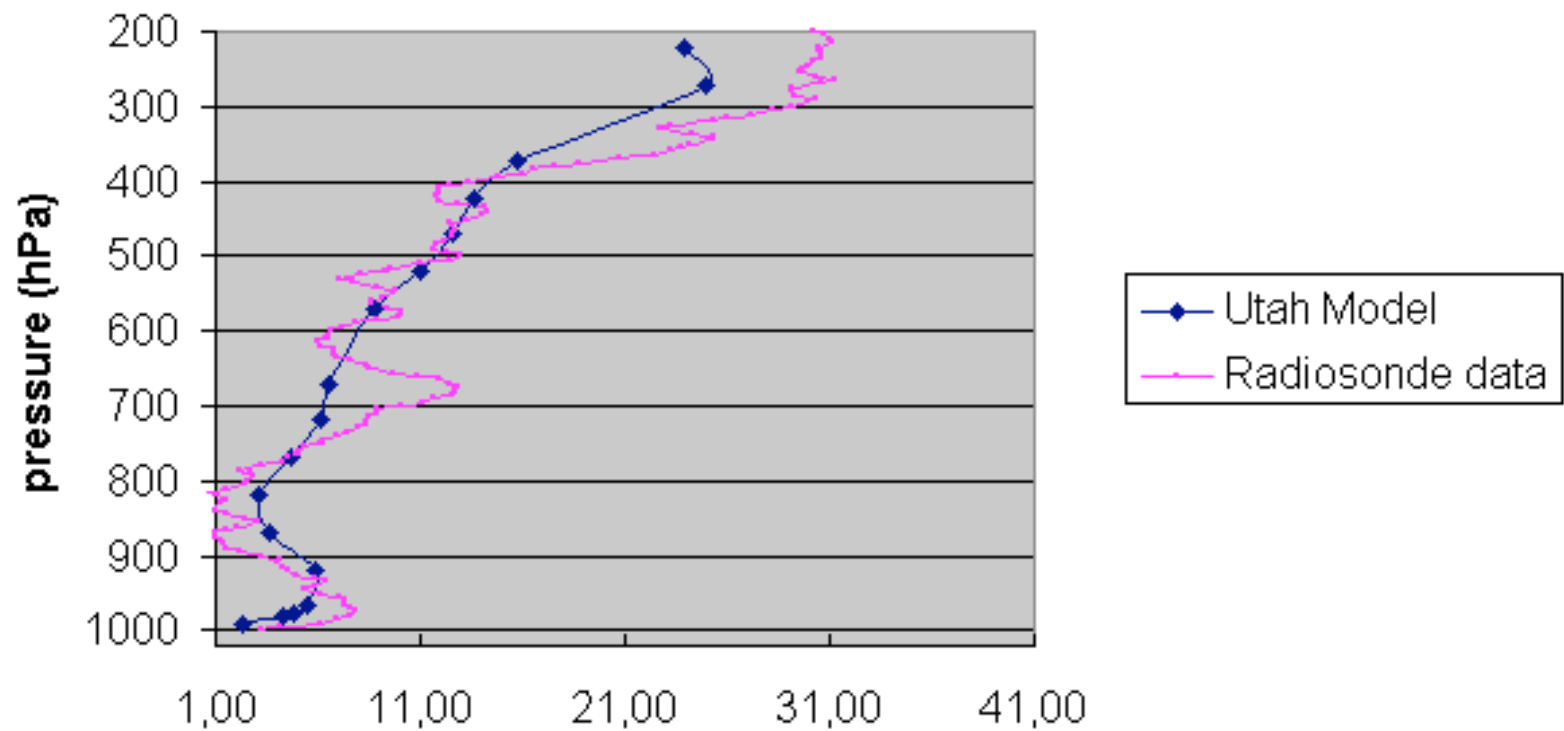
- Analysis Impact
- Model Evaluation
 - Utah Global Model vs radiosondes (Saulo)
 - GDAS vs radiosondes (Byerle)
- Forecast Impact

Resistencia 17 Jan 2003, 06 UTC



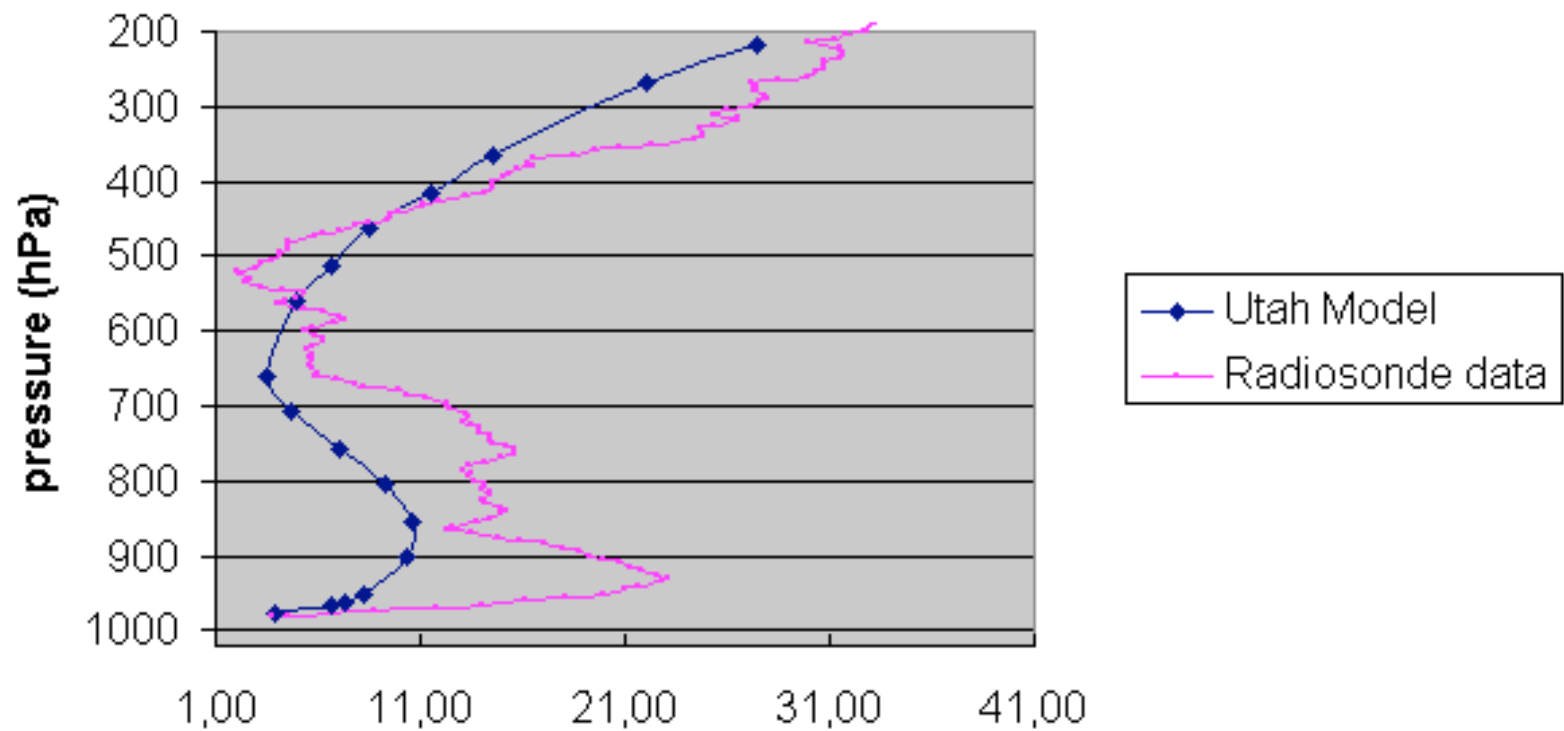
Resistencia 17 Jan 2003, 06 UTC

wind speed (m/s)



Santiago del Estero 17 Jan 2003, 06 UTC

wind speed (m/s)



EVALUATION AND SENSITIVITY STUDIES OF SALLJ NUMERICAL SIMULATIONS

- Analysis Impact
- Model Validation
- Forecast Impact

Surrogate data sensitivity experiments (Saulo et al)

Second week global forecast sensitivity to local and remote targeting of initial state specification

Lee A. Byerle, A.C. Saulo, J.C. Roman and J. Paegle
Department of Meteorology, University of Utah
Salt Lake City, UT, USA

Overview:

- Current deterministic weather prediction typically has useful skill through the first week, but limited value in the second week
- There may be many reasons why the second week may not typically be predictable, including the chaotic nature of atmospheric evolution, poor specification of initial state and of atmospheric boundary conditions
- We focus upon the loss of predictability that may be associated with changes of the initial state due to different amounts of information available in analyzed research and operational data sets

Goal
targeting of initial state
evolution at other locations

THE UNIVERSITY OF UTAH



Model and Data / Experimental Setup:

- UGM (U/UTAH) RESEARCH

SPECTRAL, FINITE ELEMENT (129 X 115 pts)

WAVE #56, 23 levels

SIMPLE PHYSICS (CONV ADJ)

ROTATE GEOGRAPHIC POLE TO REGION OF INTEREST

VARIABLE RESOLUTION--LOCALLY ENHANCED RES.

--1 DEG SPACING 45N TO NORTH POLE

--2 DEG SPACING SOUTH OF 45N

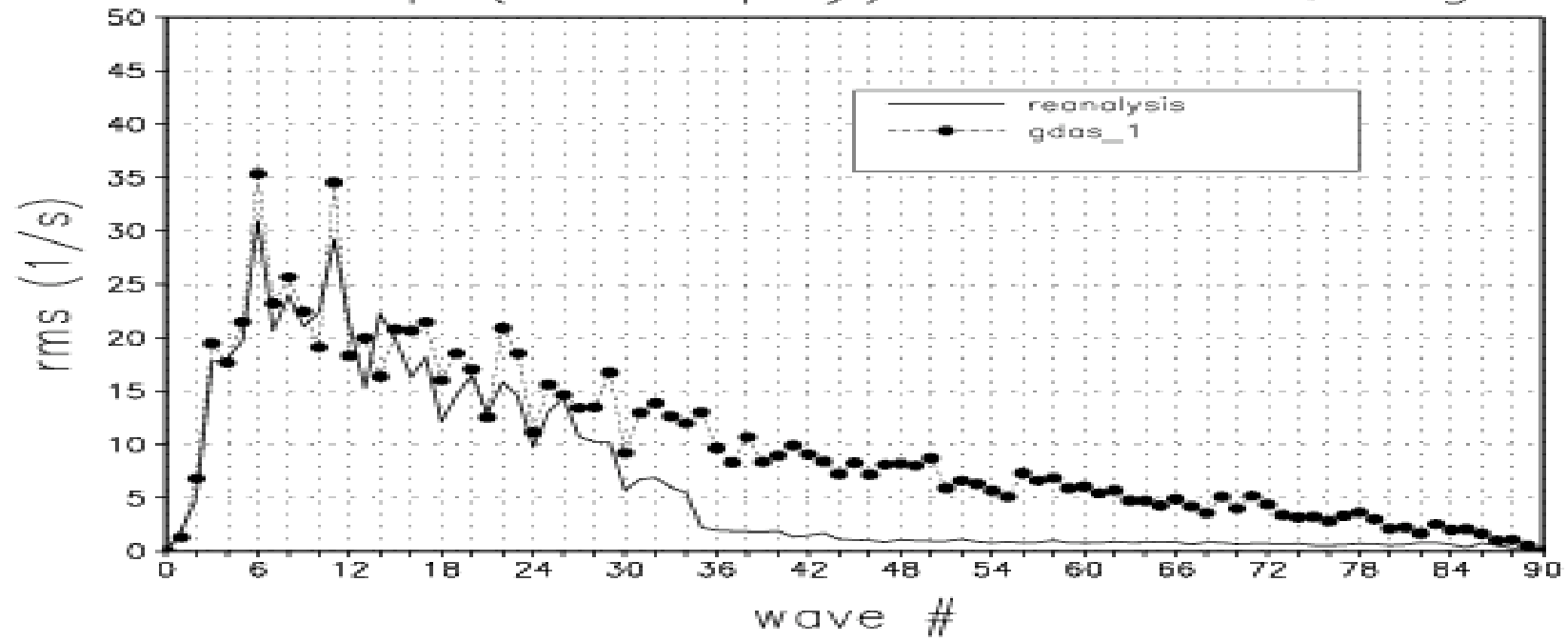
-GDAS DAILY ANALYSES (1 DEG)

-NCEP/NCAR DAILY REANALYSES (2.5 DEG)

We target two locations that have received attention in recent field campaigns. We use UGM to study rate at which local, initial state changes made at these locations propagate around the world.

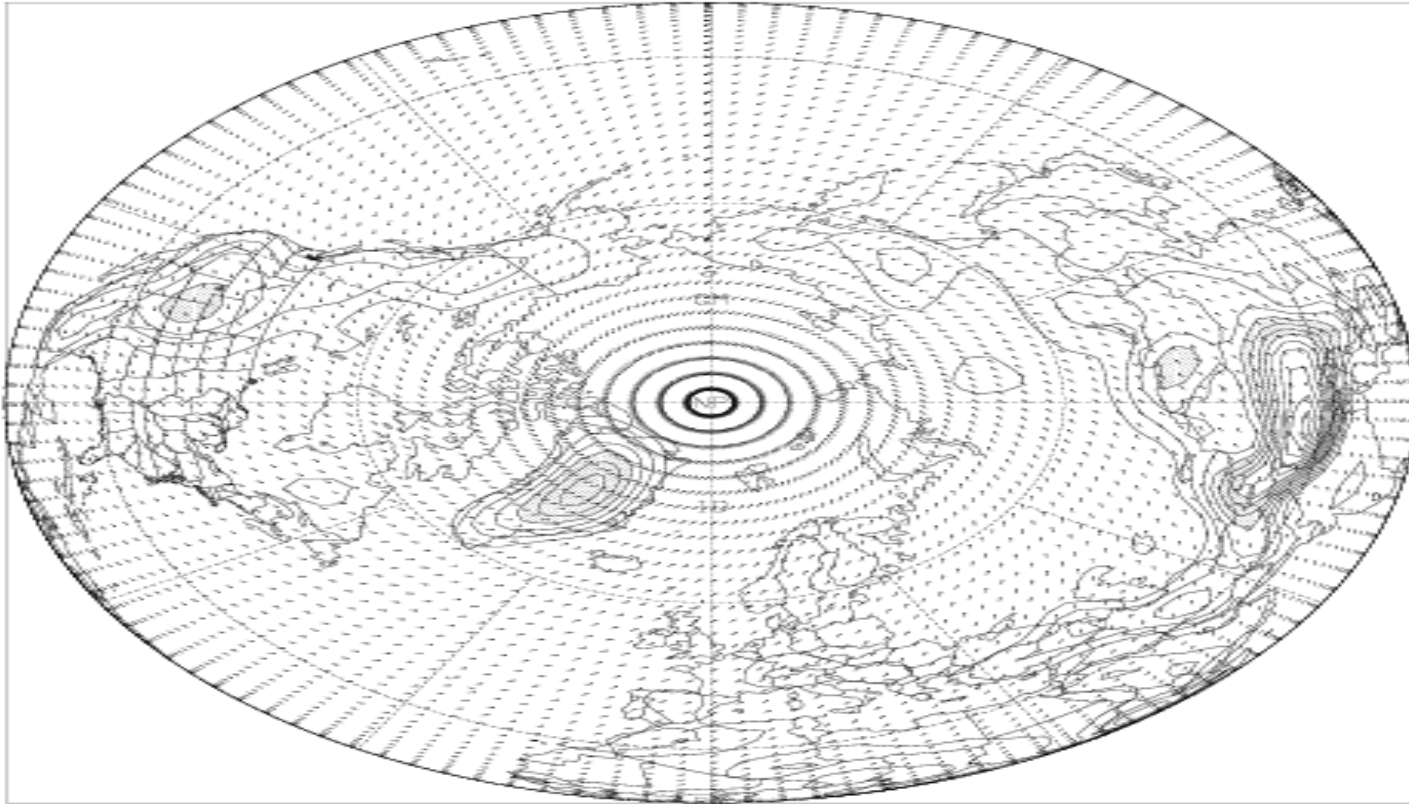
The first targeted region includes tropical and subtropical South America, which has been the focus of recent summer field experiments relevant to regional hydrology (e.g. SAILIEX)

hires sqrt(Enstrophy) 03013012, Sig .2



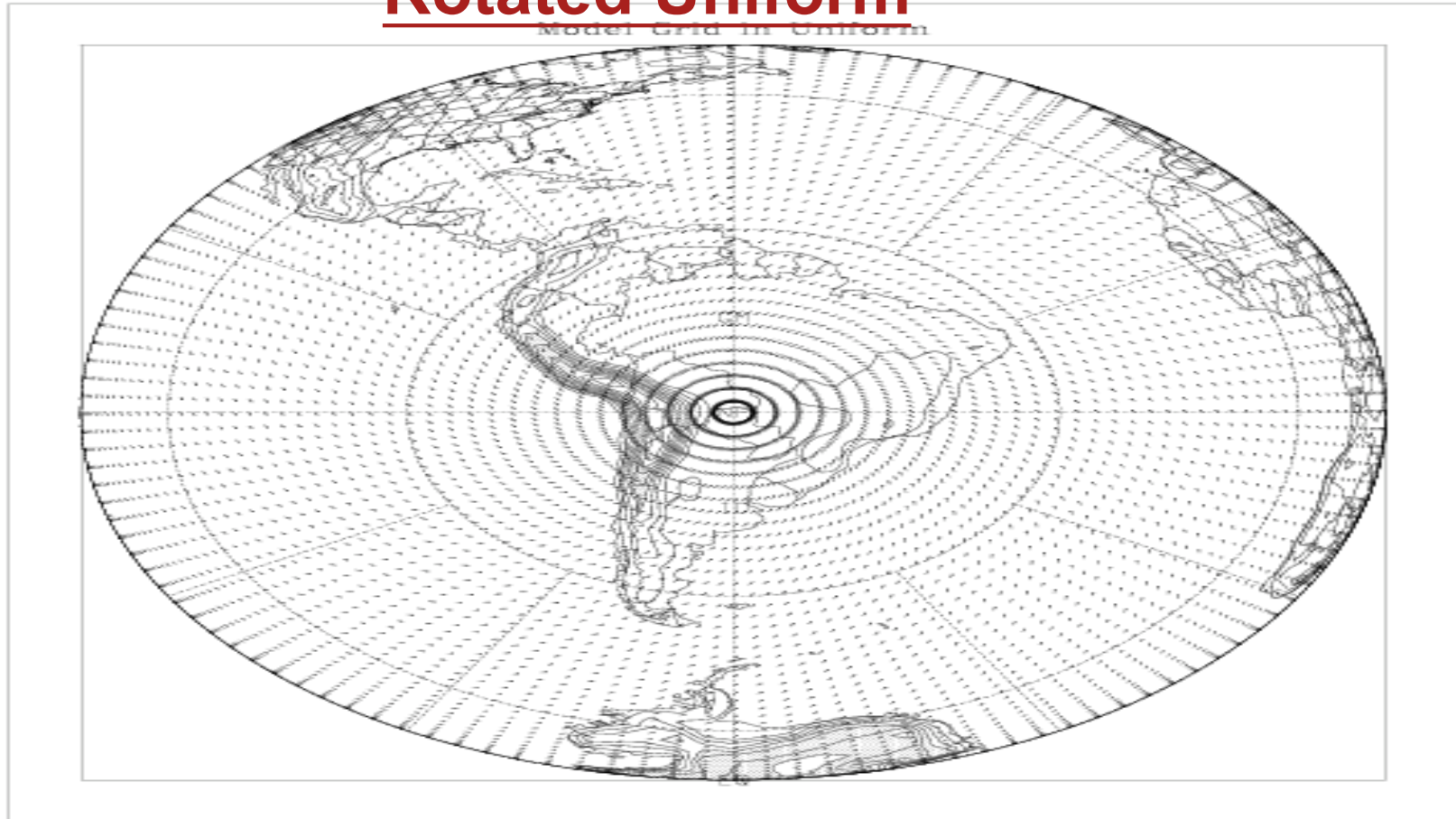
Standard Uniform

Model Grid in Uniform



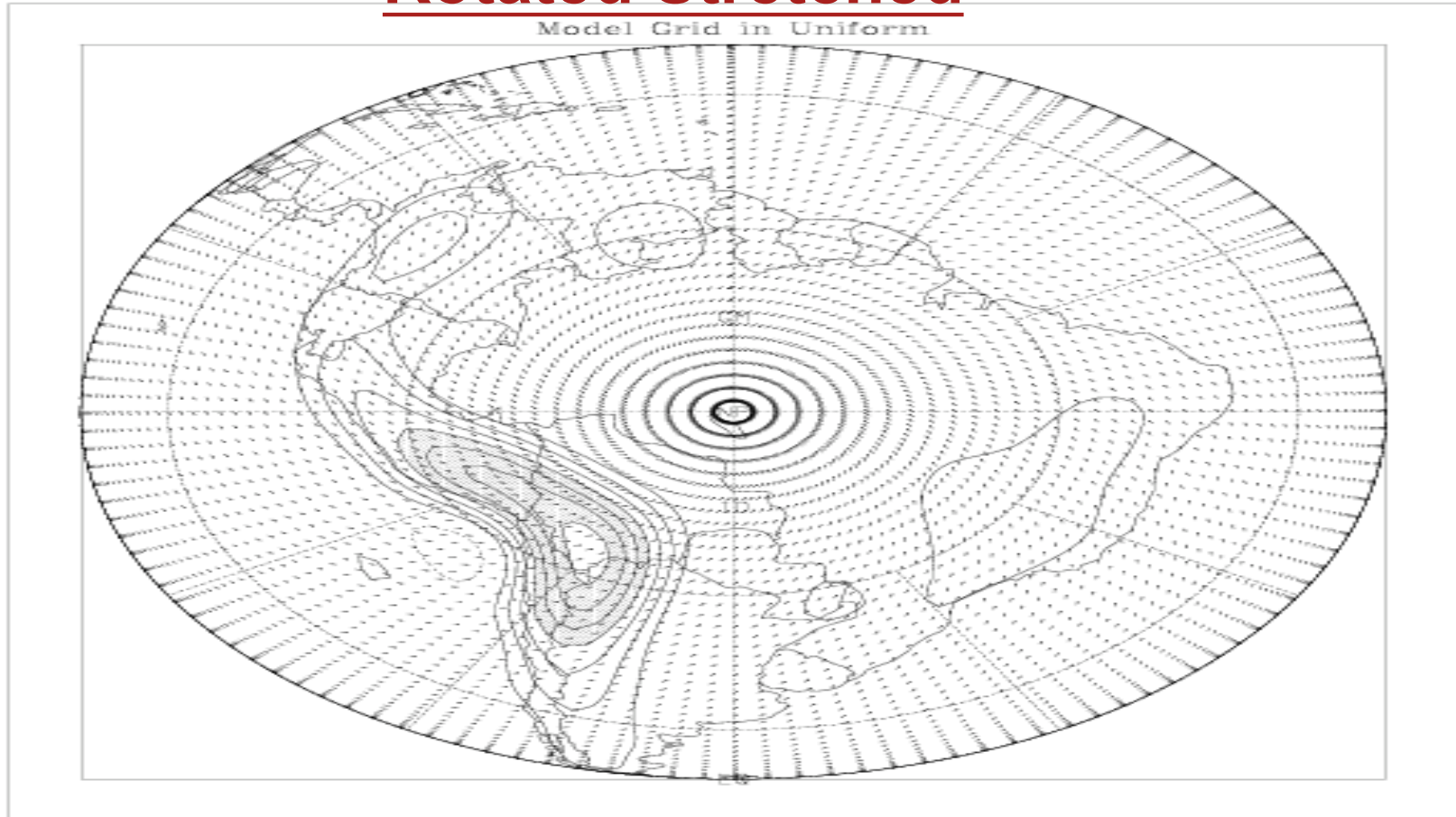
Utah Global Model

Rotated Uniform



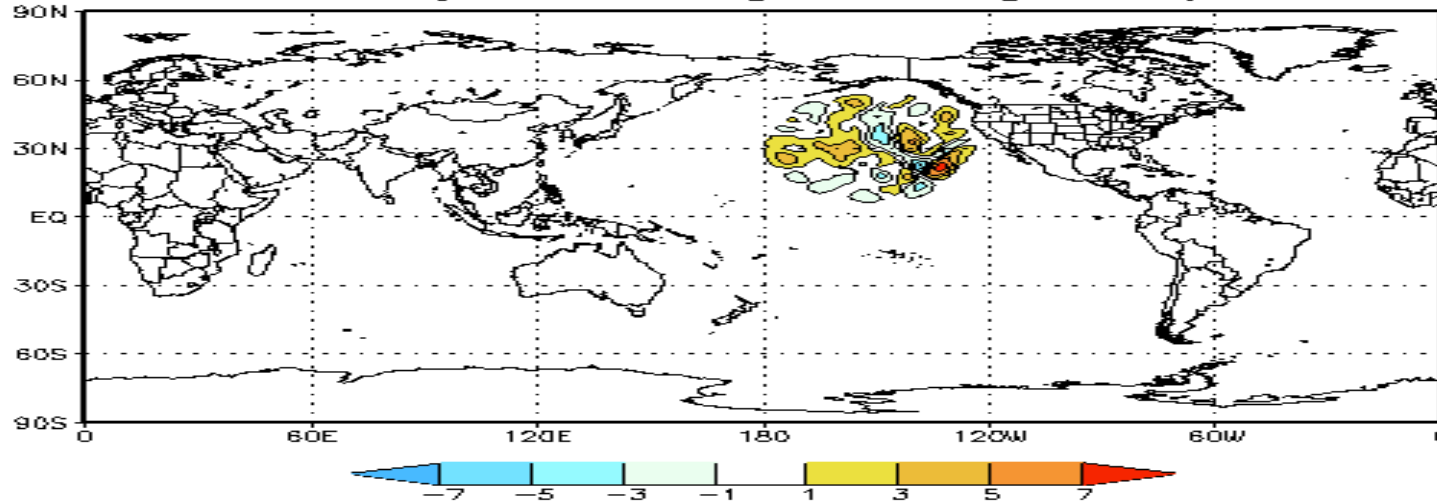
Utah Global Model

Rotated Stretched

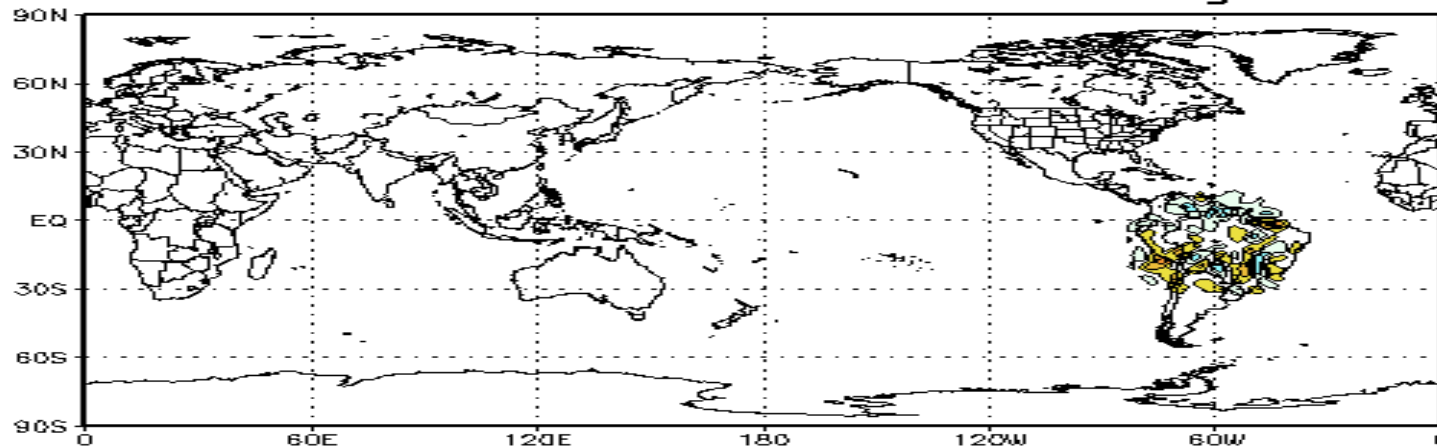


Utah Global Model

00 Hr Meridional Wind Sigma .2
Initial Uncertainty Over Targeted Regions (REAN-GDAS)



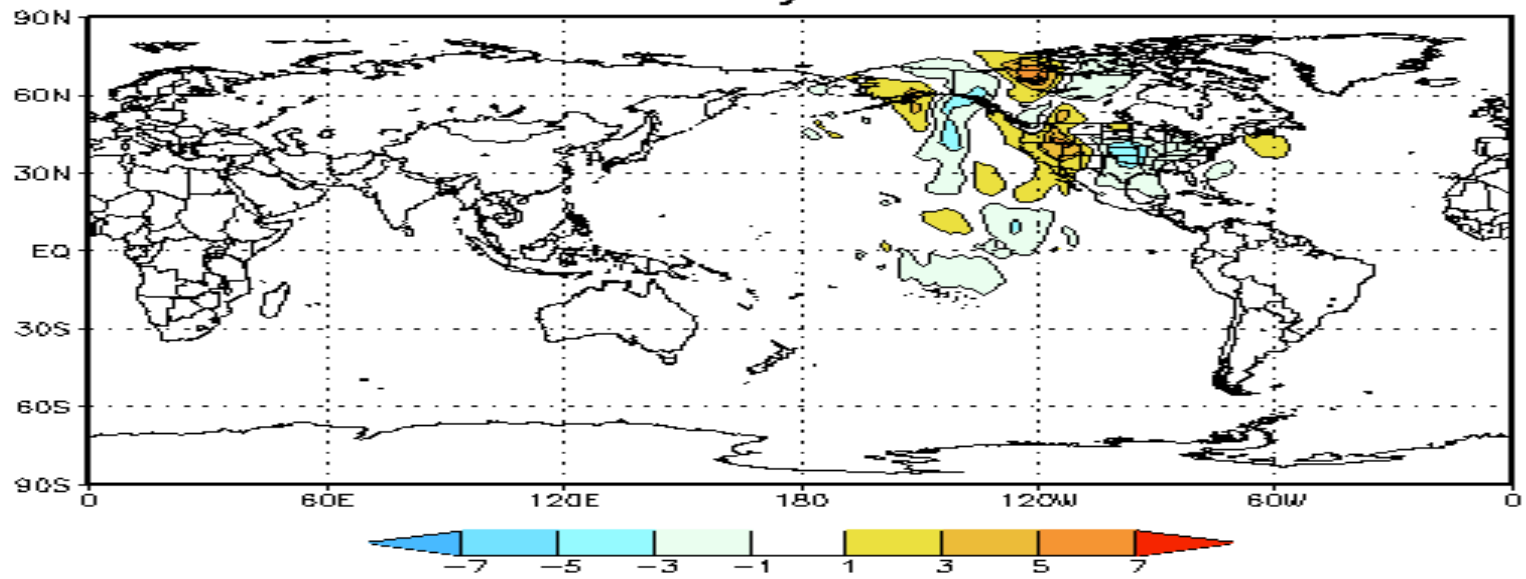
Enhanced Resolution over 2 Regions



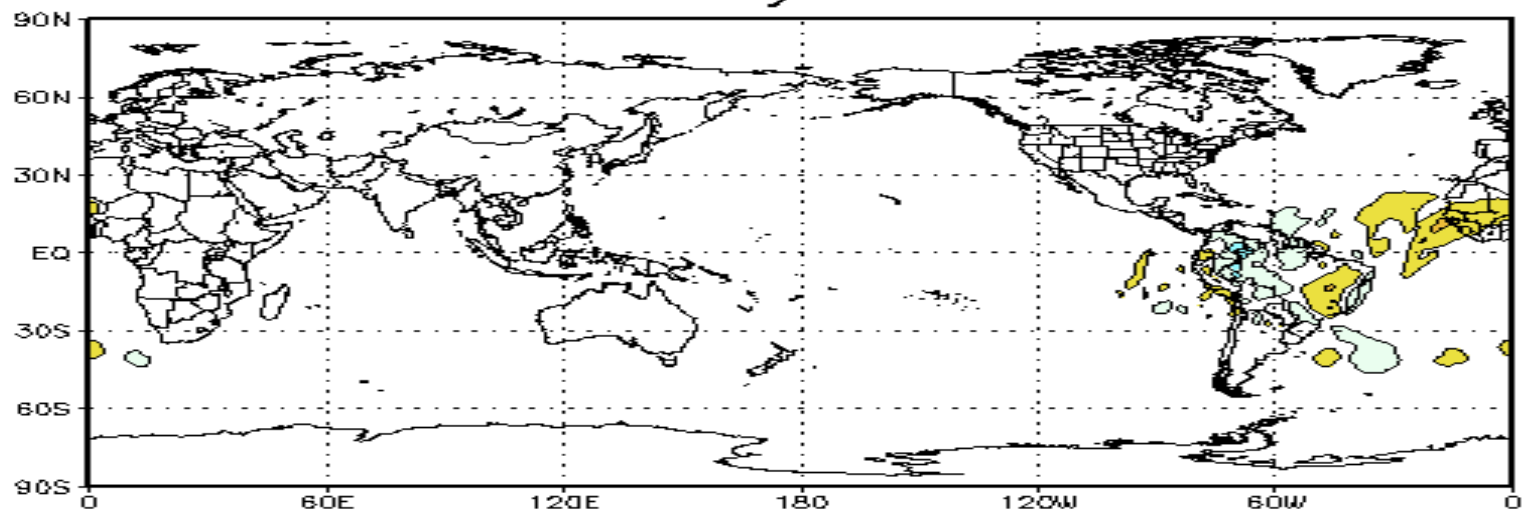
00 Hr (2 Feb 2003 / 12 UTC)

Local Targeting experiments to track influence of
“initial uncertainty” over 2 regions --defined as
NCEP/NCAR R-1 (0.5 deg) vs GDAS (1 deg)

48 Hr Meridional wind Differences Sigma .2 Initial Uncertainty Over NE Pacific

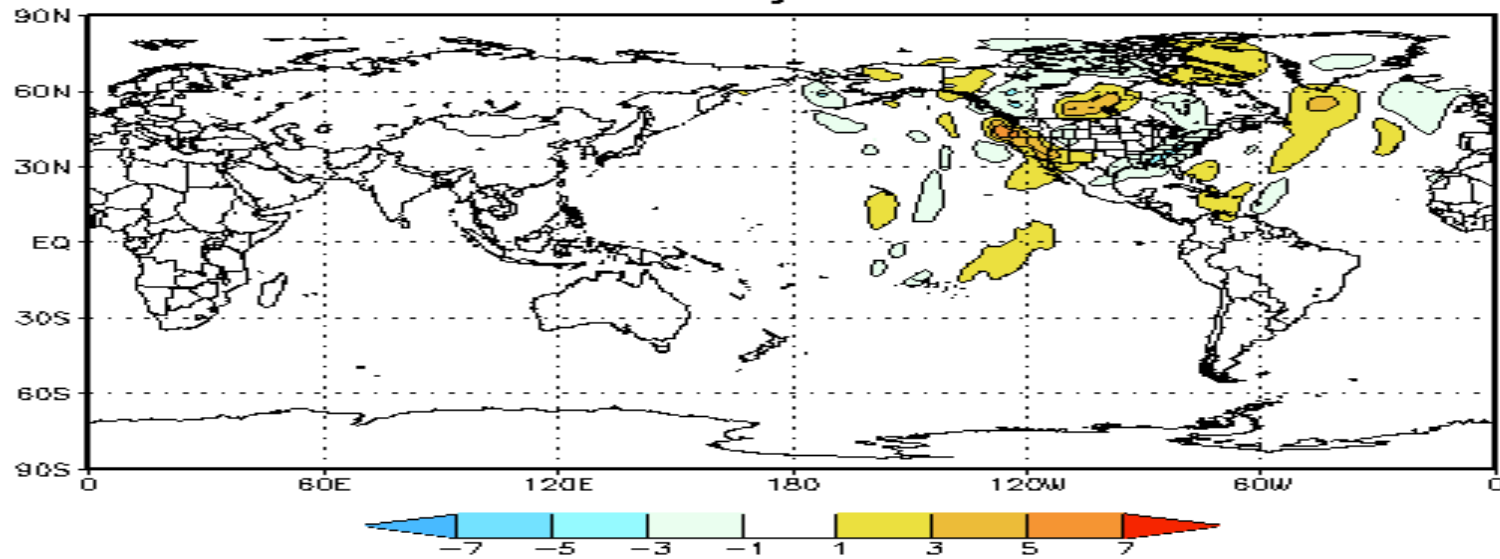


Initial Uncertainty Over S. America

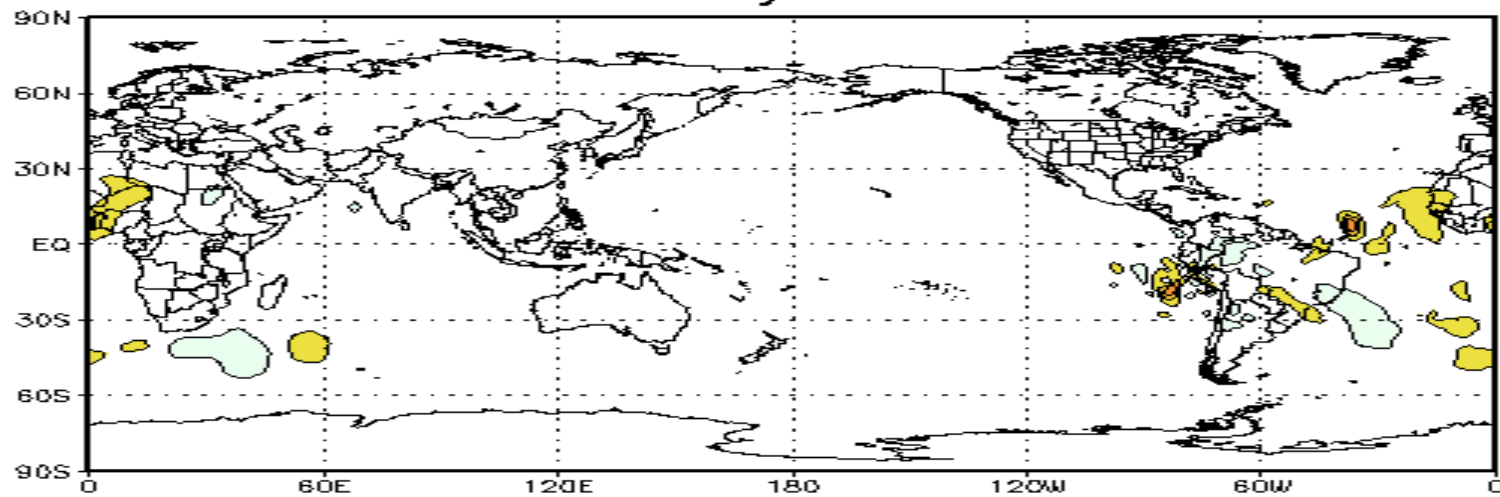


48 HR

96 Hr Meridional wind Differences Sigma .2 Initial Uncertainty Over NE Pacific

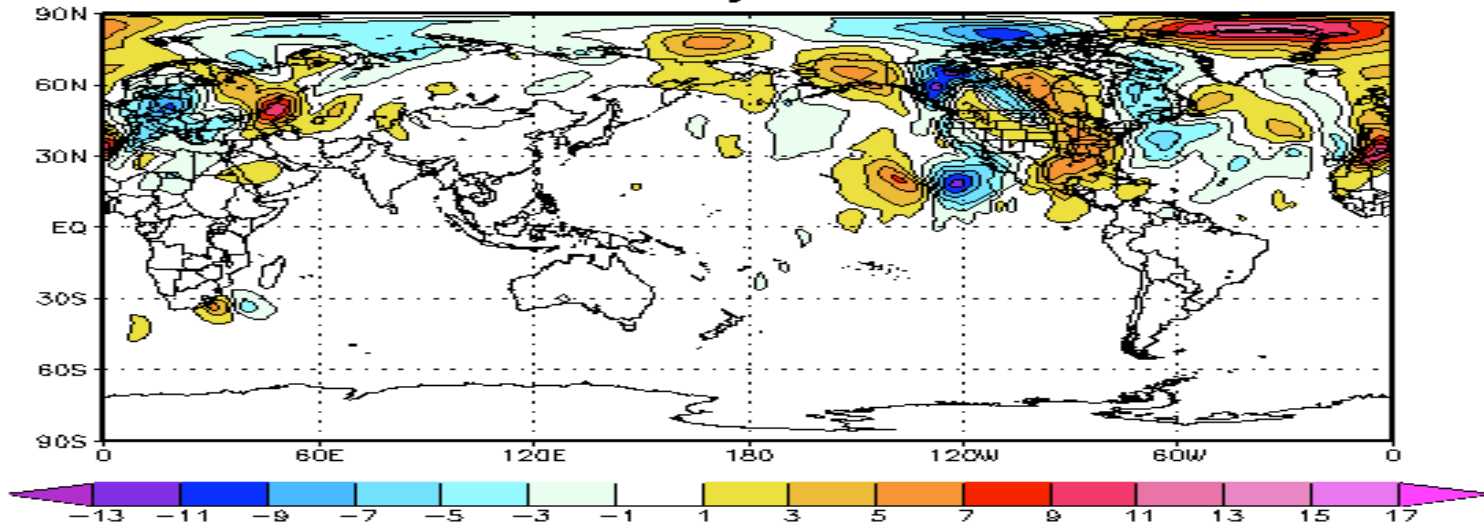


Initial Uncertainty Over S. America

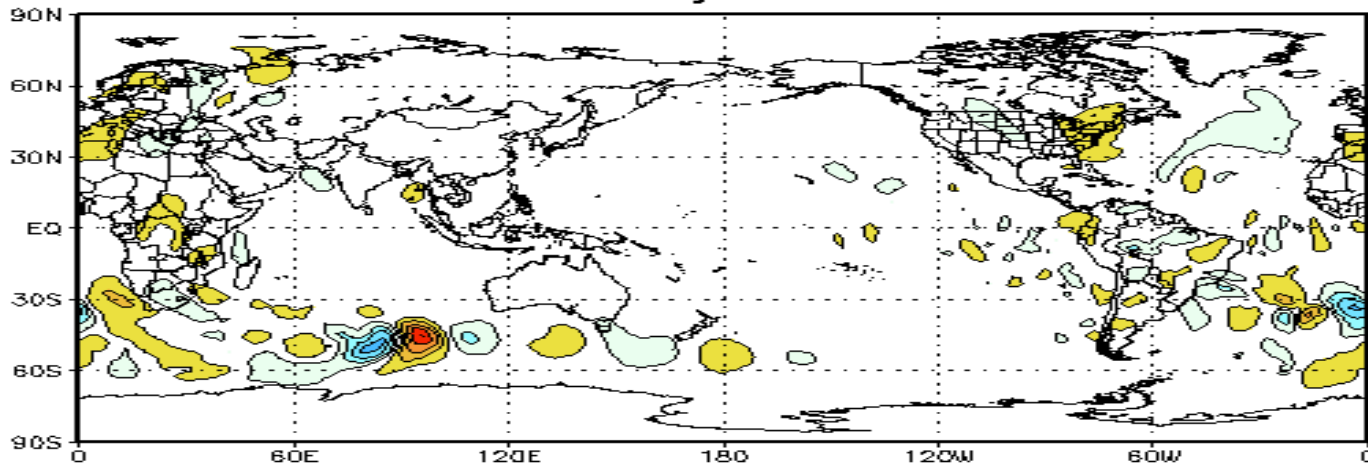


96 HR

192 Hr Meridional wind Differences Sigma .2
Initial Uncertainty Over NE Pacific

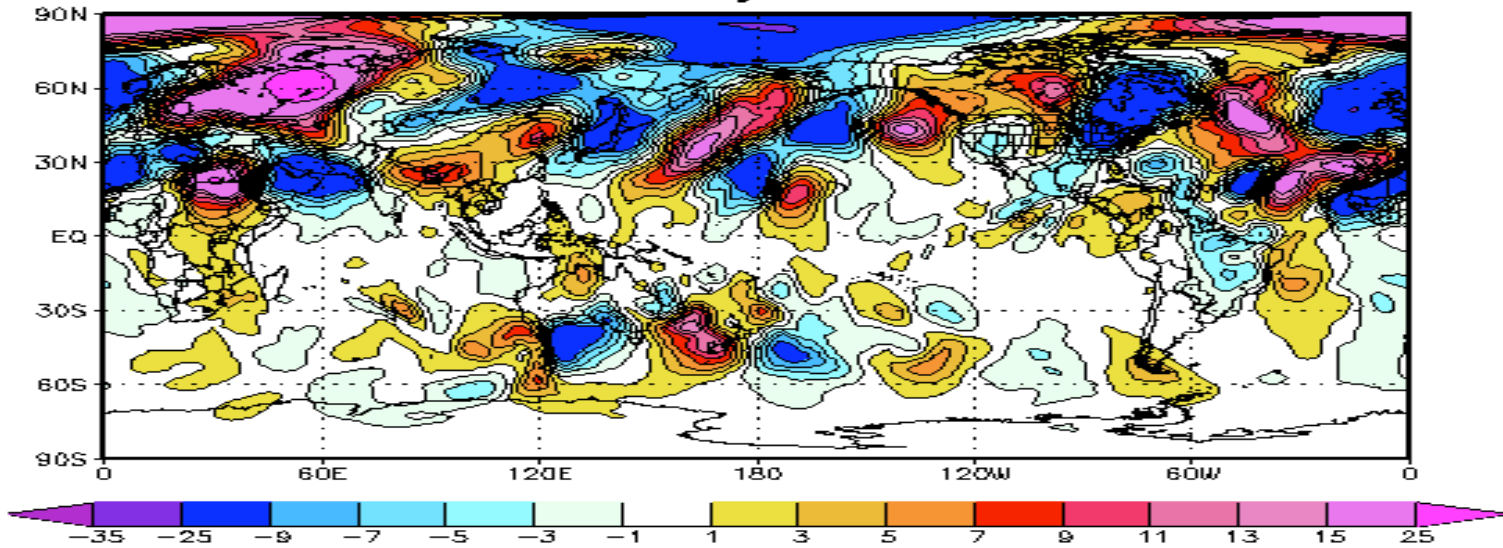


Initial Uncertainty Over S. America

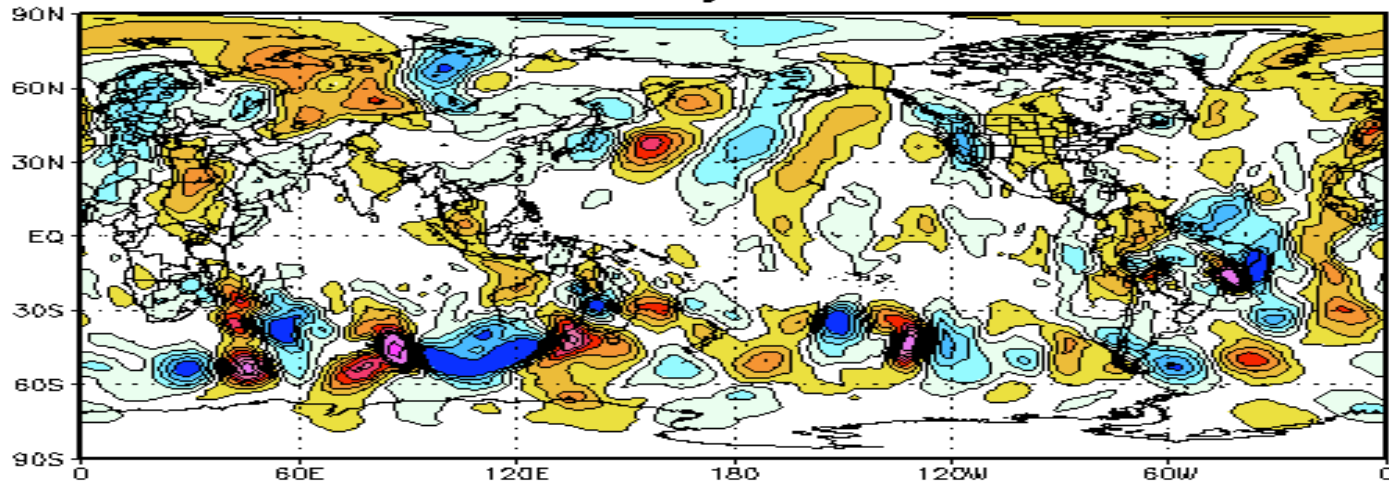


192 HR

360 Hr Meridional wind Differences Sigma .2 Initial Uncertainty Over NE Pacific



Initial Uncertainty Over S. America



360 HR

Discussion:

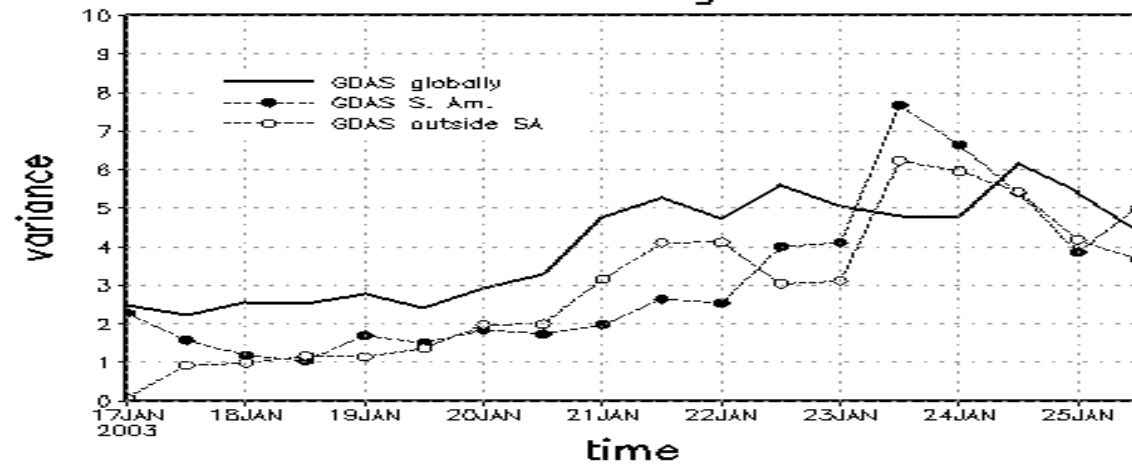
These experiments were conducted for the period including the February snowstorm of 2003, over the NE U.S., which was relatively well forecast at longer ranges.

Enhanced detail of the initial state over South America influences deterministic forecasts around much of the Southern Hemisphere by day 7 and shows notable impact in the Northern Hemisphere after approximately day 10.

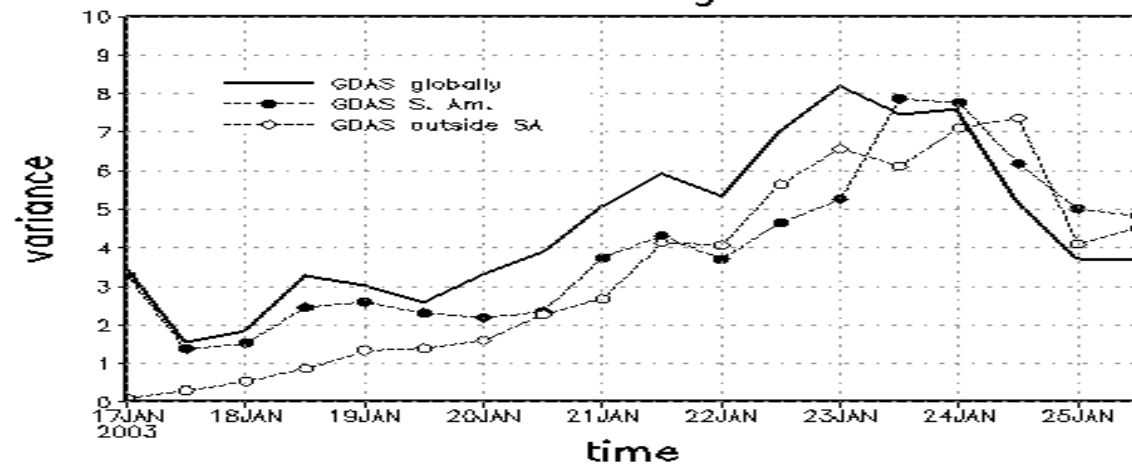
Enhanced detail of the initial state over the NE Pacific influences deterministic forecasts more strongly over the Northern Hemisphere after day 7. Influences in the Southern (summer) Hemisphere are less pronounced at day 10.

South America Targeting 17 Jan 03

SALLJEX-area Targeted v 0.525

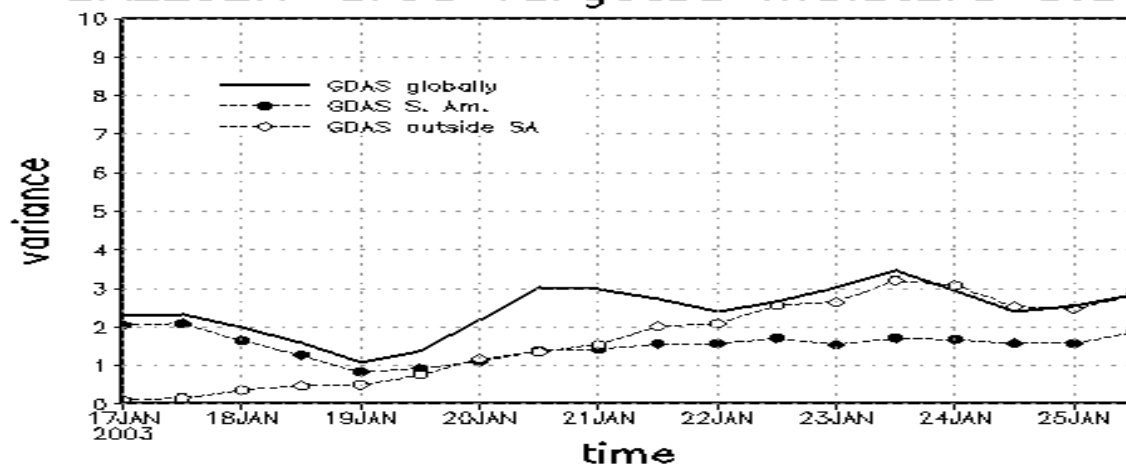


SALLJEX-area Targeted v 0.875

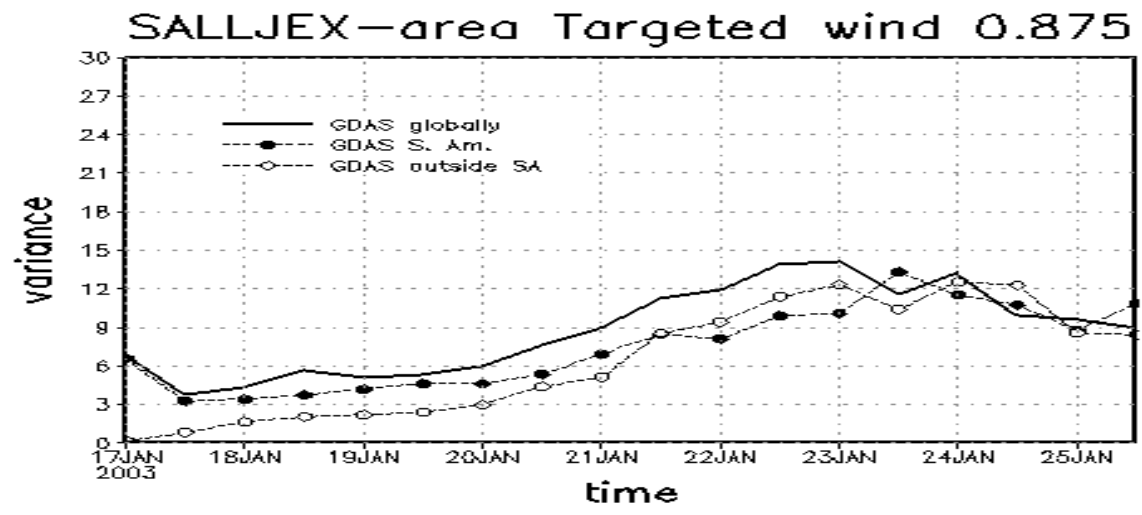
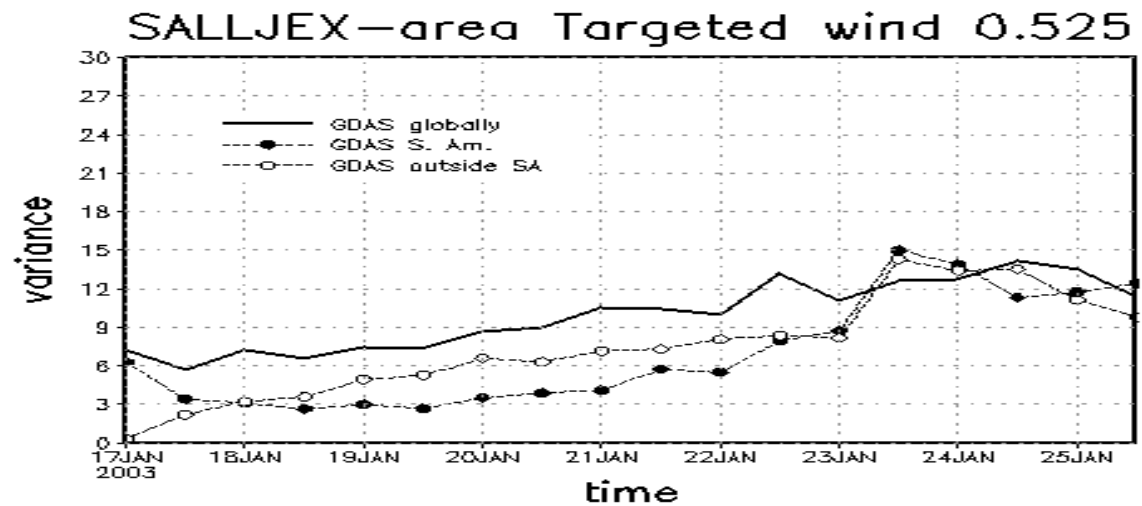


17 Jan 03

SALLJEX-area Targeted moisture 0.875



17 Jan 03



17 Jan 03