

# NOAA Perspectives on VOCALS

**Jin Huang**

**CPPA Program Manager  
NOAA Climate Program Office**

VOCALS Modeling Workshop  
Boulder, CO  
May 18-20, 2007



# Climate Prediction Program for the Americas (CPPA)

**Mission: Improve operational intra-seasonal to interannual hydroclimatic predictions for the Americas with quantified uncertainties sufficient for making informed decisions**

## CPPA Air-Sea Interaction Objectives:

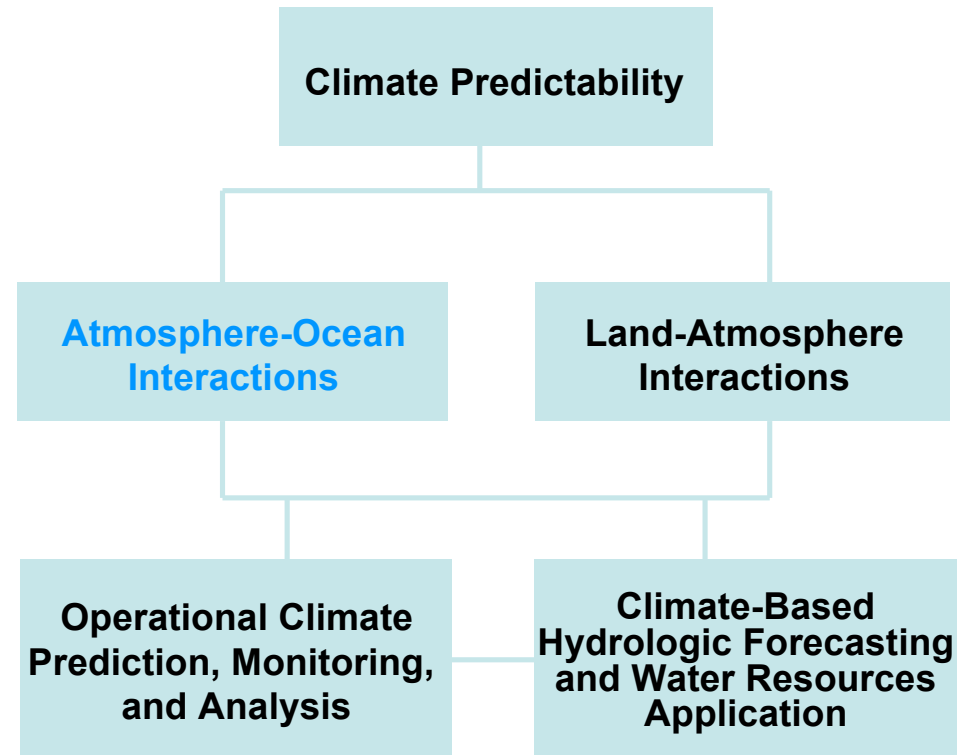
- Identify and understand the physical processes that produce the relevant ocean variability and those that link the ocean variability to regional climate variability
- Ensure that coupled climate models correctly capture the physical processes and phenomena that are critical for simulating the linkages and transient variability
- Focus on air-sea interactions in the Eastern Pacific, Intra-American Seas, and tropical Atlantic.

## Strategies:

- Field experiments
- Data analysis and diagnostic studies
- Modeling



## CPPA Research Components





# CPPA Funded Projects Using EPIC Data During FY03-FY06



## Data and analysis:

- Albrecht (FY04):** "Process Studies of Marine Boundary Layer Clouds and Structures over the Eastern Pacific"
- Bretherton (FY06):** "Development and Application of EPIC Integrated Datasets for Atmospheric and Coupled Modeling"
- Cronin (FY04):** "Investigation of Synoptic Disturbances and their Effect on the Boundary Layer and SST in the East Pacific ITCZ on Seasonal and Interannual Time Scales"
- Fairall (FY03):** "Investigation of Cloud and Precipitation Aspects of Air-Sea Interaction in the Eastern Pacific: Analysis of ESRL Ship-Based Data from EPIC2001"
- Fairall (FY06):** "Shipboard Monitoring of Air-sea Flux and Cloud Processes in the Southeast Pacific Stratocumulus Region"
- Jensen (FY04):** "An Observational Study of Mid- and Deep Convective Cloud Characteristics in the Eastern Tropical Pacific Ocean Using a Combination of EPIC and EOS Observations"
- Meloney (FY05):** "East Pacific Intraseasonal Oscillations and Air-Sea Interaction during Northern Hemisphere Summer"
- Weller (FY04):** "Air-Sea Interaction in the Eastern Tropical Pacific ITCZ/Cold Tongue Complex"
- Zuidema (FY06):** "Eastern Pacific Stratocumulus Liquid Water Path, Radiatively-Derived Cloud Properties, Drizzle, and Boundary-Layer Dynamics"

## Modeling:

- Serra (FY06):** "Variability and Dynamics of Atlantic and Pacific Easterly Waves in Observations and Operational Models"
- Thomas (FY06):** "Frontal Dynamics and Lateral Mixing at the Equator with Application to the EPIC/IOP"



## CPPA Funded VOCALS Projects



**Fairall, Y.Wang and S-P Xie** (FY07-FY10): “Evaluation and Improvement of NOAA Climate GCM Air-Sea Interaction Physics” (total \$518K)

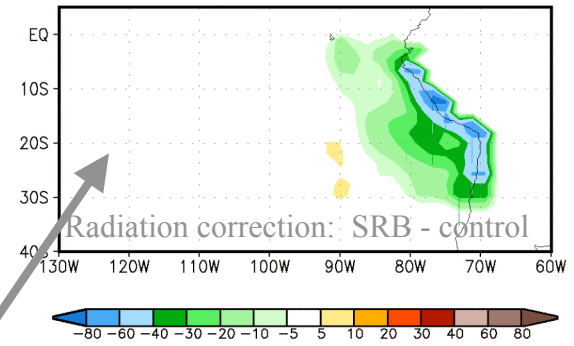
**Mechoso and Pan** (FY07-FY09): “Impacts on the Regional and Global Climate of Cloud Macrophysical and Microphysical Processes in the Southeast Pacific” (total \$662K)

**P. Xie and W. Wang** (FY06): ”Assessing the NCEP CFS Model Bias over the Tropical Eastern Pacific Stratus Deck and its Impact on the Simulation of Climate”

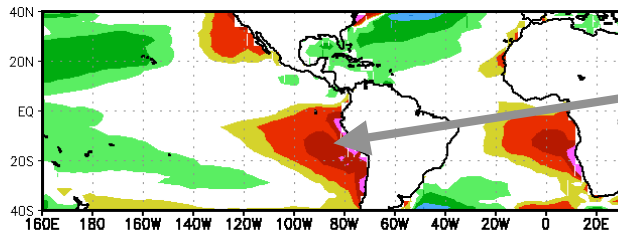
# Annual mean SST

(after P.Xie and W.Wang)

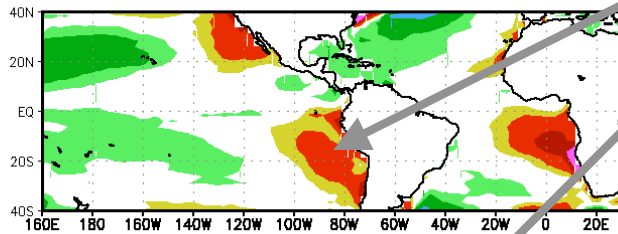
Control	Standard free simulation
SRB	Simulation with SRB radiation over the SEP
CFS	NCEP climate forecast system model
MOM3	Oceanic component of CFS



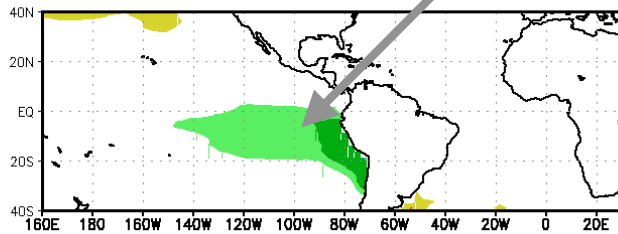
CFS control - ERSST



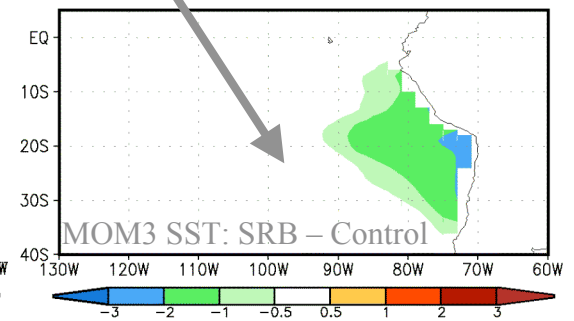
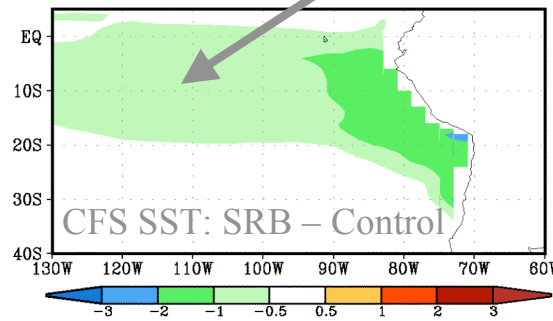
CFS SRB - ERSST



SRB - CFS control



- Warm SST bias over the SEP in the CFS control simulation.
- Correction in radiation reduces the warm bias by about 50%.
- Without air-sea interaction, the impact of the radiation error is localized. The air-sea coupling leads to cooling over local areas and over equatorial eastern Pacific.





# CPPA Interest in VOCALS



- to study the climate of Americas as an integrated system
  - Equatorial Pacific: EPIC (2001)
  - Northern American: NAME (2004)
  - Southeastern Pacific: VOCALS (2008)
- to improve process understanding and model representations of key processes
- to transfer improved climate models to NOAA operations

## CPPA investment on VOCALS (\$4-5M during FY07-FY10)

- Rex: NOAA Research Vessel Ronald Brown
- Data Collection, Analysis and Modeling studies
- Post-doc at NCEP during the field phase?

VOCALS is one of CPPA FY08 research priorities

# Atmospheric Composition and Climate Program

## ACC in VOCALS

- Aerosol/cloud/climate interactions:
  - Aerosol processes and cloud dynamics studied together
  - Measurements designed to inform models (data, processes)
  - Modeling designed to capitalize on field results
- Currently supported/committed: \$830K
  - Wood et al., “Lagrangian Satellite Observations and Modeling of Aerosol-Cloud Interactions” (FY07-09): \$366K
  - Bates et al., Aerosol physical, chemical, optical and cloud nucleation properties from the Brown (FY08-09): \$464K
- Planned (estimate): \$900K
  - FY08 competition, measurements (FY08-10): \$450K
  - FY09 competition, data analysis/modeling (FY09-11): \$450K



## NOAA Interests in VOCALS



- CPPA and ACC will have call for proposals for VOCALS in FY08
- NCEP Climate Test Bed:
  - CTB may support Research-to-Operation (R2O) transition proposals in VOCALS area in FY09 or FY10
  - NOAA's Operations-to-Research (O2R) view: funding opportunities ramp up
- Questions from NOAA Climate Program Office:
  - how to measure the program success?
  - how applicable of results from VOCALS to other climate regimes?
  - any experience or lesson to learn from NAME?
- Data management requirements?
- NOAA is interested in VOCALS Outreach and Education component