Proposal for a 2-day Workshop on Southeast Atlantic Coupled Ocean-Atmosphere-Land Processes

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On behalf of AIP
And
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Motivation

• Persistent of tropical Atlantic biases and lack of progress in understanding and reducing these biases
• Impediment to both seasonal climate forecast and future climate projection
• Similarities between the Pacific and Atlantic and experience gained by VOCAL in the southeastern Pacific
• Unique dynamics of the tropical Atlantic and existing international research programs, PIRATA, TACE and AMMA, …
SST bias in SE Pacific is reduced, but the bias in SE Atlantic remains!

Overall reduction SST bias, all basins
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Stream 1 ENSEMBLES Seasonal Hindcasts:
SST bias - ref. ERSST JJA 1991-2001

Biases appear very quickly in all forecast models!
*Caminade et al. (2009)*

Forecast start: May 1st,
Forecast period: month [2-4] JJA
Stream 1 ENSEMBLES seasonal hindcasts:
Precip bias - ref. CMAP JJA 1991-2001

Caminade et al. (2009)

Biases deteriorates seasonal forecast in all forecast models!
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• **Similarities:**
  ITCZ/Cold Complex, Near Surface Seasonal Cycle, Stratus Cloud Decks, ...
  VOCAL has gained considerable experience in the Pacific ...

• **Differences:**
  Basin Size, Land Interactions, Coastal Orography, Ocean Circulation, …
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Regional Features:

Southeastern Tropical Atlantic:
Angola Dome, Angola-Benguela front (very strong SST gradient), relatively flat coastal orography, …

Southeastern Tropical Pacific:
no oceanic domes, no frontal zones, Andes along the coast, …
**JJA biases**

SST (shading), sfc winds (vectors), precip (contours)

reference: ICOADS (SST, winds), CMAP (precip)

From Richter
Origin of Cold Tongue Bias

I. Richter, S.-P. Xie: On the origin of equatorial Atlantic biases in coupled general circulation models

Hypothesis:

JJA cold tongue SST bias originates from AGCM bias in simulating MAM convection in Amazon and ITCZ region, resulting a weaker-than-observed equatorial trade.
Current Thoughts and Questions

• Possible two sources of error: 1) MAM convection bias over Amazon and 2) bias along Benguela coast. Need further studies.
• Where to focus? Benguela coast? Or Amazon?
• How to proceed? AMIP analysis? OMIP analysis? Coordinated coupled model experiments? New field programs?
• What to do next? A workshop focused on tropical Atlantic bias problem, bringing together TA and VOCALS/VAMOS communities?
Workshop on Coupled Ocean-Atmosphere-Land Processes in the Tropical Atlantic

Wednesday 23 (noon) – Friday 25 (noon) March 2011, Miami
(appended to the VOCALS meeting March 21-23)

• **Wednesday: Large-Scale Overview (pm)**
  - Tropical Pacific and Atlantic climates
  - Ocean-atmosphere-land interactions in the tropical Atlantic

• **Thursday: Southeastern Atlantic Regional Climate (am)/ Process Studies (pm)**
  - The southeastern Atlantic: Subsidence, aerosol and cloud systems
  - The southeastern Atlantic: Upwelling system and ocean eddy field
  - Ocean-atmosphere-land interactions in the Pacific: The lessons from VOCALS
  - Field experiments/observational work

• **Friday: Climate Change and and Planning (am)**
  - Climate Change projections in the (sub) tropical Atlantic
  - Discussions in break-out and plenary modes
• Countries of Participants
  – Brazil, Germany, France, Italy, South Africa, Spain, UK, US, …

• Research Programs
  – AMMA, PIRATA, TACE, VOCALS, VAMOS, …

• Modeling Centers
  – NCAR, GFDL, ECMWF, MOHC, MPI, I PSL, CNRM, CPTEC, …

• Comments and Suggestions?
WRF-ROMS Coupled Model Simulation

CpmModel Ensemble Mean SST vs Raynold SST, DJFM Mean
T & U along the equator (CCSM3)
T & U along the equator (CCSM4)
CMI P 20C3M simulations: SST bias
ref.: icoads JJA

Richter and Xie (2008)