

**Draft Notes from First Telecon of  
the US CLIVAR Working Group on  
“Upper-Ocean Heat Budget Synthesis for the Eastern Equatorial Pacific & Atlantic  
Oceans”**

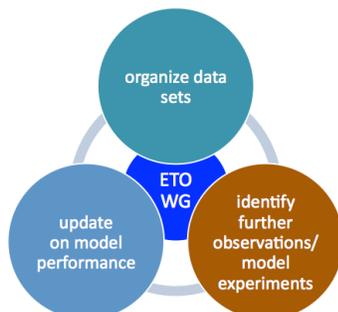
Attendees: Michela Biasutti, Ping Chang, Simon de Szoeke, Tom Farrar, Carmen Grados, Alban Lazar, Roberto Mechoso, Brian Medeiros, Irina Sandu, Ed Schneider, Rob Wood, Paquita Zuidema, Mike Patterson, Jennifer Mays

**1. Orientation: WG Genesis by Steering Committee of PZ, SdS, RM, RW**

Paquita reviewed the origins of the WG concept, having emerged out of (1) the VOCALS project in the eastern Tropical Pacific, in which ocean eddy-mixing is a leading hypothesis for closing the upper-ocean heat budget, and (2) the Atlantic Tropical Biases Workshop in Miami, Spring 2011, which identified multiple potential hypotheses reflecting coupled processes among ocean, land and atmosphere. During the 2011 US CLIVAR Summit, Simon put forward the idea of a WG focused on the eddy mixing hypothesis for the Eastern Pacific, while Paquita, Rob and Roberto proposed a WG to examine the eastern Atlantic tropical biases. The Summit discussion of the two proposed ideas resulted in a recommendation to combine the two into a single WG focused on addressing the biases and heat budgets in both eastern basins.

**2. Discussion of WG Goals:**

The WG prospectus puts forth these three goals:



a. Organize Datasets

- Establish WG website with value added products/cultivated plots
- Desire evocative plots to illustrate hypotheses
- This is needed for the Eastern Atlantic, in particular. With VOCALS, data are available for evaluation of Eastern Pacific.
- Need to consider data beyond the study domain of the Eastern Atlantic to consider larger-scale influences, e.g., remote impact of Southern Ocean clouds
- **Action Item:** Identify and post relevant publications (some lists have already been started) organized by basin, e.g., Ed’s list of pubs on tropical biases at his website

- **Action Item:** Establish via the WG webpages for members to contribute data values for making overview plots
- **Action Item:** Begin identifying simple metrics for use in evaluating model performance (next goal)

b. Coordinate Model Performance Assessments

- What are the lessons learned from the Pacific that apply to the Atlantic (e.g., cloud/albedo role)? Are model improvements in the Pacific correlated to those in the Atlantic?

- Do CMIP5 model/observation comparisons behave similarly and change similarly from CMIP3 to CMIP5?

Discussion of model simulations

- Ed suggested starting with documenting biases in the Atlantic from real initial states, especially SST.
- Ingo has plots comparing CMIP5 to CMIP3 demonstrating that there is not much improvement in CMIP5 over CMIP3 (request these to share with the WG).
- Ed has decadal runs for 9-10 models.
- Michela has more than 12 20<sup>th</sup> Century integrations at LDEO.
- Brian indicates that NCAR runs are available (CCSM4 shows improved performance).
- Roberto offers that since many models have not improved from CMIP3 to CMIP5, taking an average doesn't offer much useful information—he suggests that the NCAR and GFDL models may be sufficient.
- Others think it would be helpful to have a spread of models.

Discussion of the time period for plots

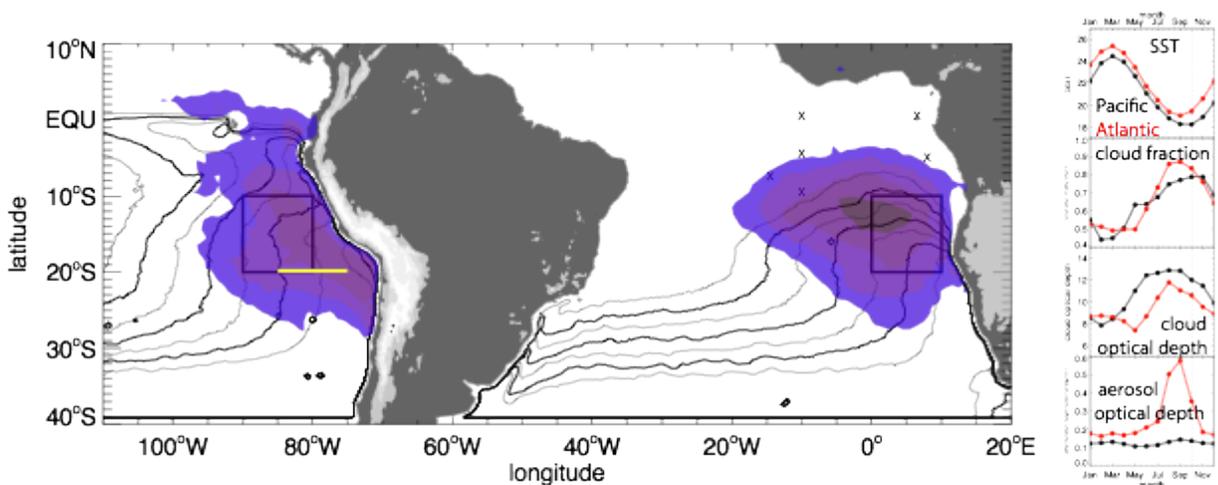
- 10-year mean period, covering the MODIS data period (2002-2012)
- 50-year period to resolve phenomena of interest (e.g., ENSO) and to establish a representative climatology; 1950-2000 would include reanalyses and satellite periods

- What observations/model metrics are most useful? e.g., PIRATA line, Klein/Hartmann box averages, Ascension Island.

Discussion of domain for plots

- To enable an examination of time evolution, how best to present and summarize information? e.g., plot of SST distribution across the Atlantic basin? annual mean cross-section at the equator (could show wrong sign of SST gradient, having an impact on winds)?
- Equatorial and off-equatorial biases are likely linked, and should both be included.
- SE Atlantic biases are largest at 18°S, near the Angolla Convergence Zone
- Make a section along the coast at 8°E; Alban indicates that largest errors occur at and along the coast.
- Need more than a section line in order to calculate budgets
- Need to cast a broad net

- **Action Item:** Assemble/Request plots of readily available CMIP3 and CMIP5 simulations for annual and seasonal-mean values of SST, cloud cover (total, low, middle and high), surface winds, thermocline depth (and possibly sharpness), for a climatological time period (beginning ~1950? 1980?) up to 2012 if possible to include modern satellite period at these locations:
  - along the Atlantic equator
  - the lines 40°S to 10°N for both EPac and EAtl (near shore; 6.5E intersects with Sao Tome island),
  - an E-W line along 18°S
  - along the PIRATA line at 11W
  - spatial plot encompassing the Klein & Hartmann domains depicted in the figure below



October-mean 17C-23C sea surface temperature climatology (2002-2010, TMI, black contour lines, 18-20-22C lines boldened), 2002-2009 MODIS Terra mean cloud fraction (blue-purple shading spans 60-100% cloud cover). 'X' mark PIRATA buoys, Sao Tome island (0N, 6.5E), and San Ascension island (8S, 14.5W). Boxes indicate stratocumulus deck locations used within Klein and Hartmann (KH; 1993), yellow line along 20S, 75-85W corresponds to VOCALS/cruise enhanced sampling. Land topography indicated in 1 km height increments. Right four panels depict mean annual cycles in SST, cloud fraction, cloud and aerosol optical depth for the KH boxes, with a dashed line marking October and red and black lines indicating the southeast Atlantic and Pacific respectively.

- c. Define Further Observations/Model Experiments (to be undertaken later based on a. and b. above)

### 3. Additional Actions Items Prior to Telecon #2 (mid-June)

- a. Establish group elist
- b. Continue dialogue among members, sharing publications and data sets. Question on how to share plots needs some resolution. Email round-robin is OK but does not permit a growing repository for analysis and plots/descriptions.
- c. Establish dedicated WG webpages; post publications and data plots (by basin). Simon suggested that the ideal webpage would include comment boxes below each figure.
- d. Submit AGU session on tropical biases (by April 20 deadline); Paquita and Simon to co-convene (PZ – done); WG meeting to be held in conjunction with AGU.

April 18, 2012 4:30 EDT

- e. Explore other conference software for (e.g., EVO) hosting telecons per Alban's suggestion (especially to engage international participants)