

RICO Activities Report R/V Seward Johnson

**Kollias^{1,2}, Albrecht², Vargas², Jo², Voss²
Fairall³, Hare⁴, Hill³, Feingold³, Brewer³,
Wolfe³, Bariteau⁴**

- 4. Brookhaven National Laboratory**
- 5. University of Miami**
- 6. ESRL/Physical Science Division**
- 7. University of Colorado**

Scientific Objectives

What is the range of the dynamical and microphysical structures in trade-wind cumuli, and how do these structures affect the lifecycle of clouds under varying wind shear, stability, and aerosol conditions?

What microphysical / dynamical factors and time scales are involved in the production of large-drop concentrations in fair-weather cumulus clouds?

How do the raindrop size distributions evolve from the initial to mature precipitating stages of shallow cumuli?

How is the marine boundary layer altered by precipitation from trade-wind cumuli?

What are the statistical properties of precipitating trade-wind cumuli from the cloud to mesoscale scale?

Can we find evidence for cloud processing of aerosol in the aerosol size distributions? Can we detect changes in cloud microphysics under different aerosol loadings?

RICO Activities

ESRL PSD (Formerly known as ETL) & CU Fairall, Hare, Hill, Brewer, Wolfe, Bariteau

- NOAA-K data
 - Full motion corrections computed
 - Remapped to spatial coordinates
- Air-sea fluxes
 - Motion checked against POSVM and LIDAR (looks good)
 - Motion corrected covariance pass1: Inert-Diss looks funny, investigating
- LIDAR
 - More motion work
 - Studies done with staring data
- Microwave LWP being reprocessed
 - Optimize retrieval coeff for RICO
 - Use smoothed tip curves
- Wind Profiler
 - Wind being reprocessed again
 - Plan to do daily and diurnal averages

Status and Workshop Activities I
Kollias, Albrecht, Jo, Vargas, Voss

- Processing of Cloud and Boundary Layer Properties from Remote Sensing Systems
 - SJ Radars, Wind Profiler, Lidar, Ceilometer, Microwave Radiometer
 - W-Band/X-Band Comparison (Status Completed; See Ieng Jo Poster)
 - X-Band Cloud Statistics (Initial for selected days)
 - Lidar — Use vertically pointing mode data for selected cases
 - Microwave Radiometer – Need final/calibrated data
 - Ceilometer--Processed
 - SPOL from Barbuda—(PPI full domain and ship focus scans, cloud tracking, movies, web site)
 - Workshop Activities:
 - Collaboration with the SPOL group
 - Seek aircraft in-situ measurements for inter-comparison

Status and Workshop Activities II

Kollias, Albrecht, Jo, Vargas, Voss

- Statistics--Cloud and Boundary Layer Structures
 - Regime Classifications, Specifications
 - Initial Classification Completed (See Shaunna Vargas Poster; and web site)
 - Radars (SJ and Barbuda Radars), Lidar, Ceilometer, Microwave
 - Techniques for Obtaining BL Turbulence (Sub Cloud Layer) from Upward Facing Mode Lidar Being Developed and Tested Data
 - Radiometer (LWP)—In Progress
 - Sondes (SJ, Barbuda, Drop), Fluxes, Aerosols (see web site)
 - Workshop Activities
 - Review Regime Classification (small group meeting?)
 - Aircraft Intercomparisons
 - Cloud Properties
 - Sub-cloud Layer Turbulence and Aerosol Measurements from Aircraft

Status and Workshop Activities III

Kollias, Albrecht, Jo, Vargas, Voss

- Process Studies (SJ, SPolKa, Aircraft)
 - Case Studies
 - Convective Lines—Jan 19 (Leg-II, less cloud fraction and winds)
 - Scattered Broken Cloud Field--Jan 11 (Leg-I, high cloud fraction and winds)
 - Others? e.g., Boundary Layer Outflows/Cloud interactions;
 - Workshop Activities
 - Group Meeting of Investigators Working on these cases