

Marine Trade Wind Cumulus

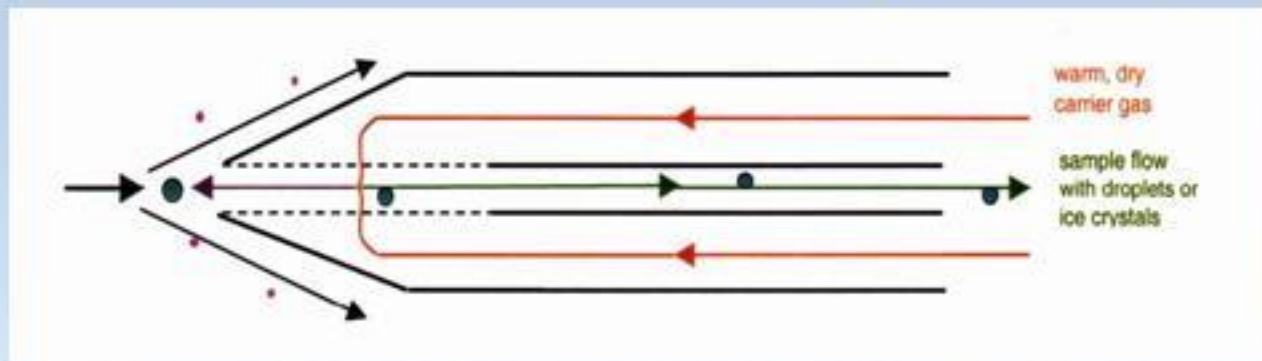
Status of CVI Measurements from RICO

**RICO Analysis Meeting
28 June 2005**

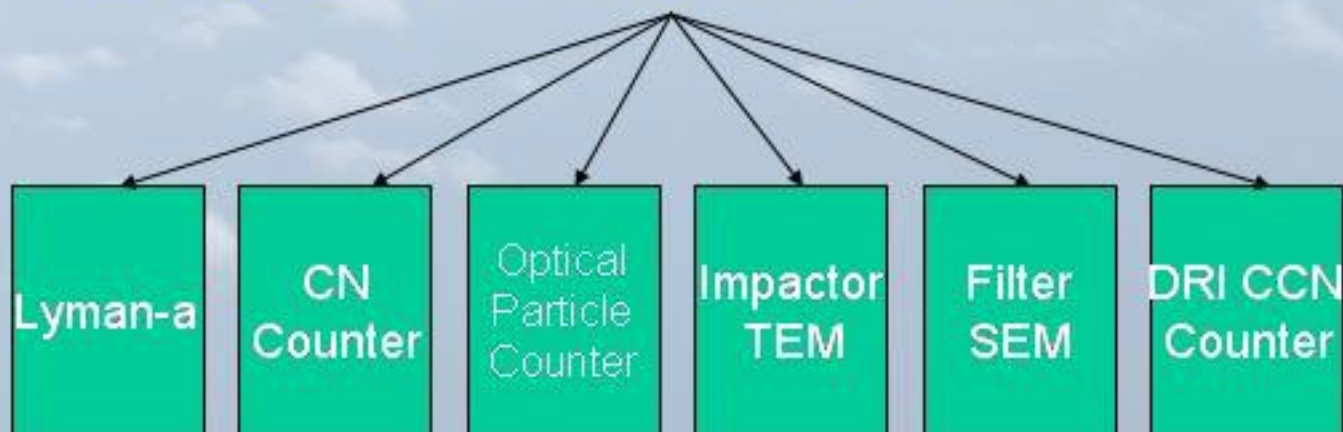
Scientific Questions

- What are the nuclei of droplets in maritime cumulus? Is there evidence of pollution in this remote area?
- What are the nuclei of the largest droplets, which initiate precipitation? What are the giant nuclei concentrations and sources?
- What are the relationships between particle size, composition and critical supersaturation, and do they agree with theory? (organics)
- How do these compare with polluted mixed-phase clouds (AIRS-II) and California stratus (DYCOMS-II)?

Counterflow Virtual Impactor (CVI)

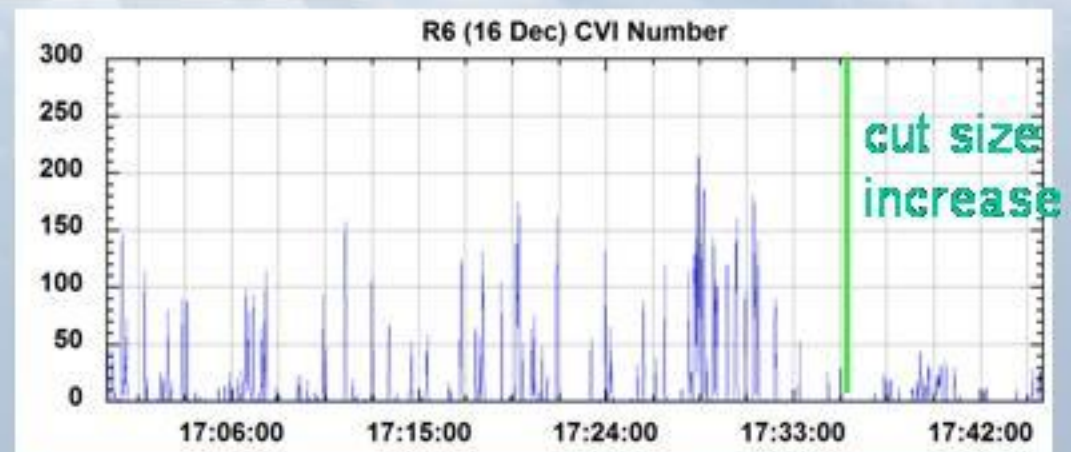
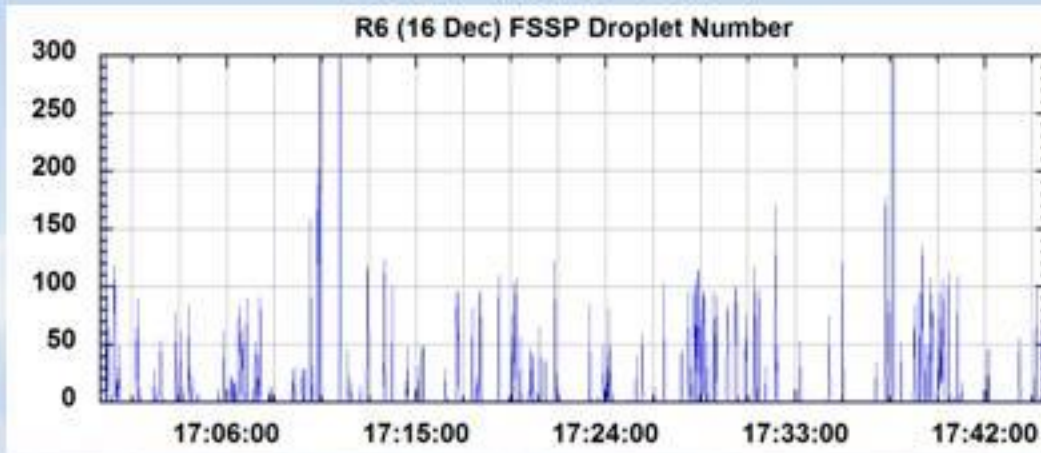


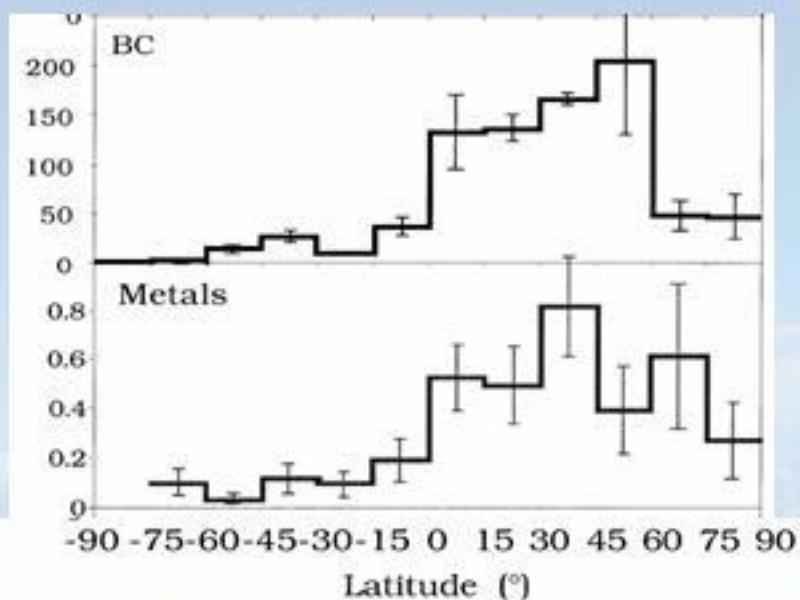
- Drops and ice crystals are impacted into dry nitrogen gas and evaporated. Interstitial particles and gases excluded.
- Measure volatile gases (water vapor) and non-volatile residual particles
- Change min. size drop sampled to investigate drop size dependence
- Also used as "giant nuclei" sampler outside of cloud



Data Example

Flight with Little Precip

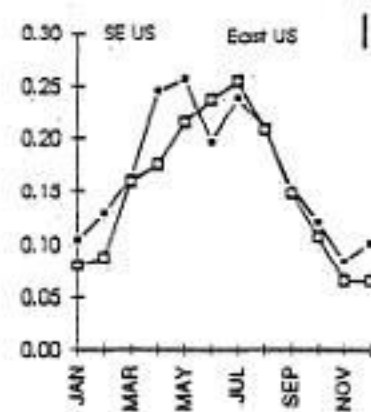
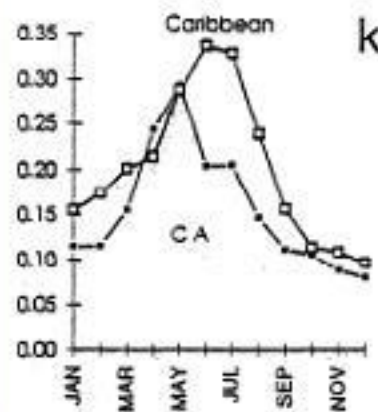
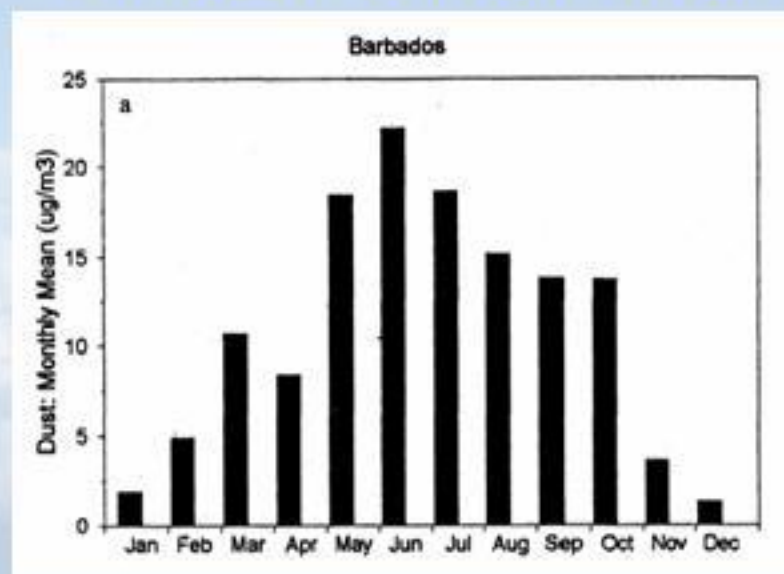




Heintzenberg et al. 2000

Northern Hem. marine environment is polluted, even away from major sources and in the tropics

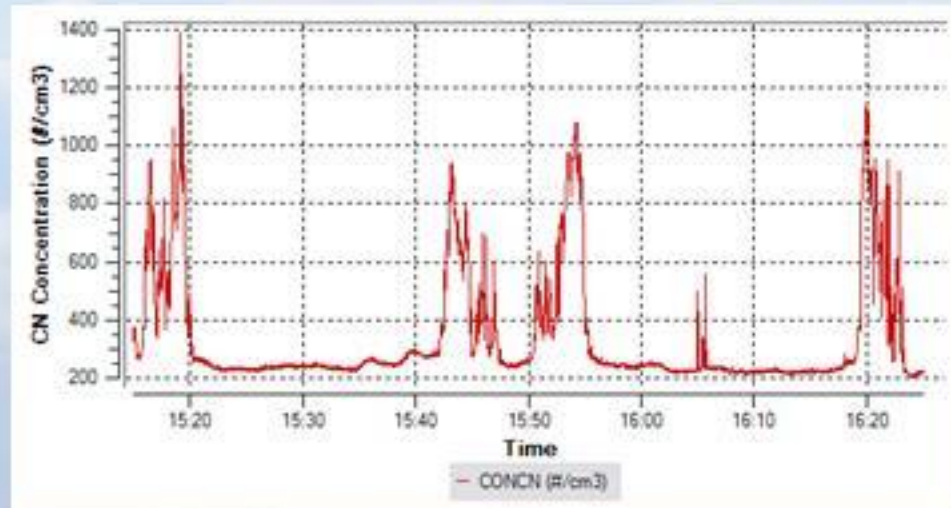
Caribbean is Not Pristine



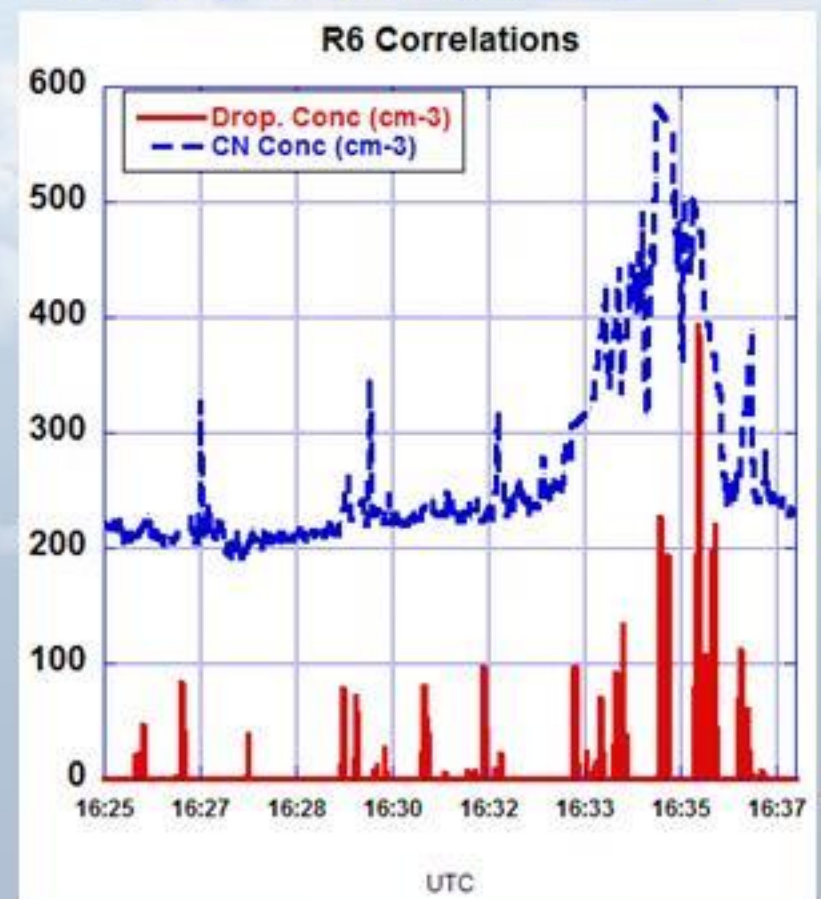
Husar et al. 1997

Interesting Things Noted: Aerosol Indirect Effect in Caribbean?

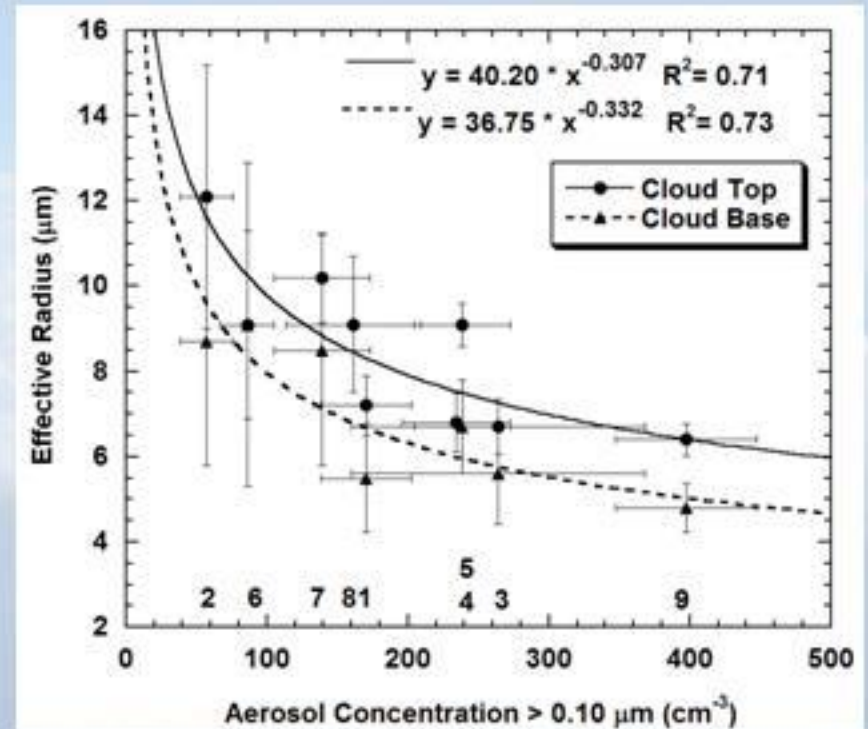
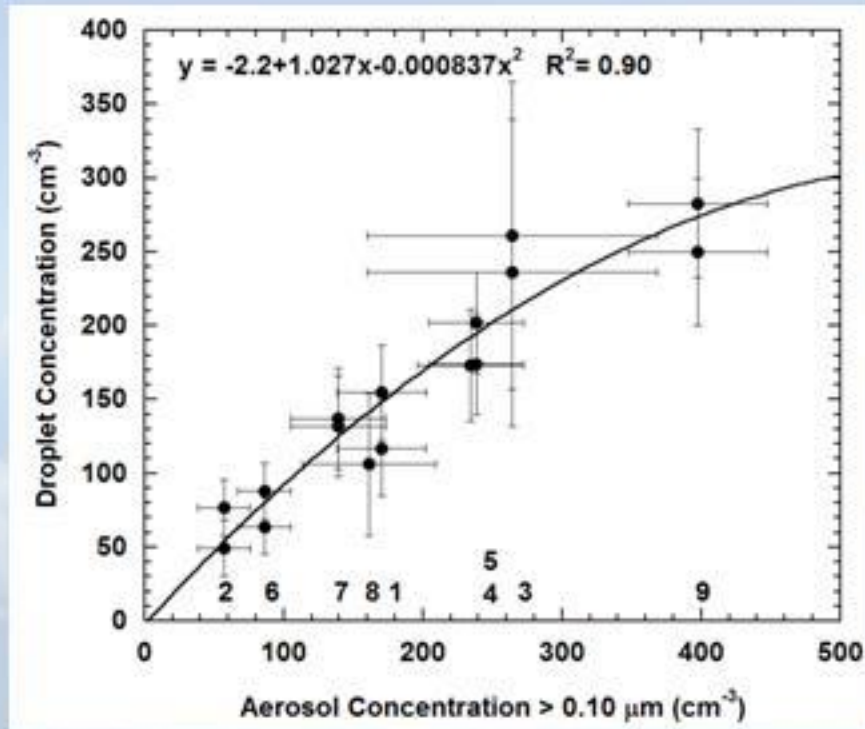
Below-cloud circles for R6 (16 Dec)



Strong effect on drop N



DYCOMS-II Indirect Effect

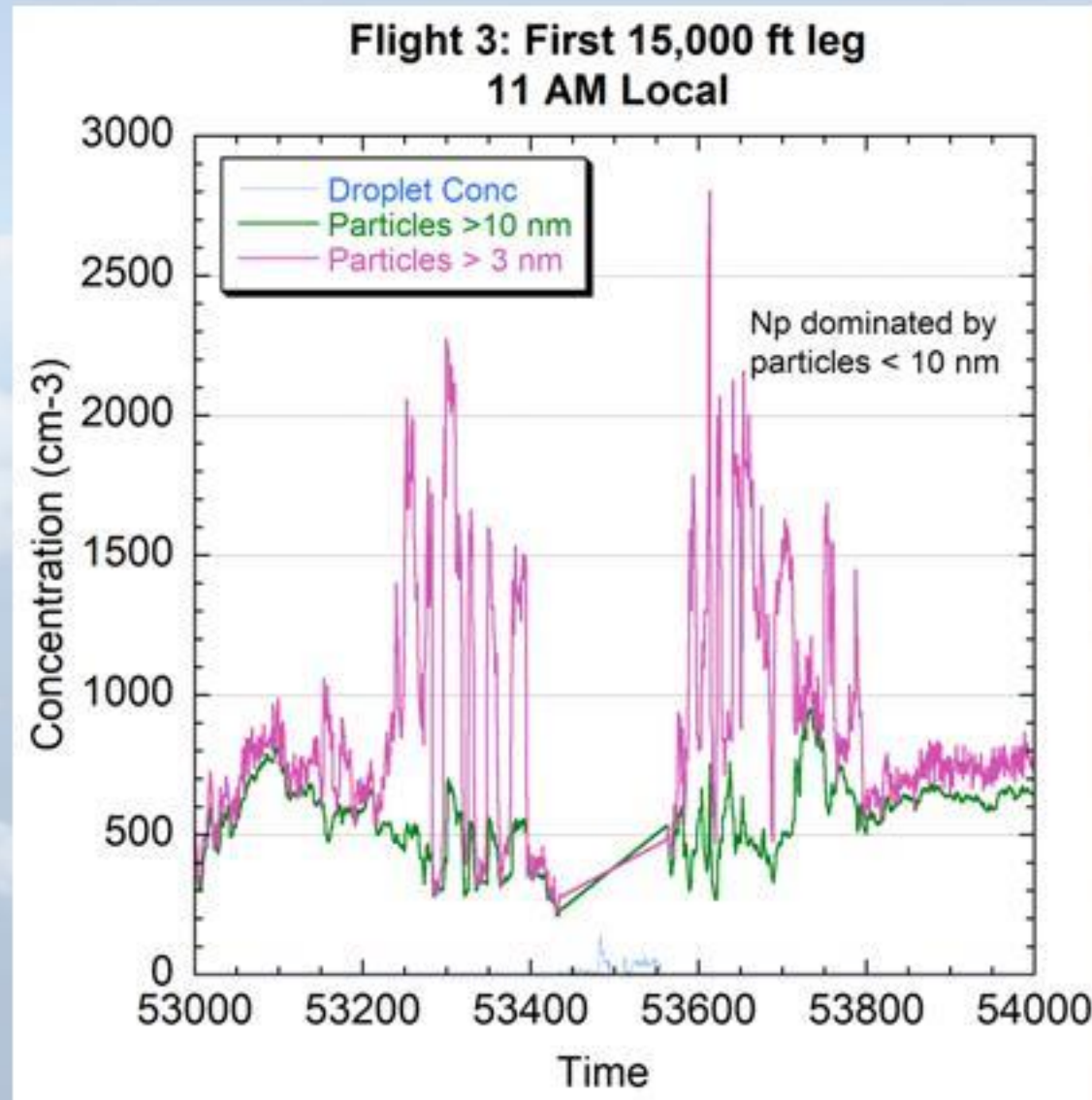


Twohy et al. 2005

Is it important for RICO? Need to stratify by updraft V

Interesting Things Noted

New Particle Production in Outflow Region



Data Analysis Goals

(collaboration with ASU, DRI, NCAR)

- Analyze all high priority SEM and TEM samples quantitatively (below cloud, in cloud at low and high cut sizes if available), above and in cloud outflow regions)
- Archive number and liquid water data for high priority cases
- Analyze Giant Nuclei samples from various samplers (CVI, TAS, UGN Stick) for concentration and composition
- Examine composition in greater detail via Electron Energy Loss Spectroscopy (organics)
- Compare ambient and cloud droplet residual CCN spectra and size distributions
- Return to Scientific Questions

Scientific Questions

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