

McFarquhar et al.

Cirrus Aerosol Shallow Cumuli  
Atmospheric Radiation Study (CAESARS)



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Um and ????

Proposal to deploy AMF2 & AAF to area around  
Galapagos Islands, Ecuador (ship or island?)

Goal: Collect long-term set of observations of  
cirrus & cumulus using in-situ & remote sensing  
platforms in eastern Pacific

# Importance to CLWG/ASR

- Cirrus covers 20% of Earth
  - Balance between ir & solar radiative effects depends on microphysical & macrophysical properties
  - Controls of these properties must be determined
  - Need observations in undersampled regions (maritime Eastern Pacific)
- Boundary layer clouds have large radiative influence
  - Shallow cumuli ubiquitous over much of tropical oceans
  - Affect radiation, heat & moisture budget & circulations
  - Treatment in climate models demonstrably poor
  - Co-dependence on meteorology/aerosols poorly known
  - Little data because of remote oceanic location

# Science Goals for CAESARS

1. Collect in-situ data on cloud microphysical & optical properties (cf. RACORO, SPARTICUS) in **cirrus** & **shallow cumuli** to aid in development/evaluation of retrieval algorithms.
2. Collect year-long data set of **cirrus** microphysical, thermodynamic & radiative properties in under-sampled region of maritime tropical environment (explore how large-scale dynamics & meteorology affects microphysical & macrophysical properties of cirrus)
3. Identify processes that influence formation, development & dissipation of **shallow cumuli** & evaluate factors that impact cloudiness, microphysical properties & diurnal cycles (including meteorology & aerosols)
4. Use in-situ & remote sensing data to develop parameterizations for **cirrus & shallow cumuli** & evaluate results of cloud resolving models & large-scale models