

# **Soundings, C-Band Radar, and Disdrometer Data Collection and Synthesis for RICO**

**Robert Wood,  
Sandra Yuter, Christopher Bretherton  
University of Washington, Seattle**

# Original proposal - Key questions

- What are the statistical properties of rain structures (spatial scales, lifetimes, etc..)?
- What are the diurnal characteristics of rain and the thermodynamic environment?
- What are the areal average surface precipitation rates and how do they relate to characteristics of cumuli in terms of cloud structure and aerosol?

# Original proposal - Key questions

- How significant is precipitation in the energy and moisture budgets of the trade-wind BL?
- What large-scale forcings modulate the rain rate?

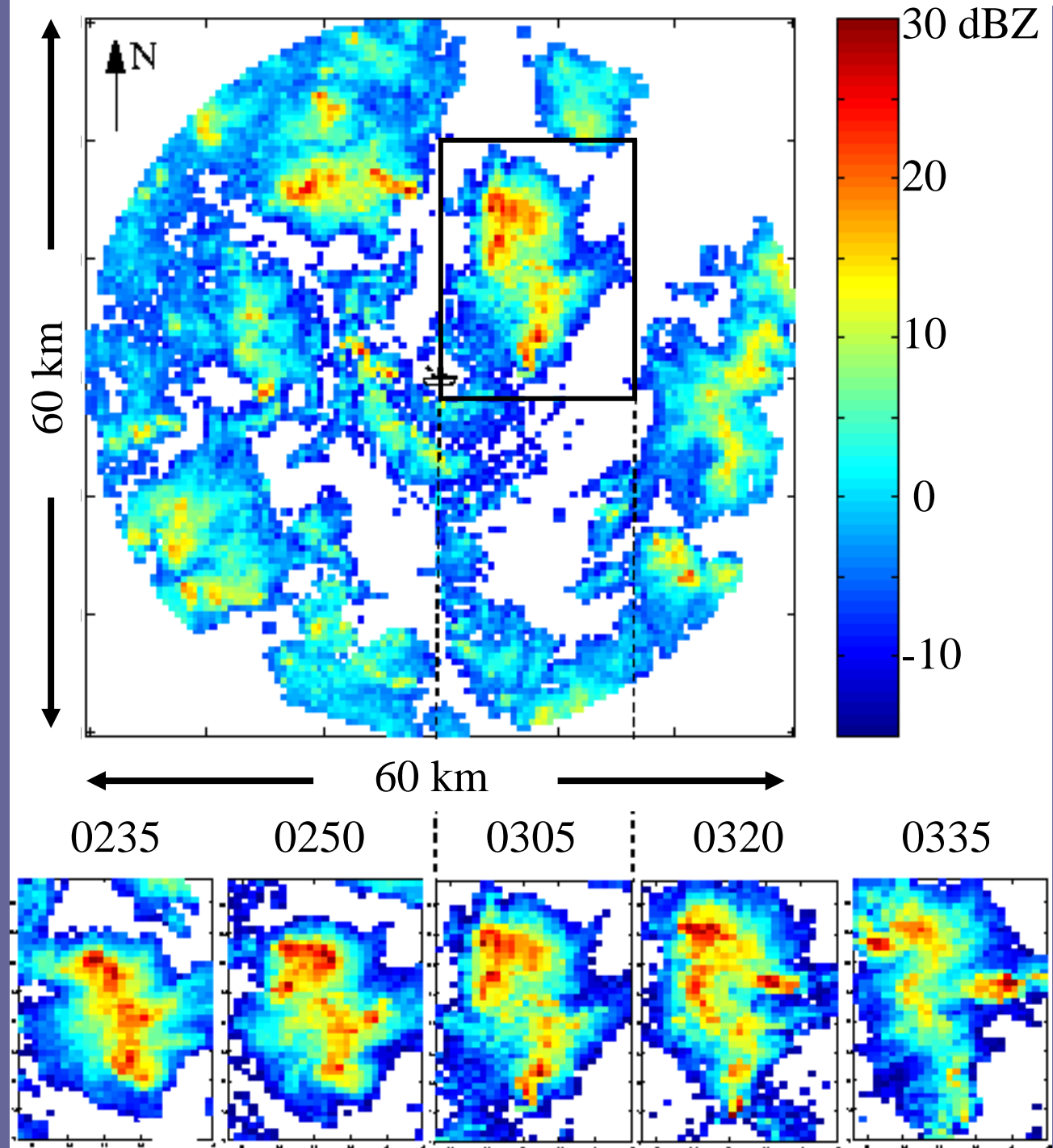
Scanning C-band radar (RHB)	Characterization of precipitation structures Areal rainmaps at < 10 minute intervals (30-40 km radius)
8 × daily radiosonde ascents (RHB)	Characterization of thermodynamic environment
Disdrometer (Antigua)	Investigation of rain DSD
Satellites (GOES, MODIS, MISR, QuikScat, TRMM)	SST, cloud coverage and structure, surface wind, some precipitation info.
ECMWF/ NCEP Reanalysis datasets	Large-scale forcings, thermodynamic structure

# RICO Gaps

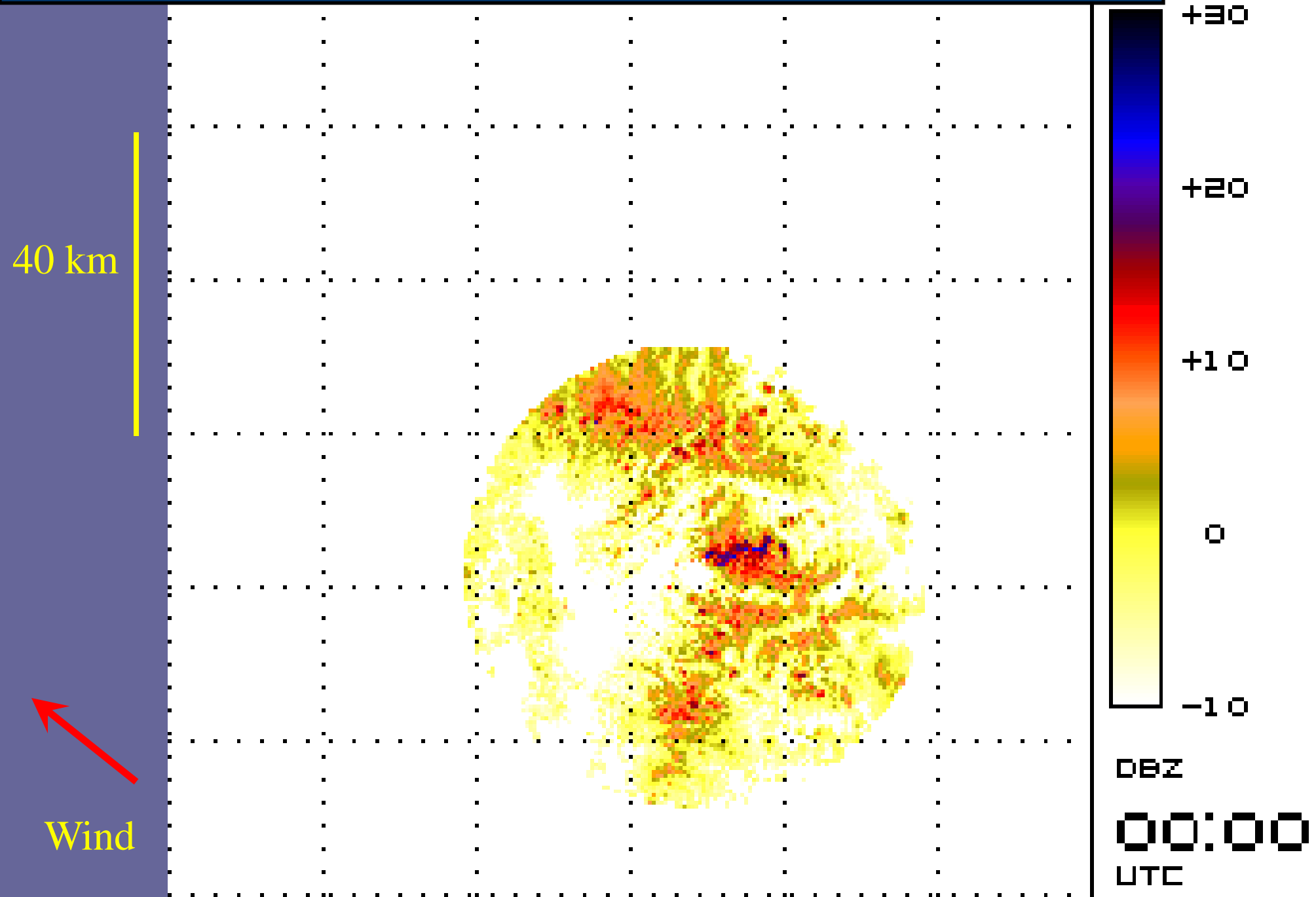
- Without the continuously scanning C-band far from land:
  - Statistical properties of rain structures
  - Rainmaps for budget studies
- Without the 3hrly radiosonde ascents:
  - High temporal thermodynamic structure and energy/moisture budgets
  - Diurnal cycle in the trade-wind BL
- Without the land-based disdrometer:
  - DSD characteristics, particularly maximum drop sizes not observable by aircraft

# Structure and evolution of drizzle cells

C-band  
example  
October 21  
0305 LT



# Scanning radar (C-band) during EPIC



# 8 × daily Radiosonde observations during EPIC

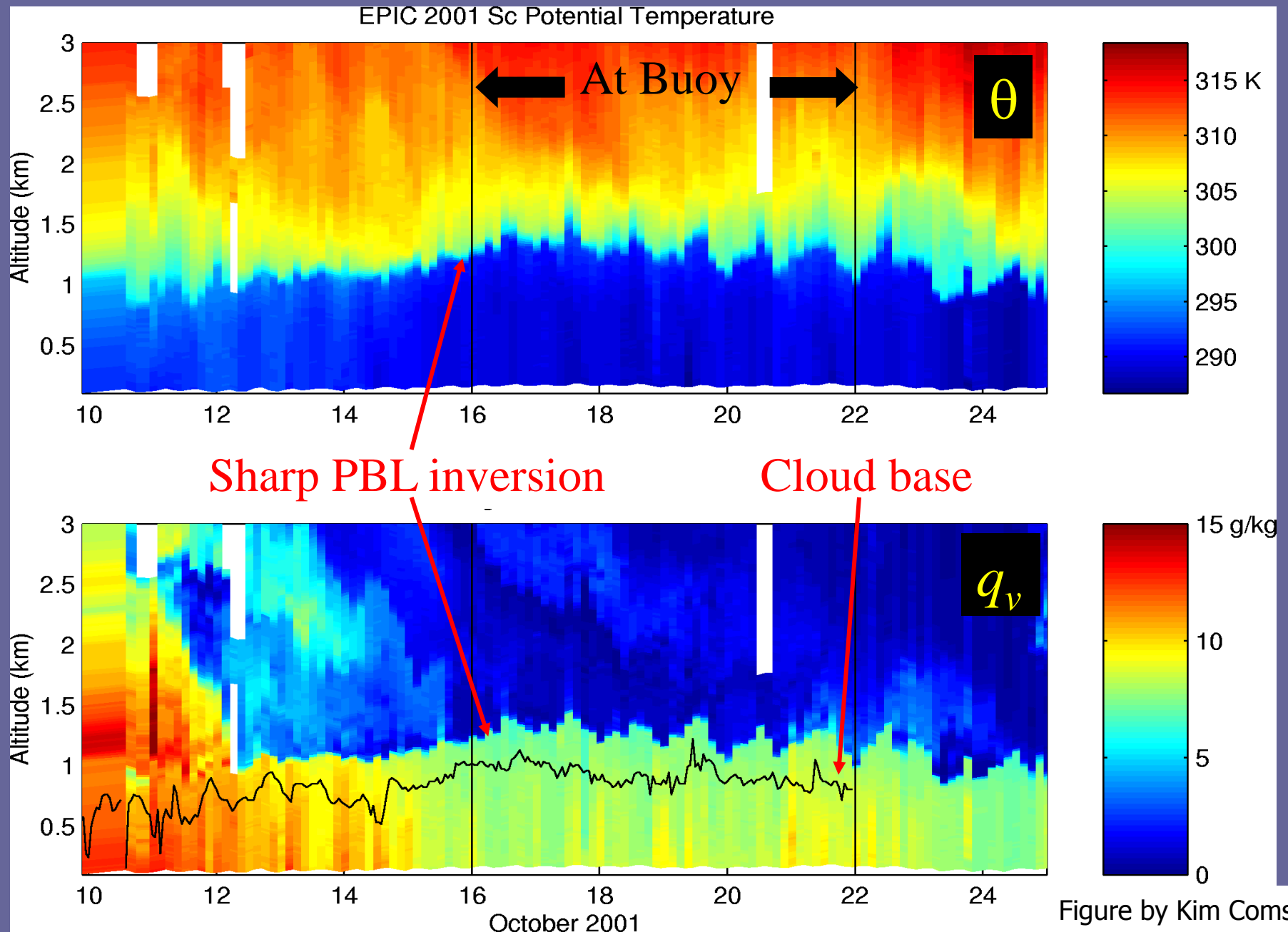


Figure by Kim Comstock



# What can be done with an alternative ship?

- Possibility of scanning K-band or X-band radars to substitute for C-band radar
  - Technical questions regarding suitability for our scientific objectives:
    - Attenuation issues
    - Radar characteristics
    - Scan strategies
- 3hrly radiosonde launches

# Summarize what we want

- Chris Fairall funded
- UNOLS Ship
- Radiosonde ascents
-

# Stop here

- Background materials

# Original proposal - personnel

- 3 researchers on ship (Rob Wood + 2 graduate student research assistants)
  - radiosonde launches, C-band radar coordination, cloud photography, meth-blue filter measurements during rain events
- Land based disdrometer/coordination (Sandra Yuter)
  - Coordination disdrometer data collection/quality control

# Outline

- Summary of original proposed work
- What will RICO lack without the Ronald H Brown (RHB)?
- Suggestions for research using an alternative research vessel

# Original proposal – field equipment requirements

- RHB:
  - C-band radar;
  - surface meteorological measurements, SST;
  - radiosonde observing system;
  - methylene blue preparation
- Land:
  - suitable disdrometer location