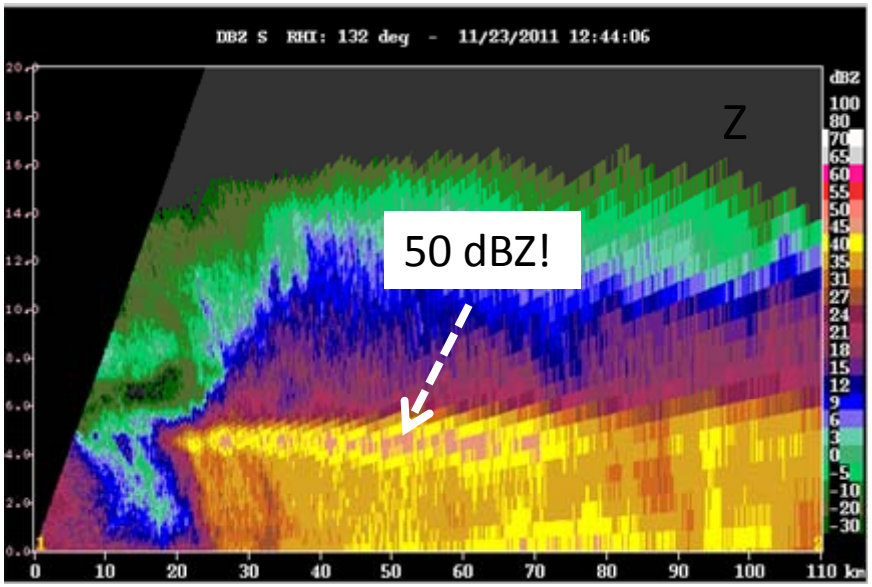
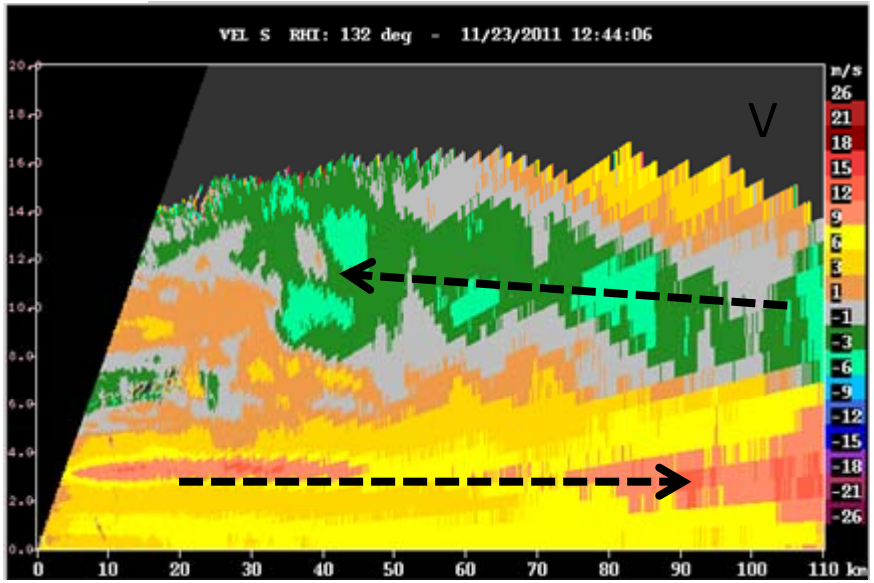
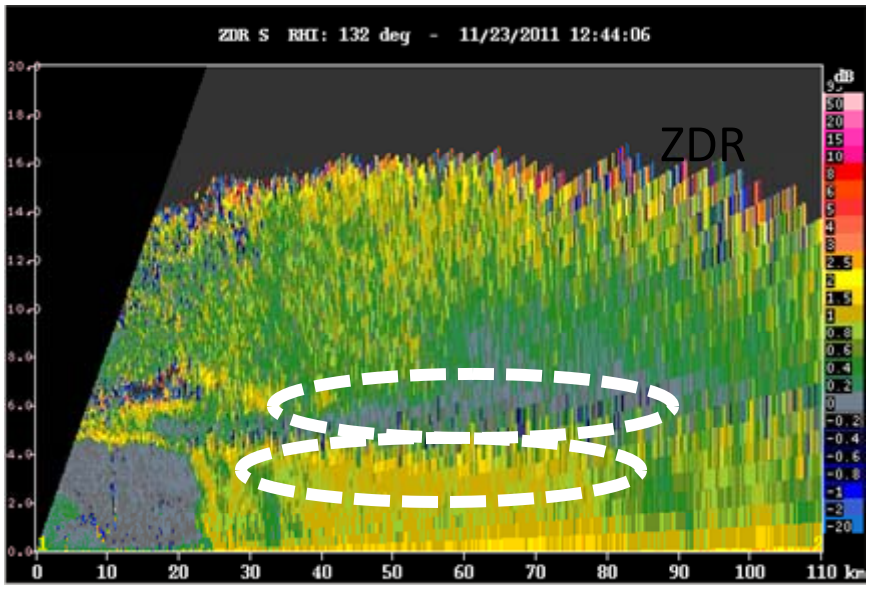
Radar Breakout 2A, Radar Science Issues Summary by S. Rutledge

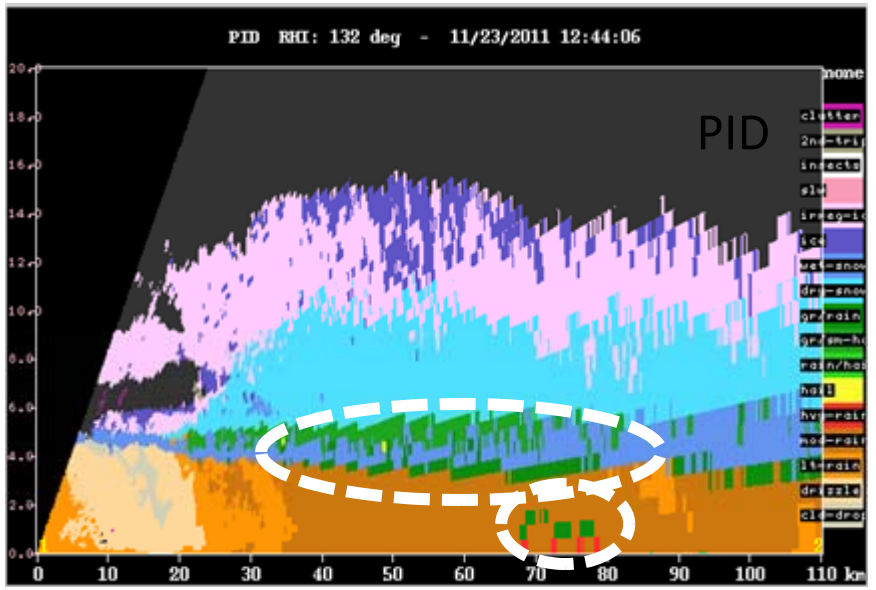
- Microphysics, radar based PID
  - Evaluation work required, consider renaming fields to have more direct microphysical meaning/context
  - Important for providing microphysical context to cloud populations
  - Important for model validation/improvement

Rowe, Barnes, Houze 11/23/20



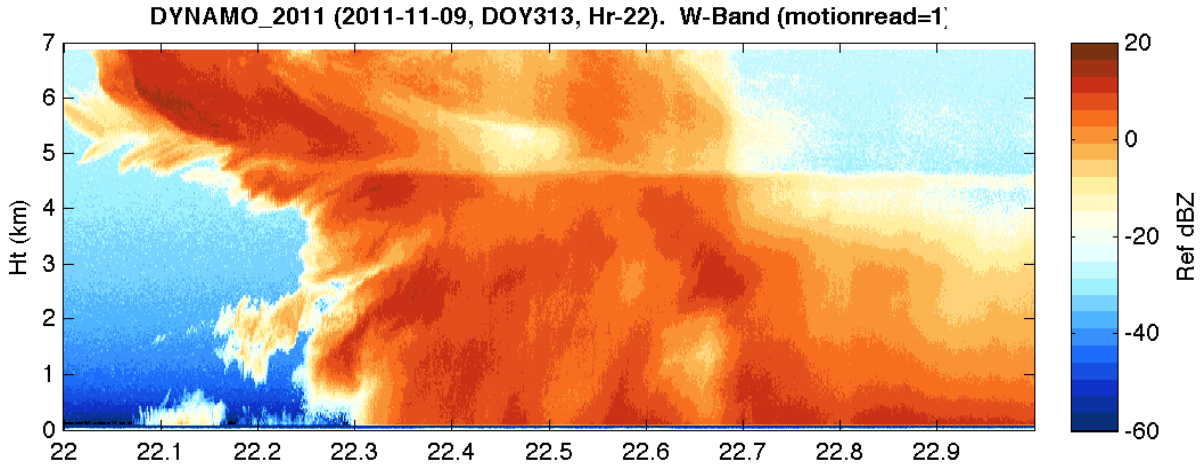




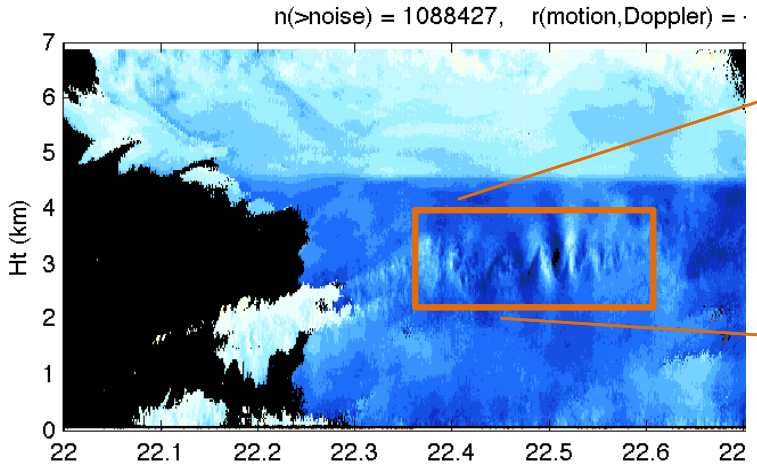


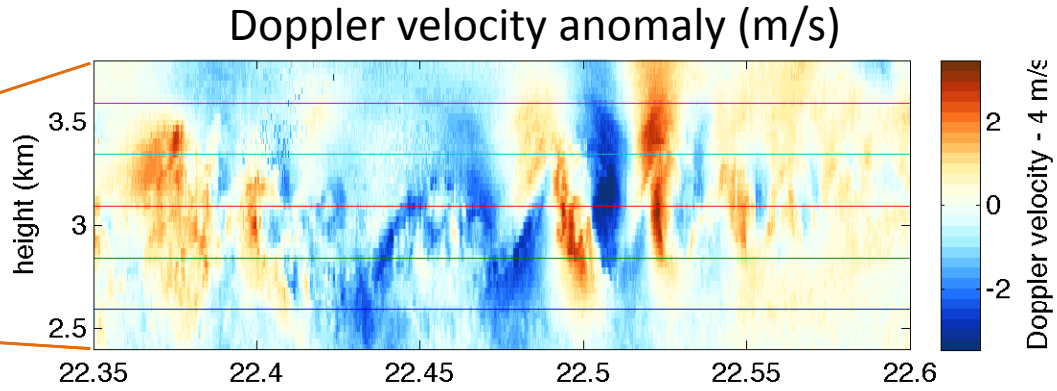
Radar Breakout 2A

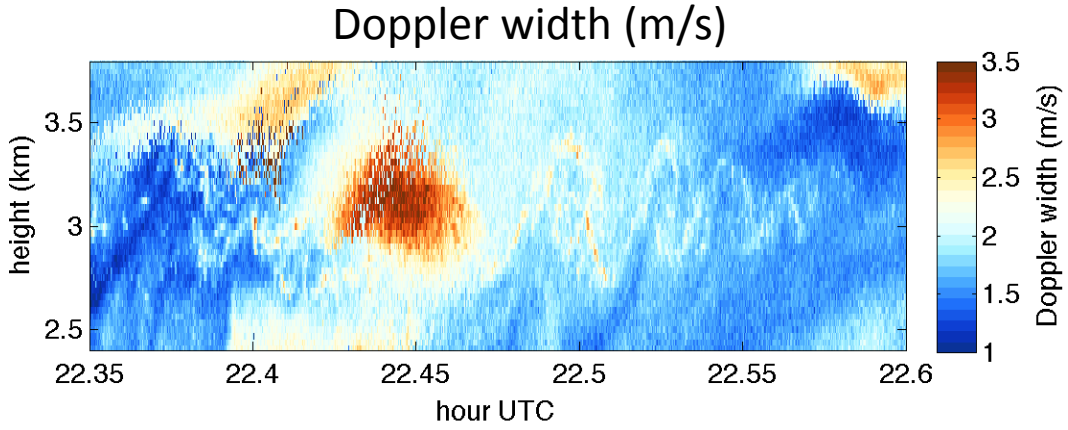
- Multi-wavelength observations on the Revelle, C-band Doppler, W-band vertically pointing radar, lidar
  - Provide clear air and precipitation components of convective systems
  - Convective gust fronts and convective initiation
- This multi-wavelength synthesis provides a context for understanding air sea interaction to develop wind and precipitation impact on the upper ocean



- Stratiform precipitation has steady fall velocity.
- makes air velocity visible to radar.
- DYNAMO has ~100 hours of stratiform rain.







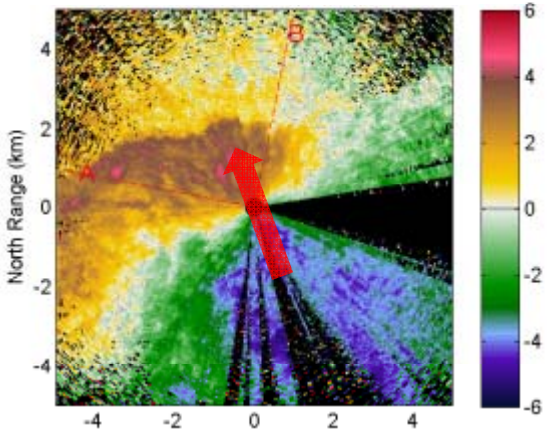
Kelvin-Helmholtz billows

Deszoeke, Fairall, Brewer

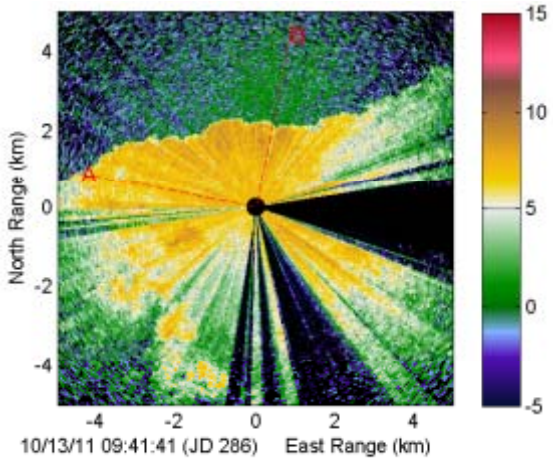
Horizontal

Vertical

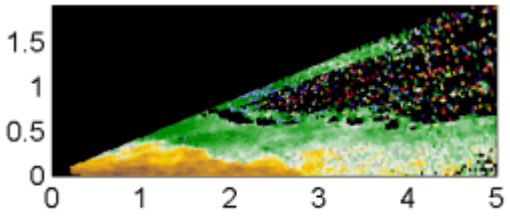
Velocity



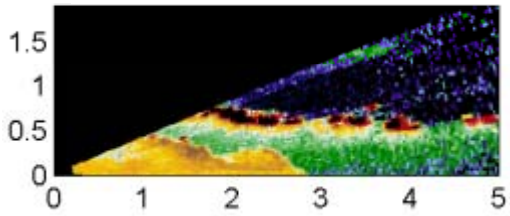
Intensity



Velocity along (B)

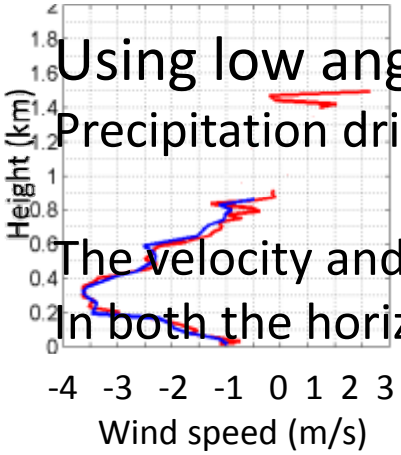


Intensity along (B)

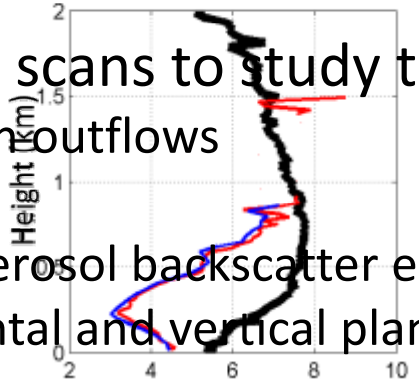


All distances in km

Change in wind speed vs Height



Wind speed vs Height

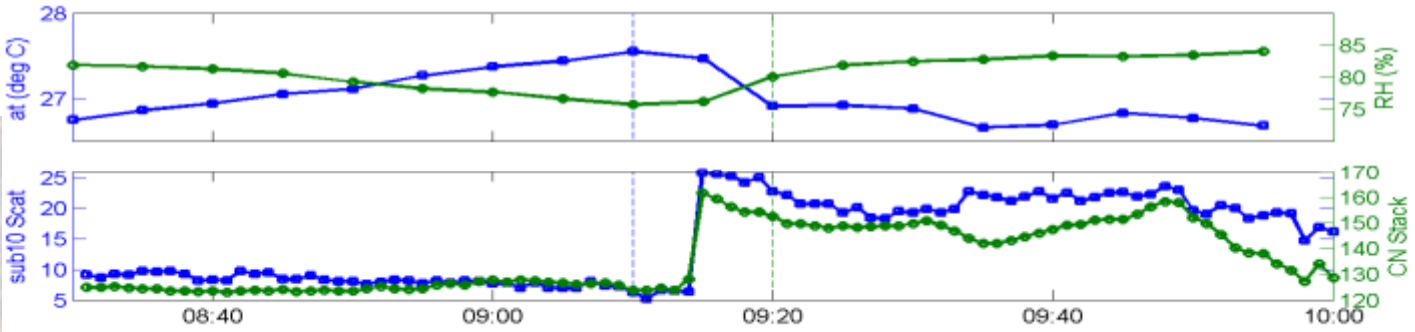


Using low angle scans to study the surface layer :

Precipitation driven outflows

The velocity and aerosol backscatter enhancement can be tracked by the lidar In both the horizontal and vertical planes

and also in other measurements made on the ship : thermodynamic and aerosol concentration and scattering



Radar Breakout 2A

- Cloud retrievals
  - Merged S-polKa/KASR product provides unique view of convective cloud structures and statistics
  - includes radiative heating estimates

Z. Feng

- 2 versions
- Merged product provide better CWC, R_e and RH than standard
- Available as ARM PI Product, contact me

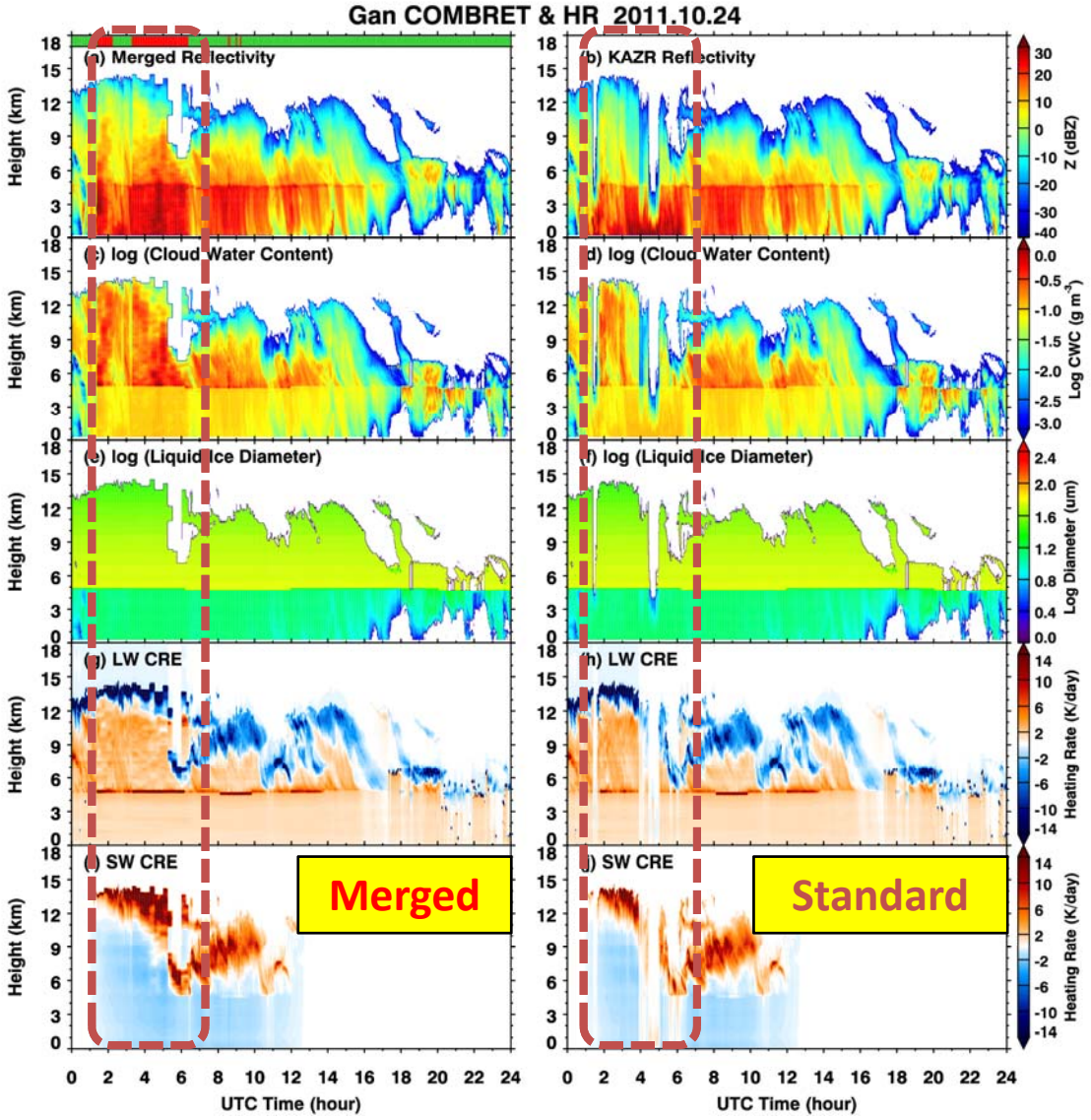
Z

CWC

R_e

LW RH

SW RH

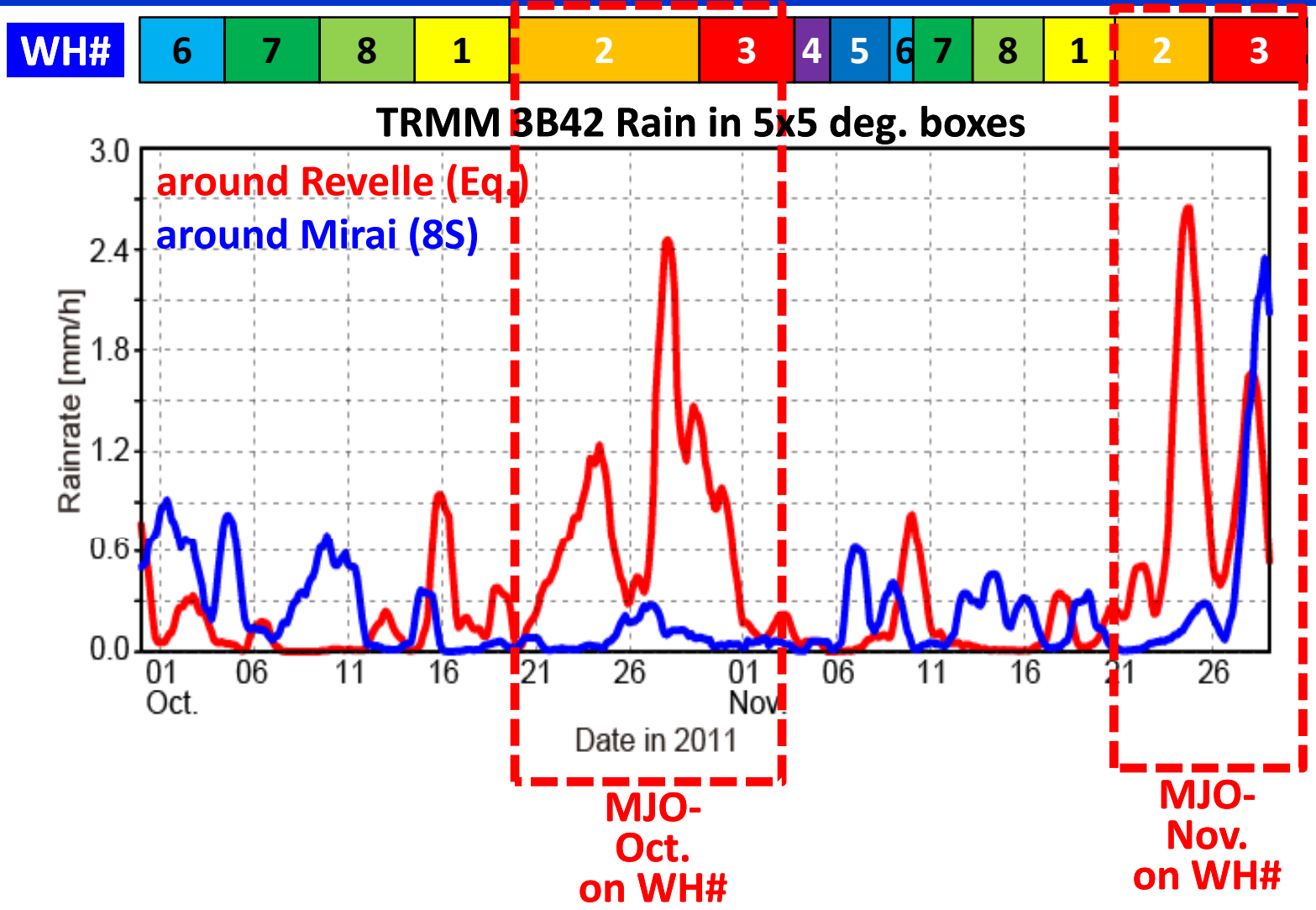


http://www.arm.gov/data/pi/71

Radar Breakout 2A

- How do the cloud statistics compare at the locations of the 3 C-band radars?
- Manus Is. and DOE resources deployed there permit opportunity for statistical comparison between IO and W. Pacific O. (Collis)

Alternation between Eq. and 8S



Meridional alternation occurred in MJO-scale temporal variations (and in synoptic-scale, also)