

The DYNAMO/AMIE International Field Campaign: Cloud Population of the Madden-Julian Oscillation

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and

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R. H. Johnson, C. N. Long, S. A. McFarlane, C. Schumacher, M.
Katsumata, N. Viltard, S.-S. Chen, and K. Yoneyama

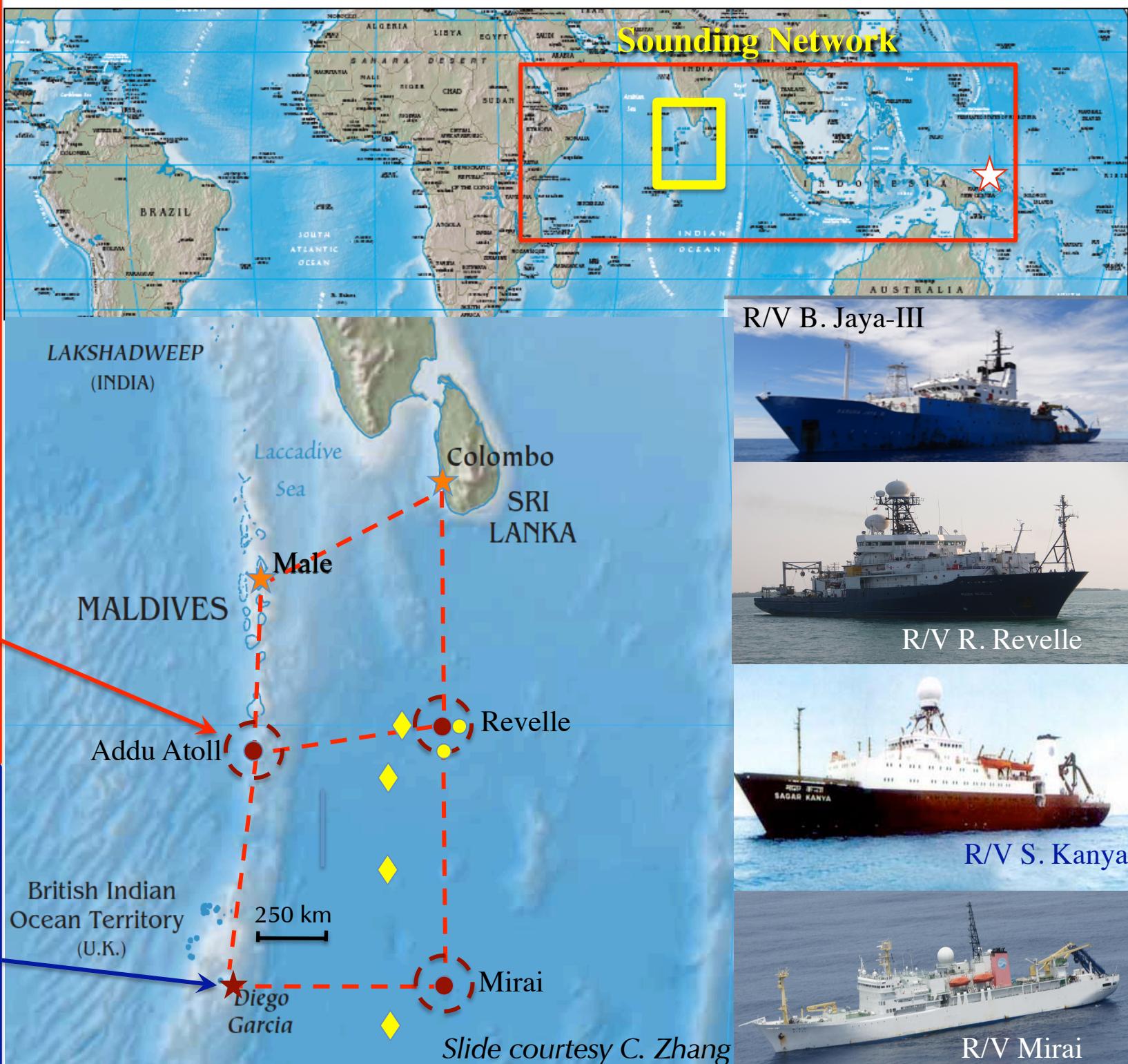
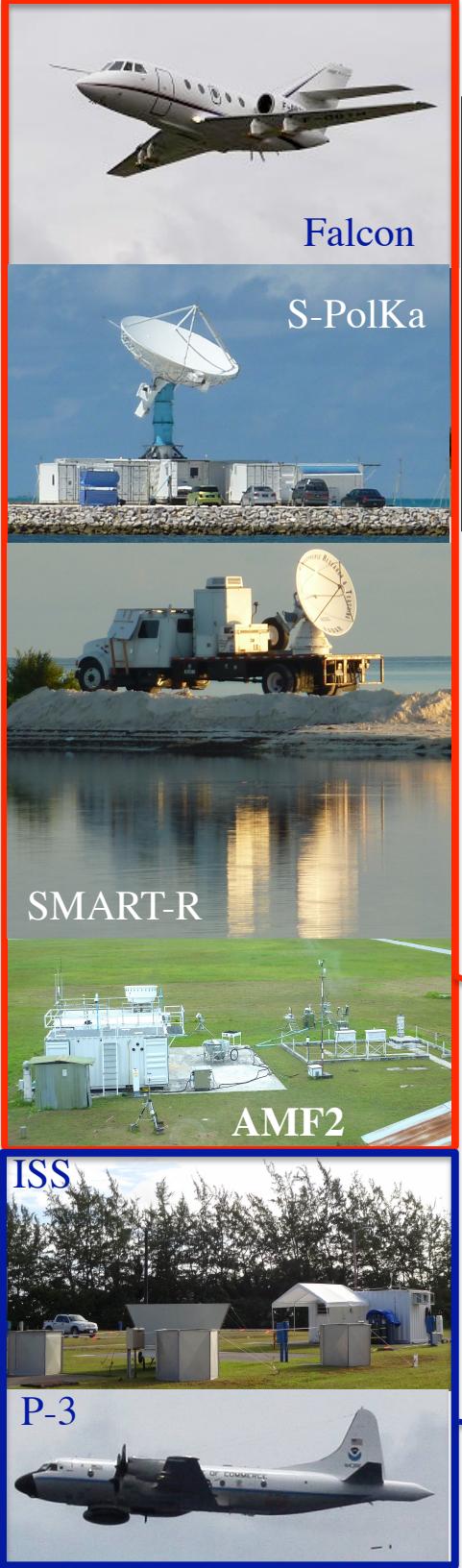
Radar experiment goal

- Characteristics and evolution of the MJO cloud population in the region where the disturbance builds up
- Role of clouds in humidification of troposphere prior to MJO onset

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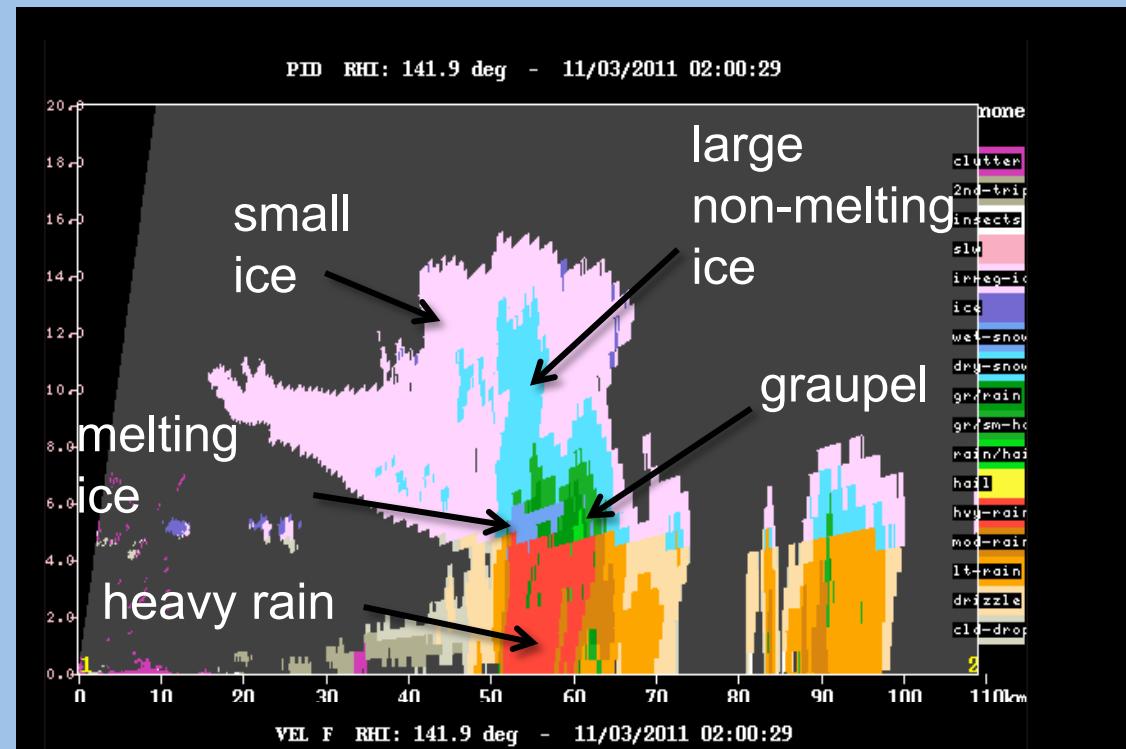
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DYNAMO Field Experiment (October 2011 – March 2012)

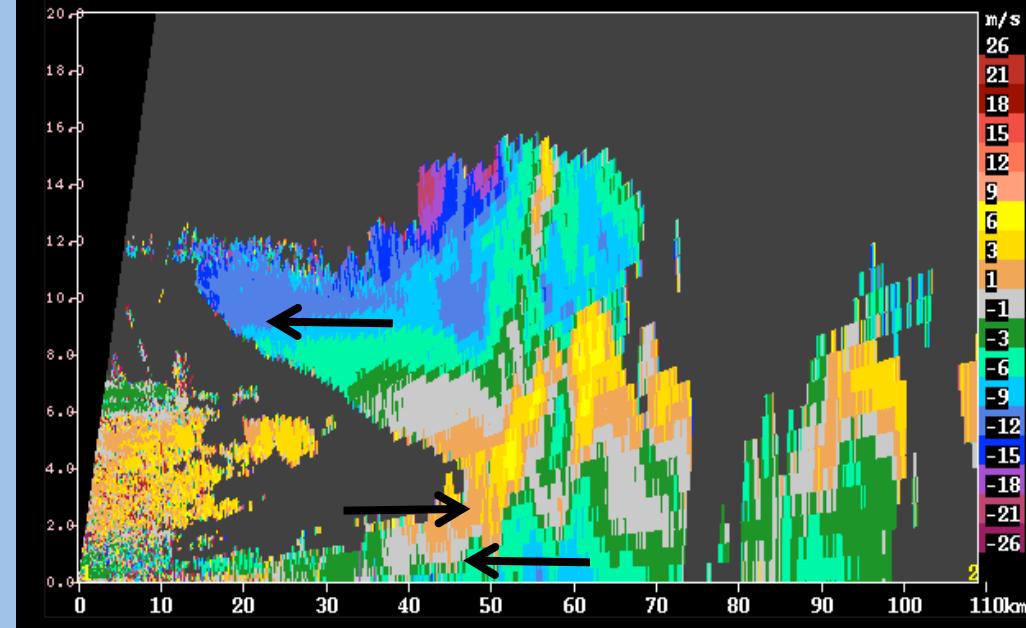


S-PolKa: Moderate cumulonimbus

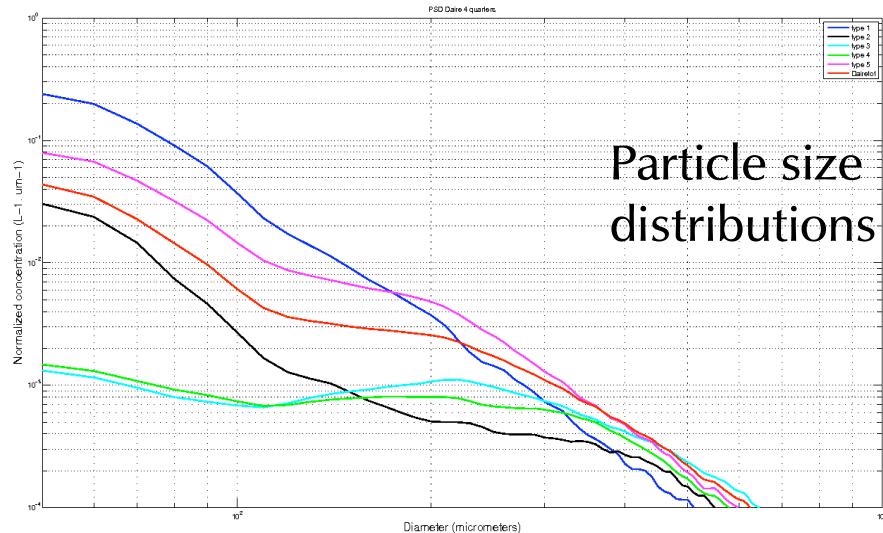
Hydrometeor type



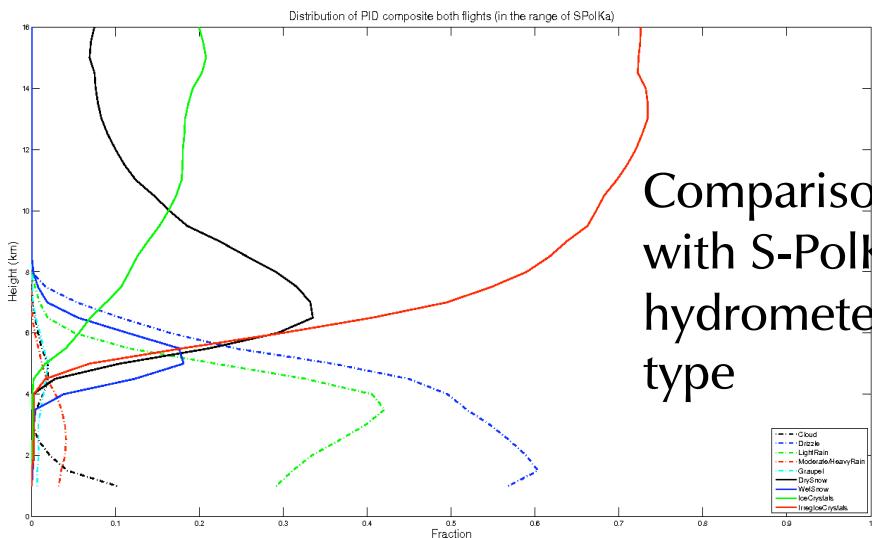
Doppler velocity:
range folding
corrected



Falcon (F-20) microphysical data

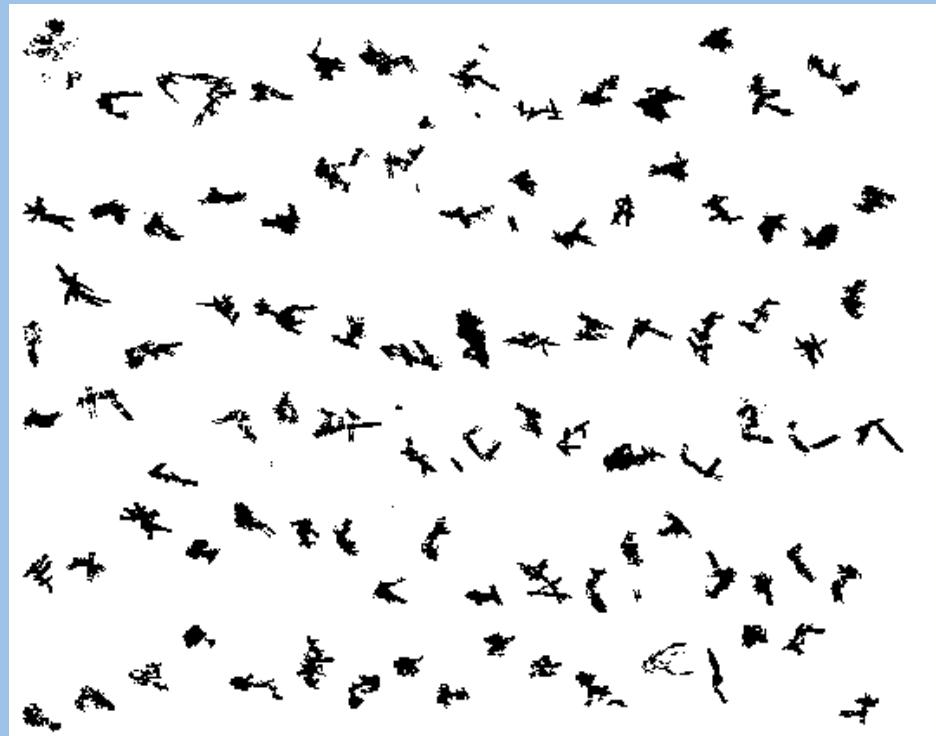


Particle size distributions



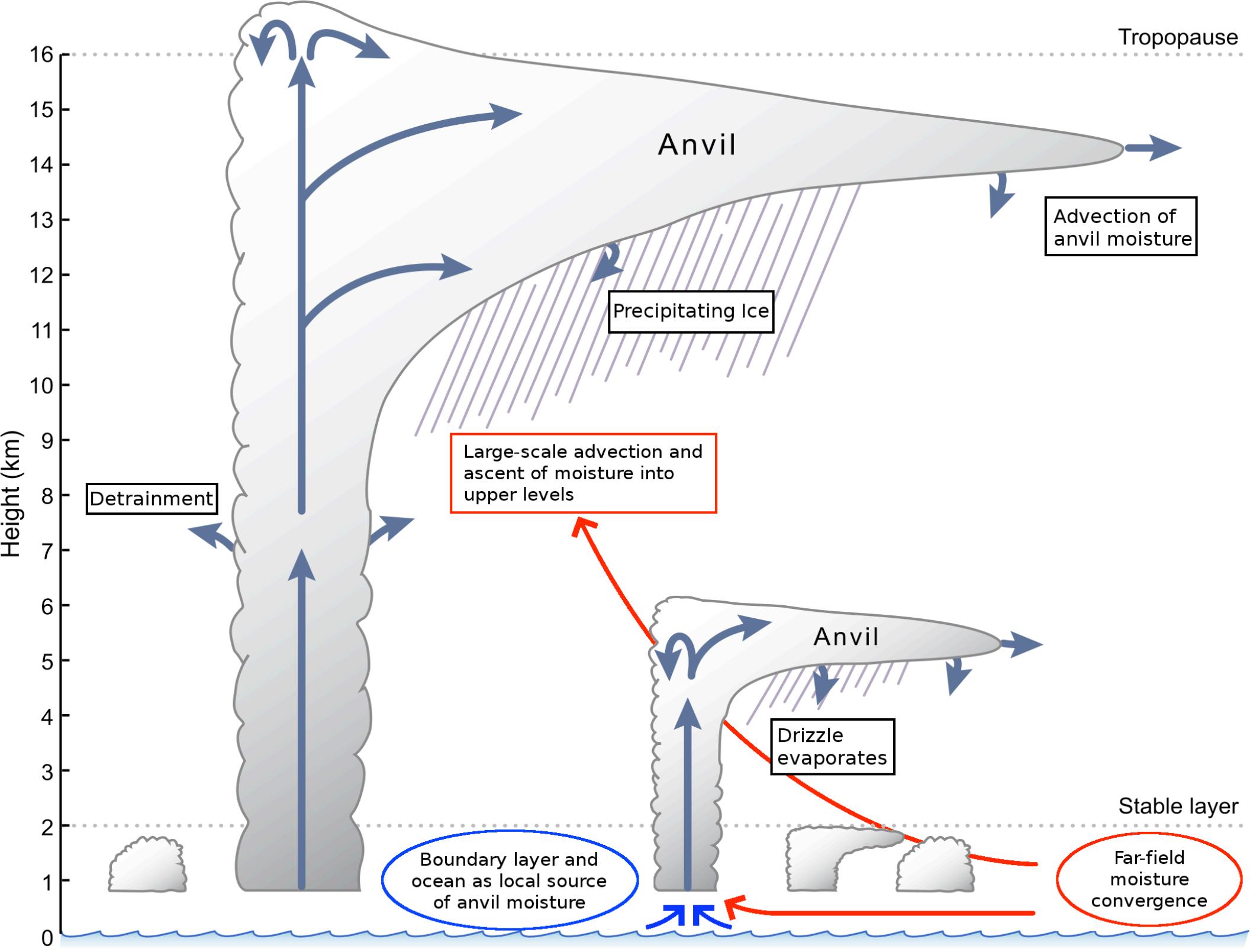
Comparison with S-PolKa hydrometeor type

Particle Images

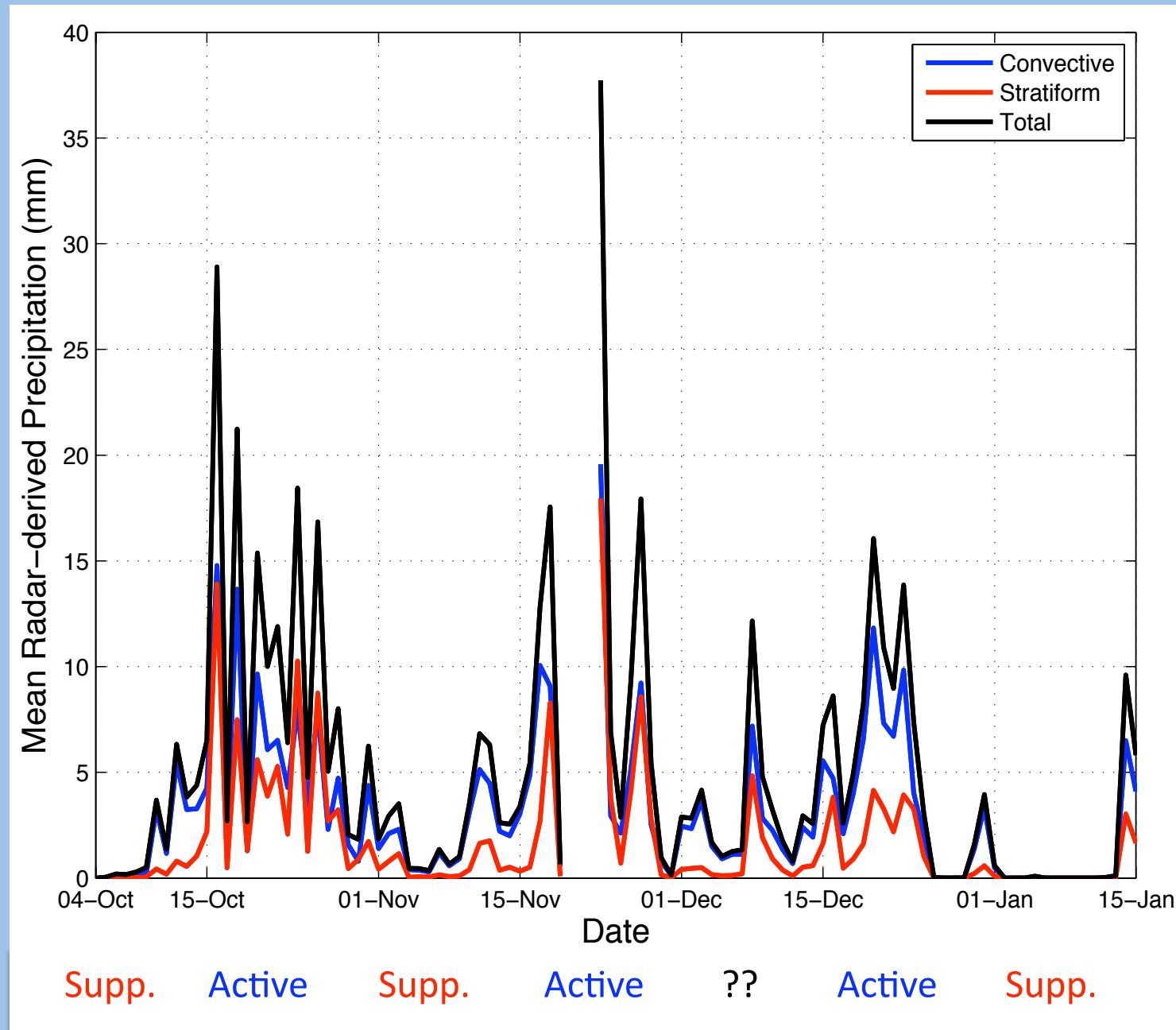


Figures courtesy D. Coppin

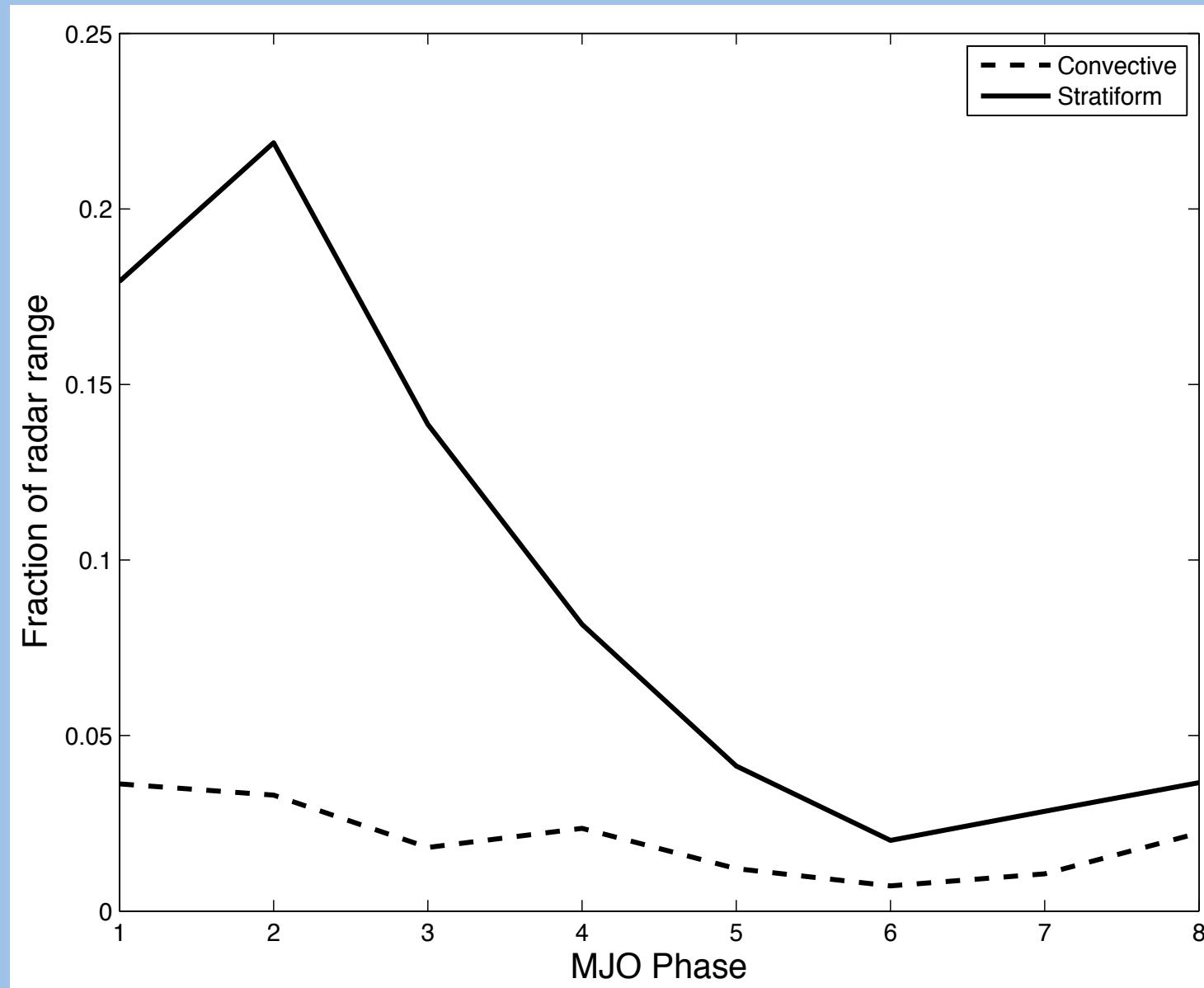
See Talks 3.1-6 (Friday, 9:45AM) and 3.2-5 (Friday at 11:30AM) in HS9.

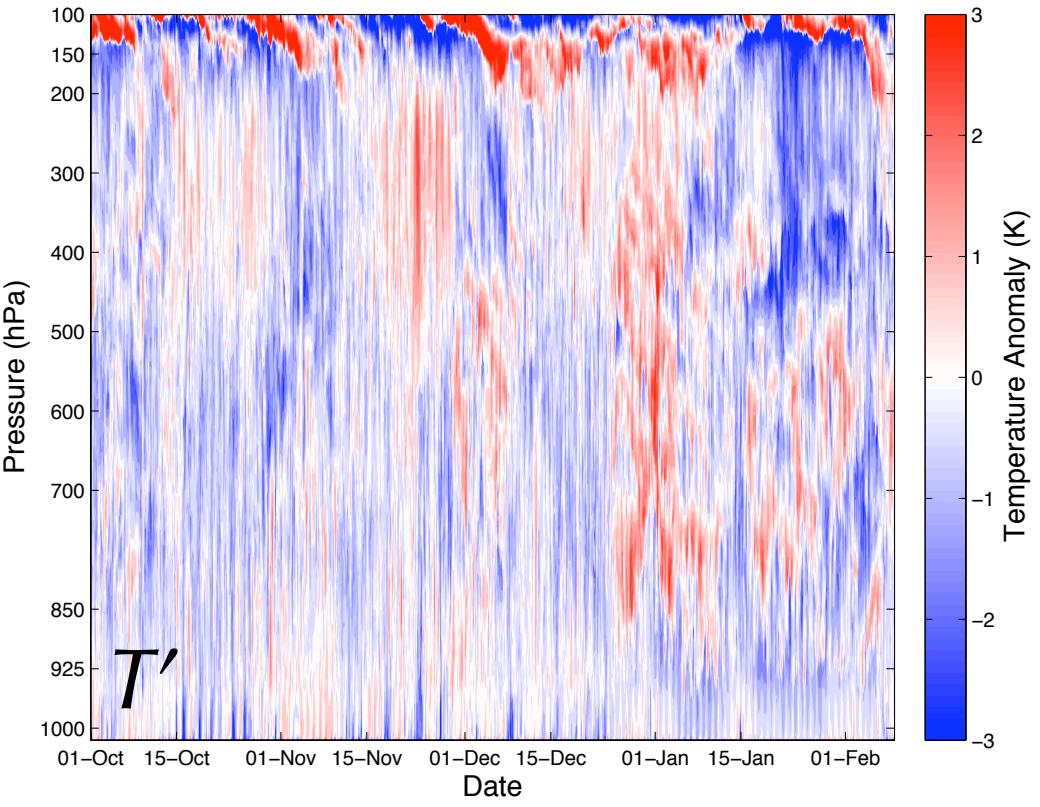
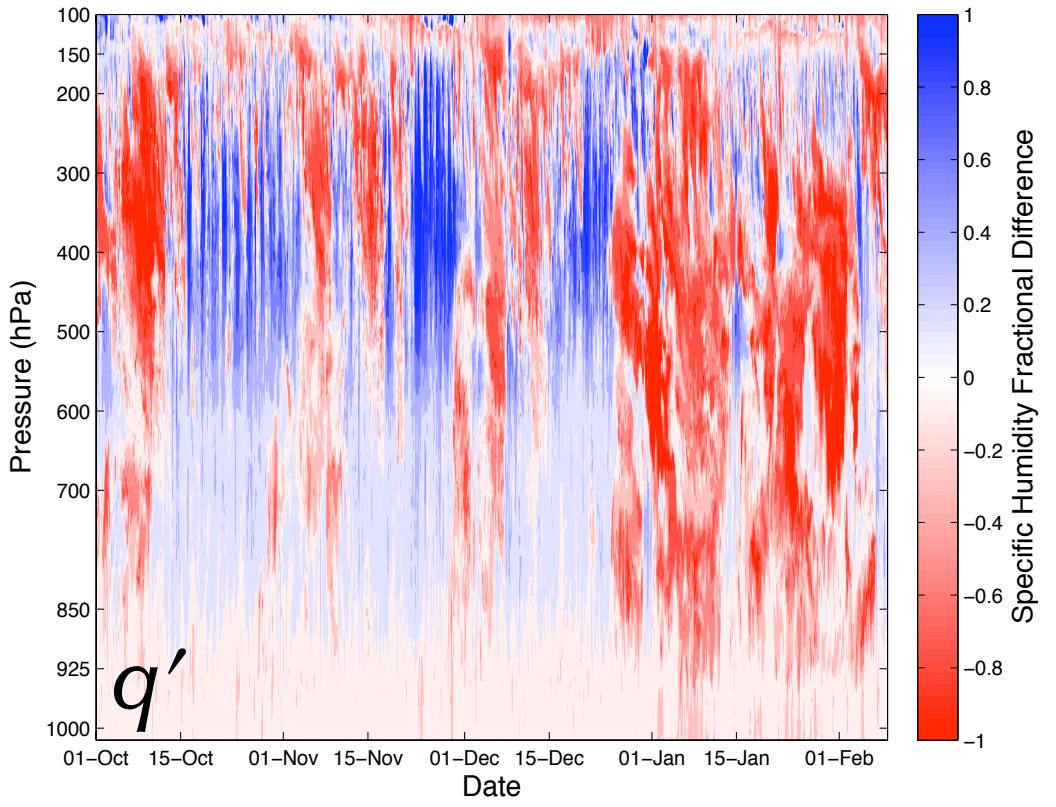
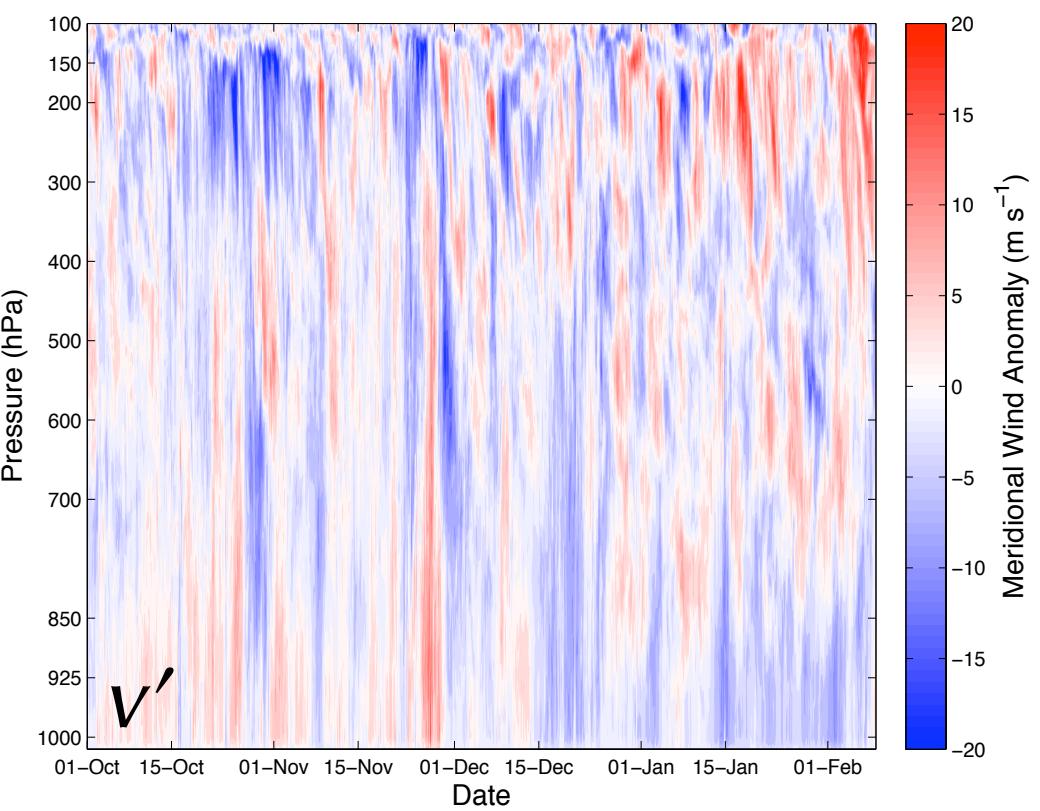
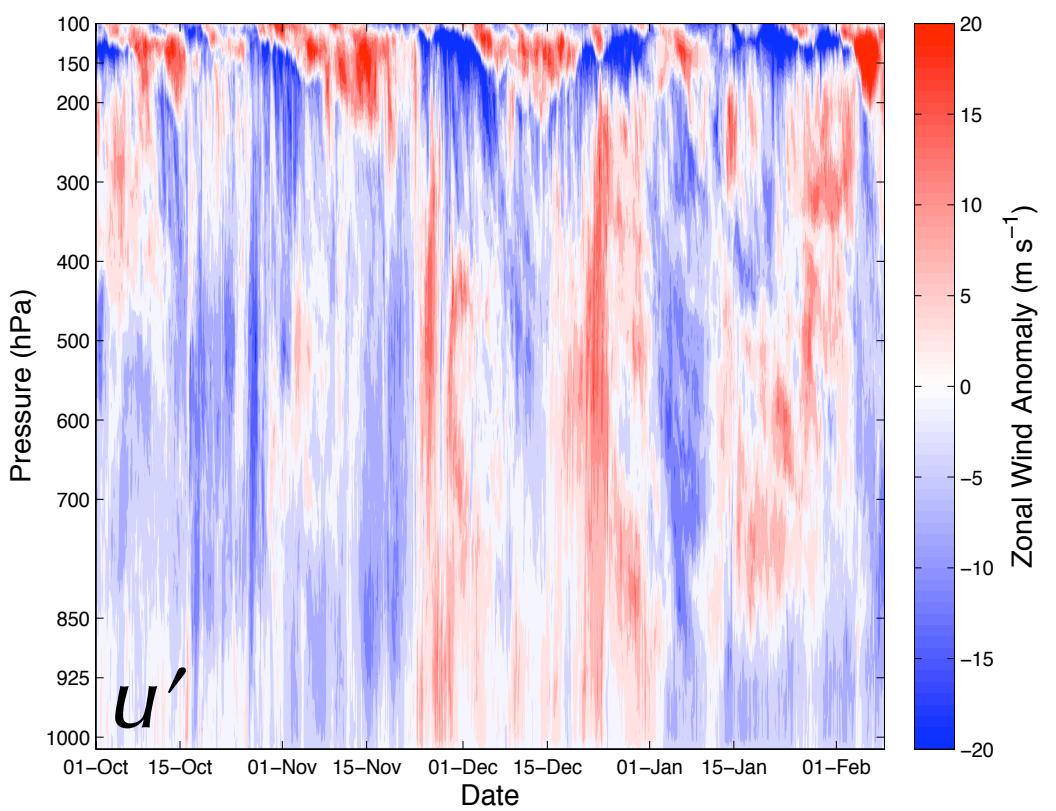


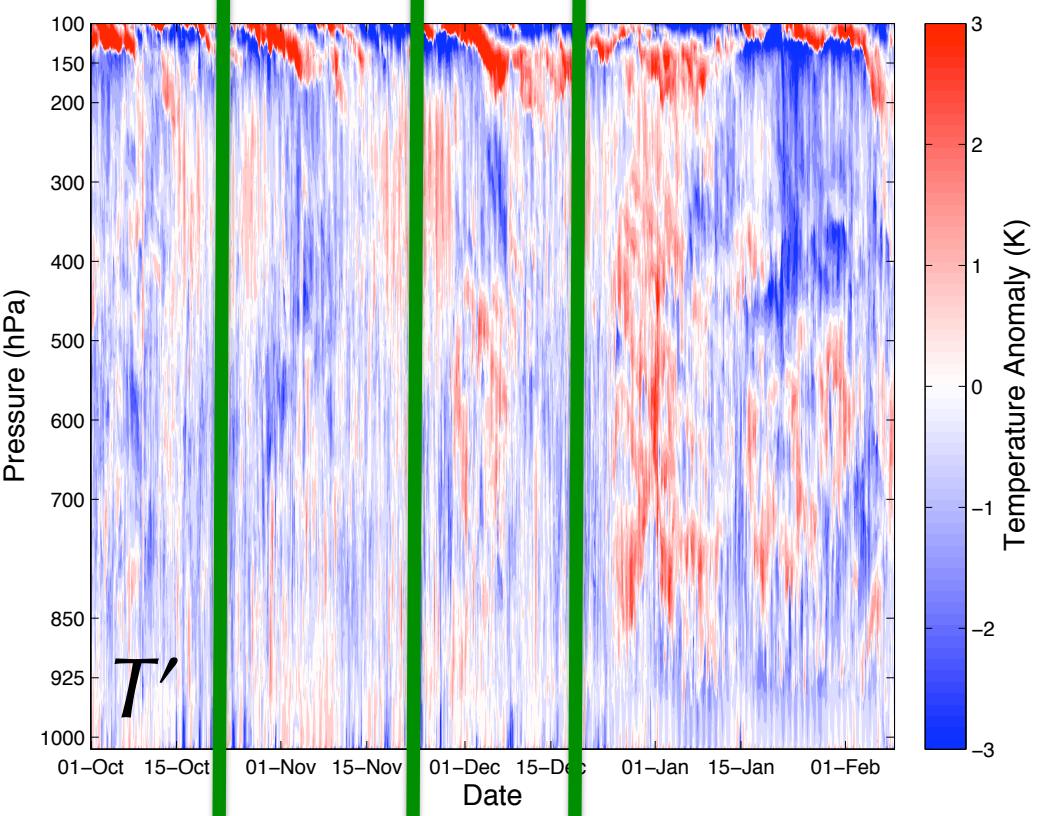
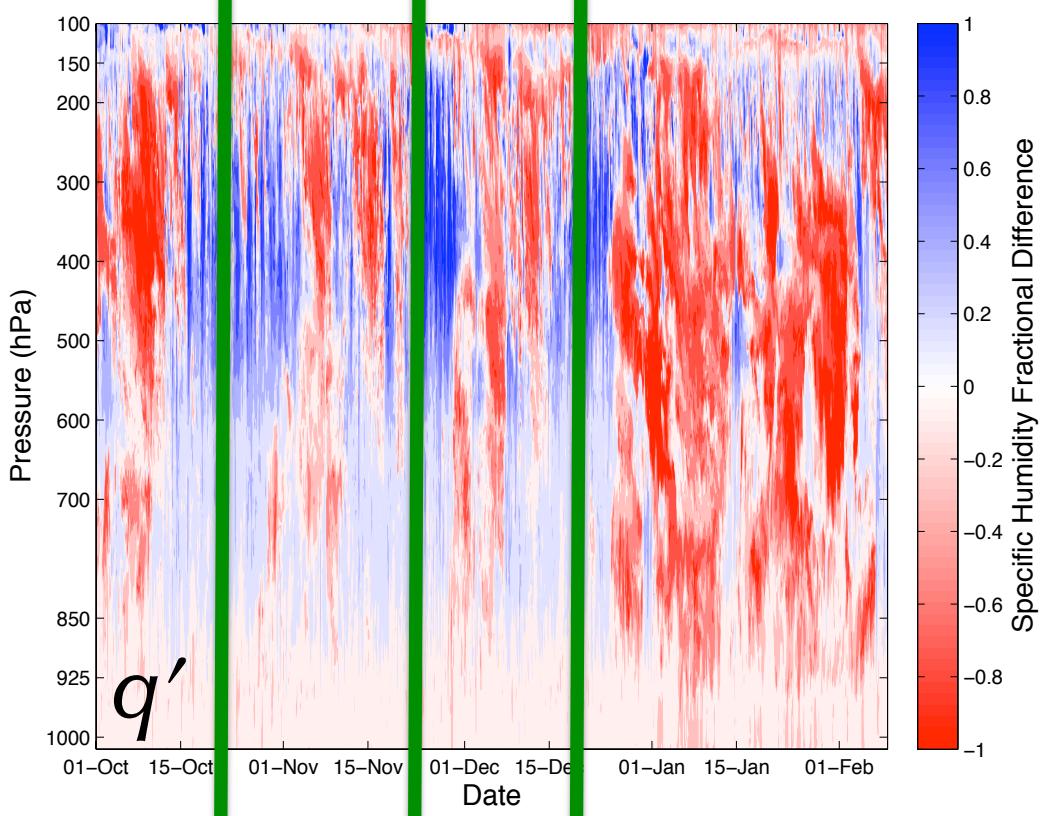
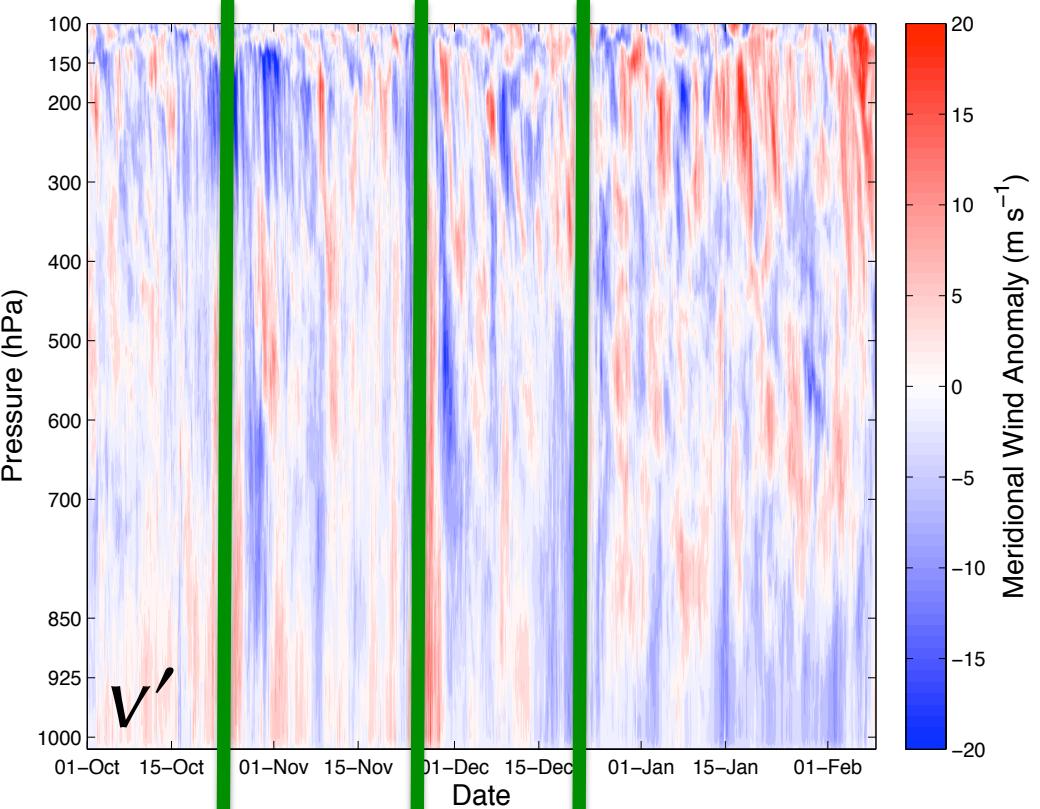
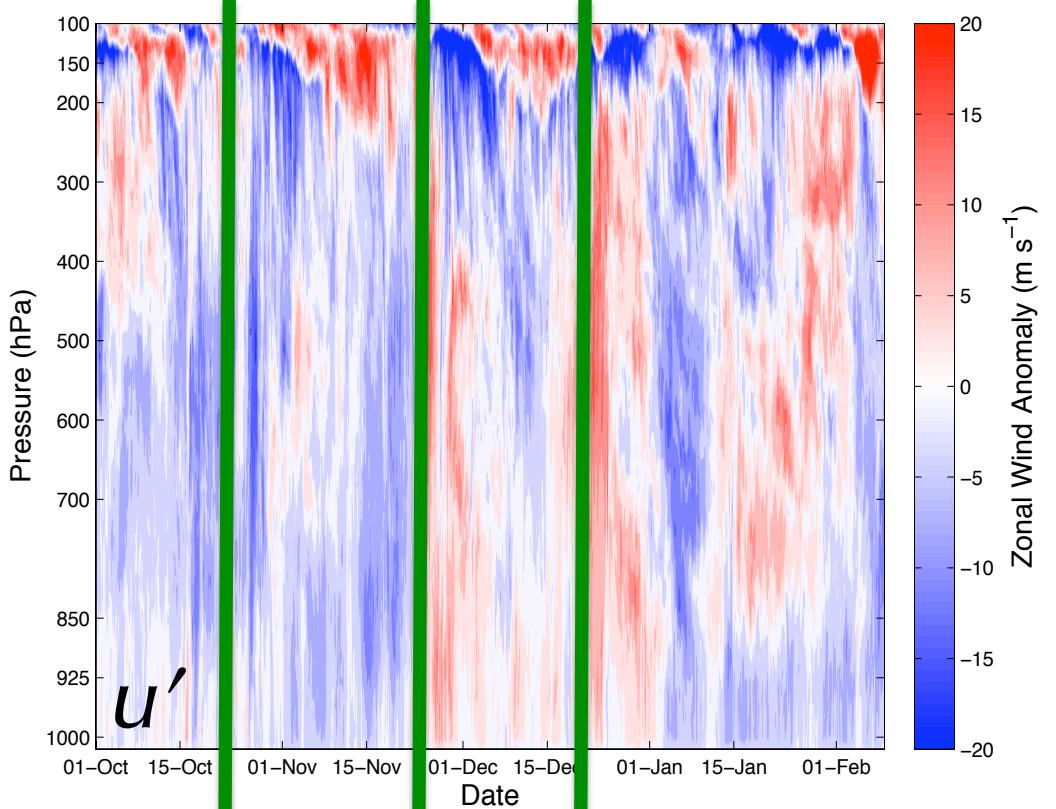
Precipitation at Addu



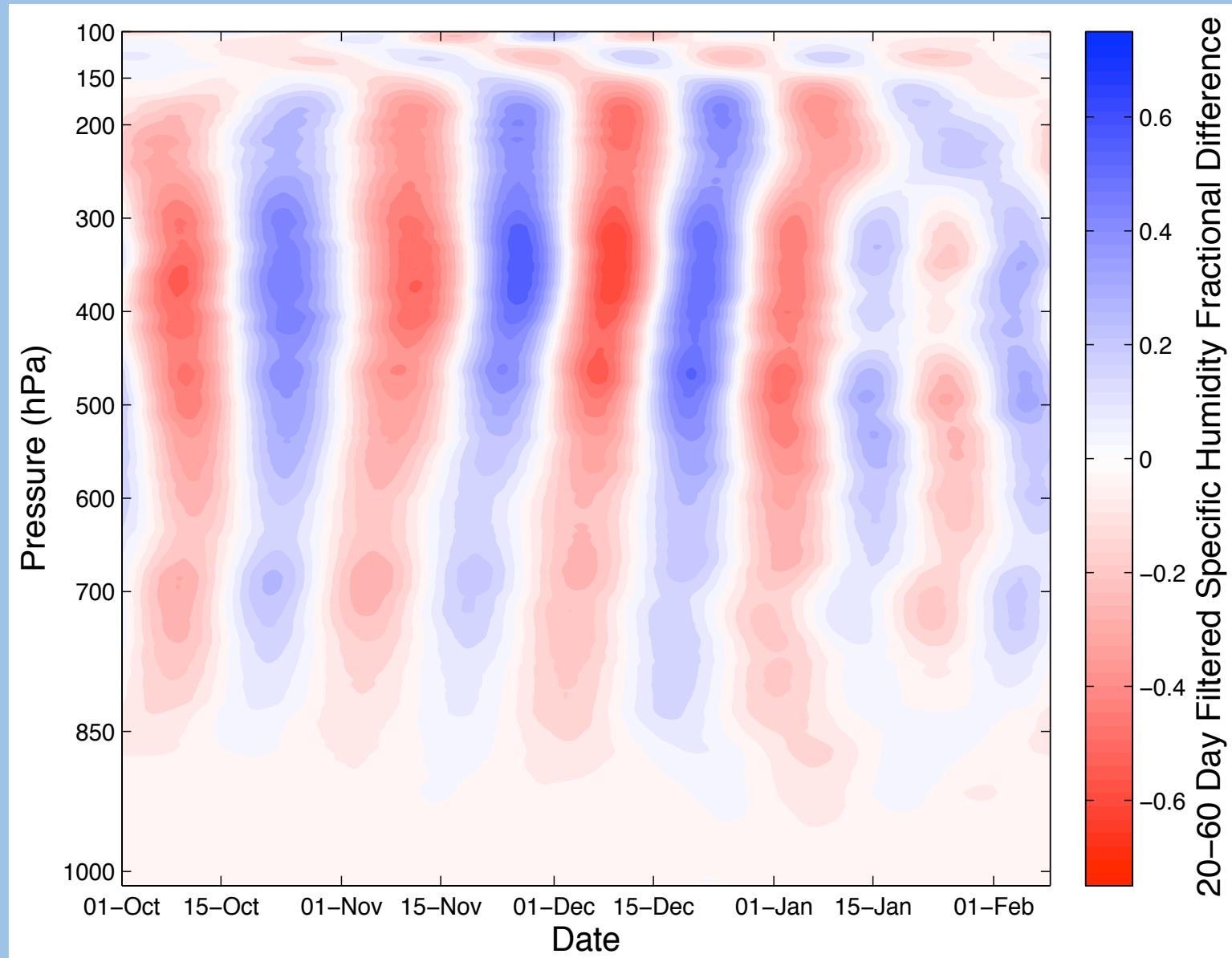
Convective and stratiform observed by S-PolKa



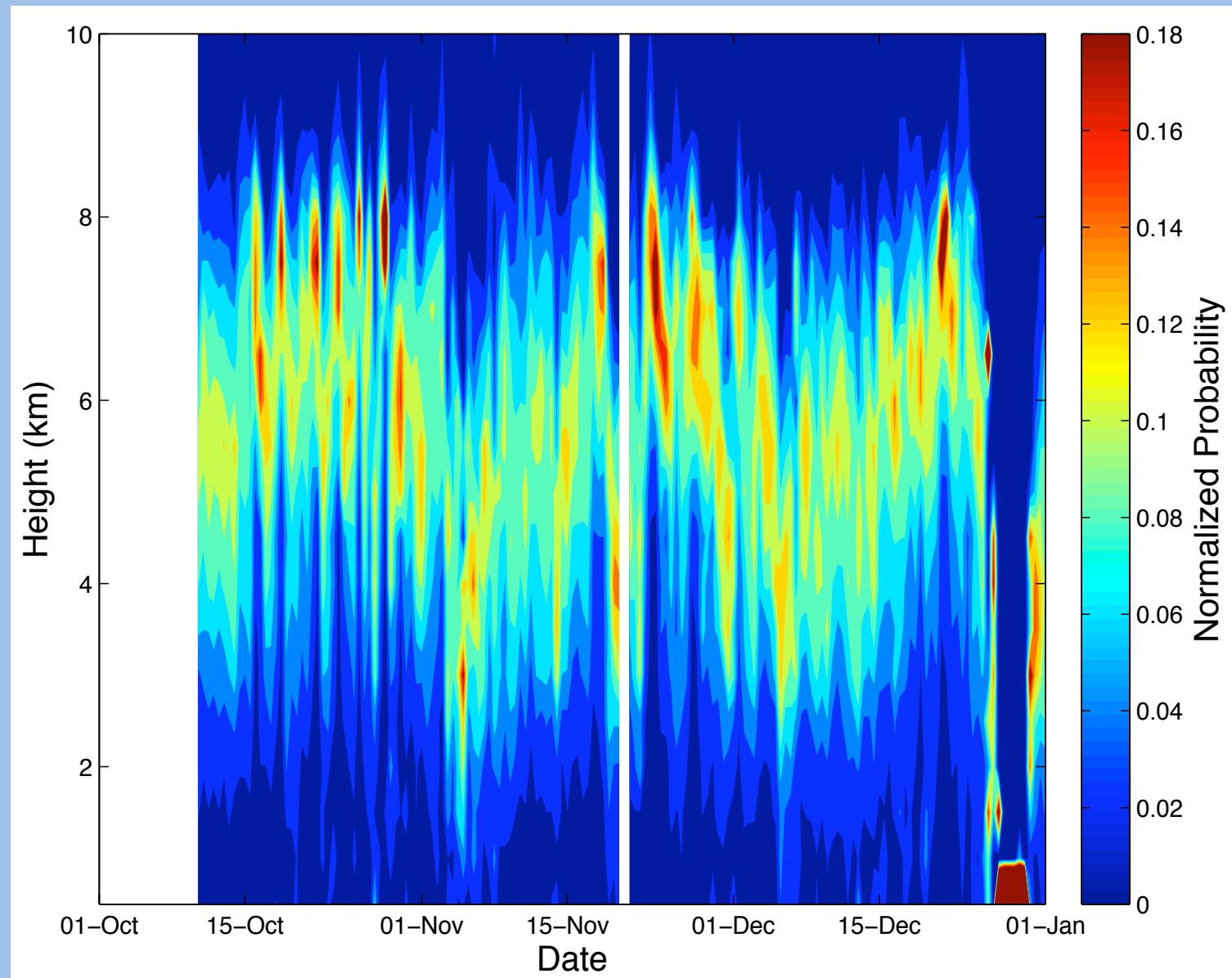




Filtered specific humidity anomalies

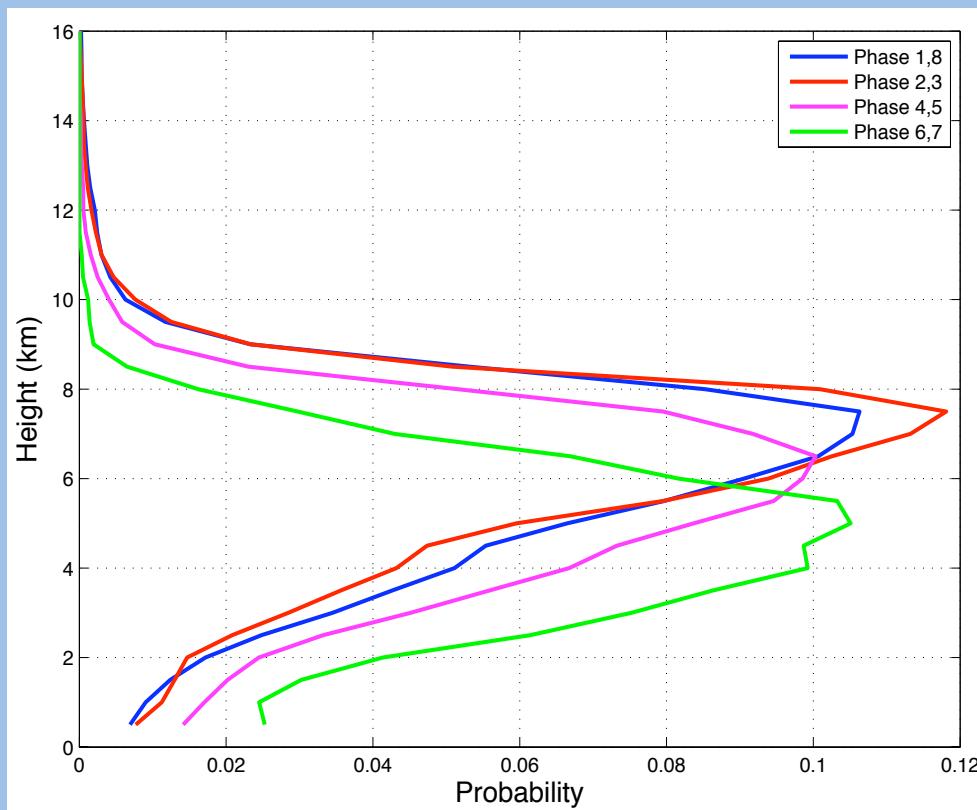


Convective echotops observed by S-PolKa

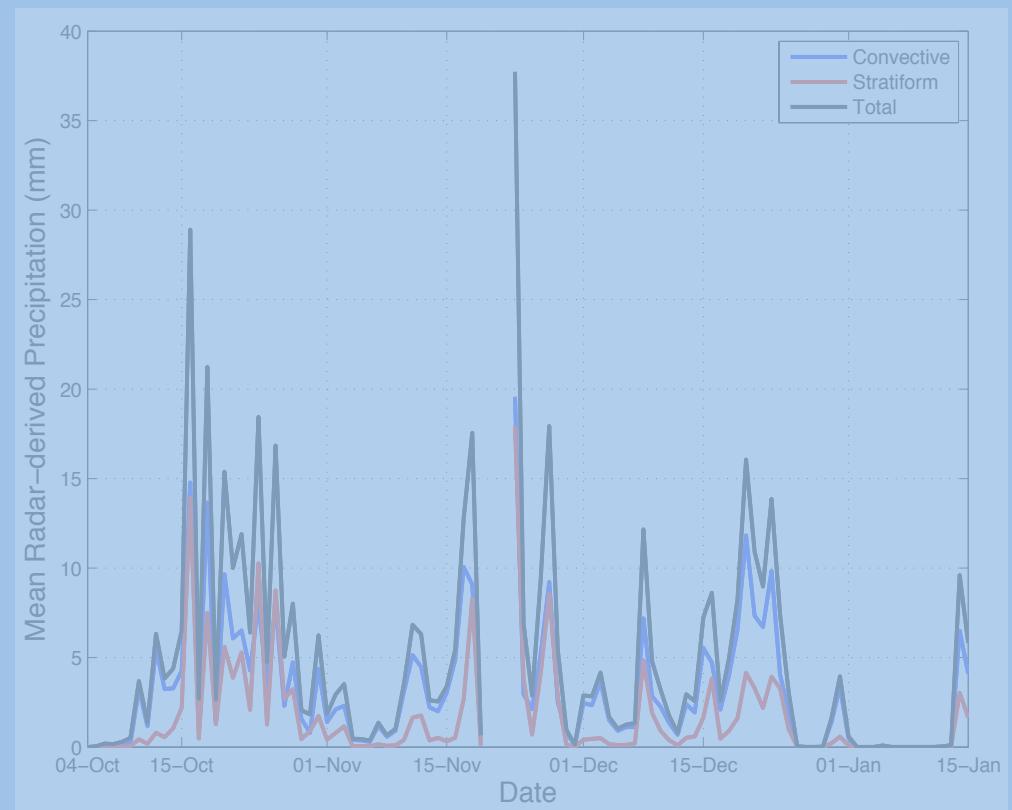


Convective echotops observed by S-PolKa

Echotop PDFs grouped by “bi-phase”

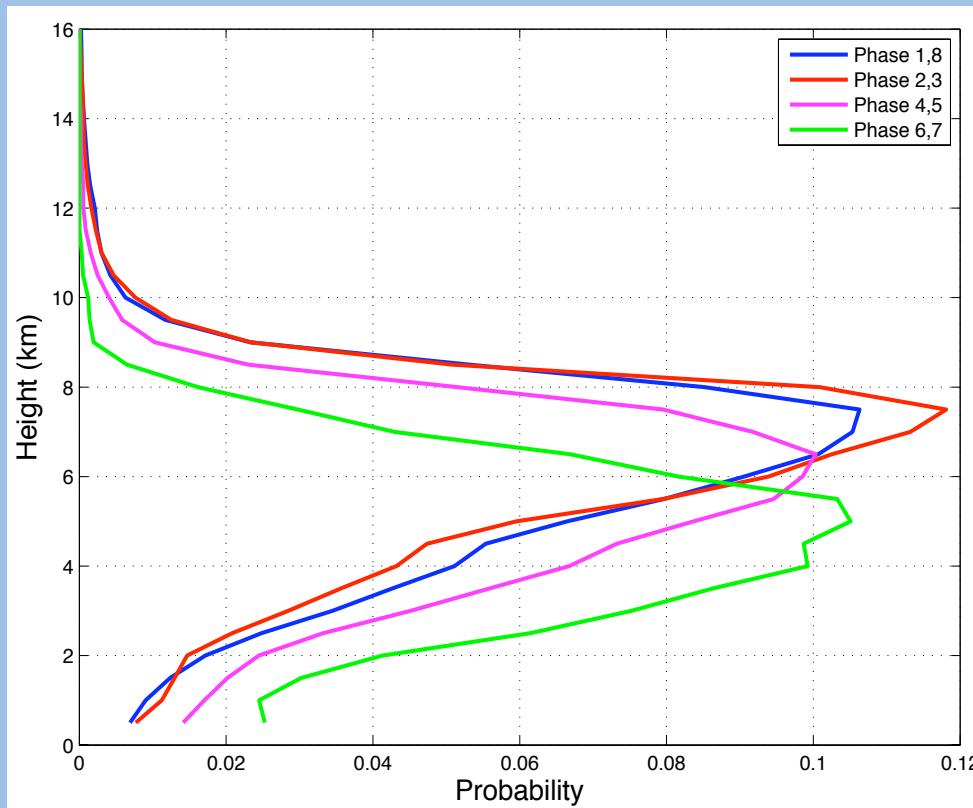


Echotop PDFs during “wet” and “dry” days of active phases

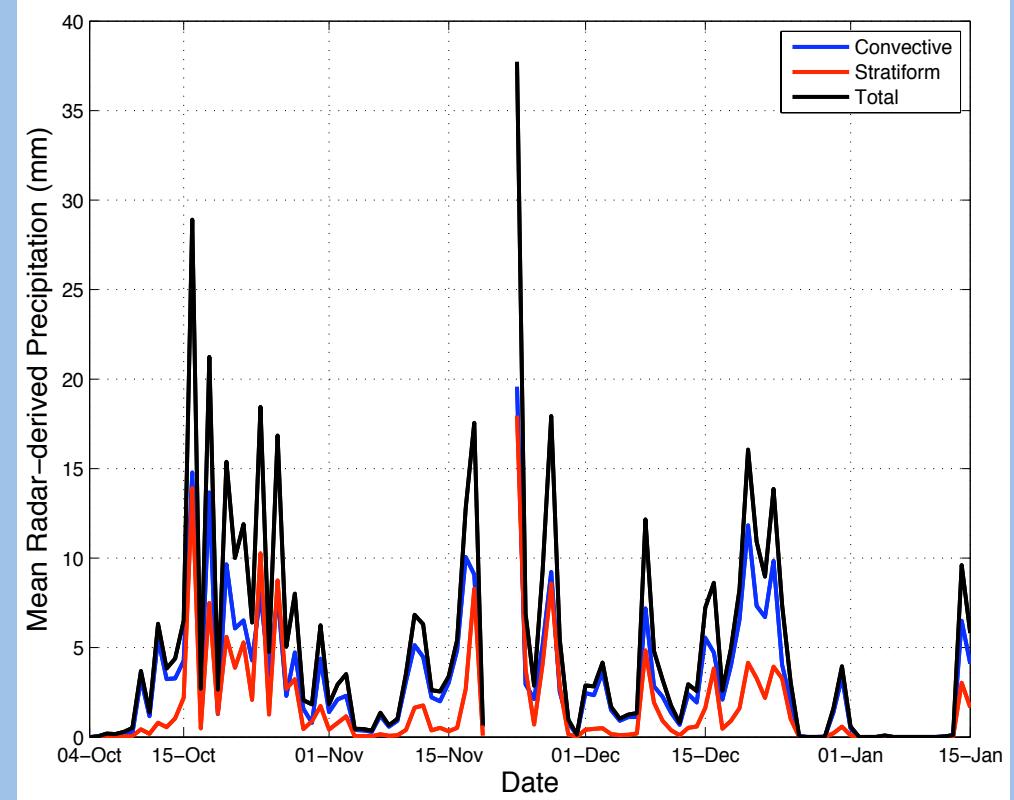


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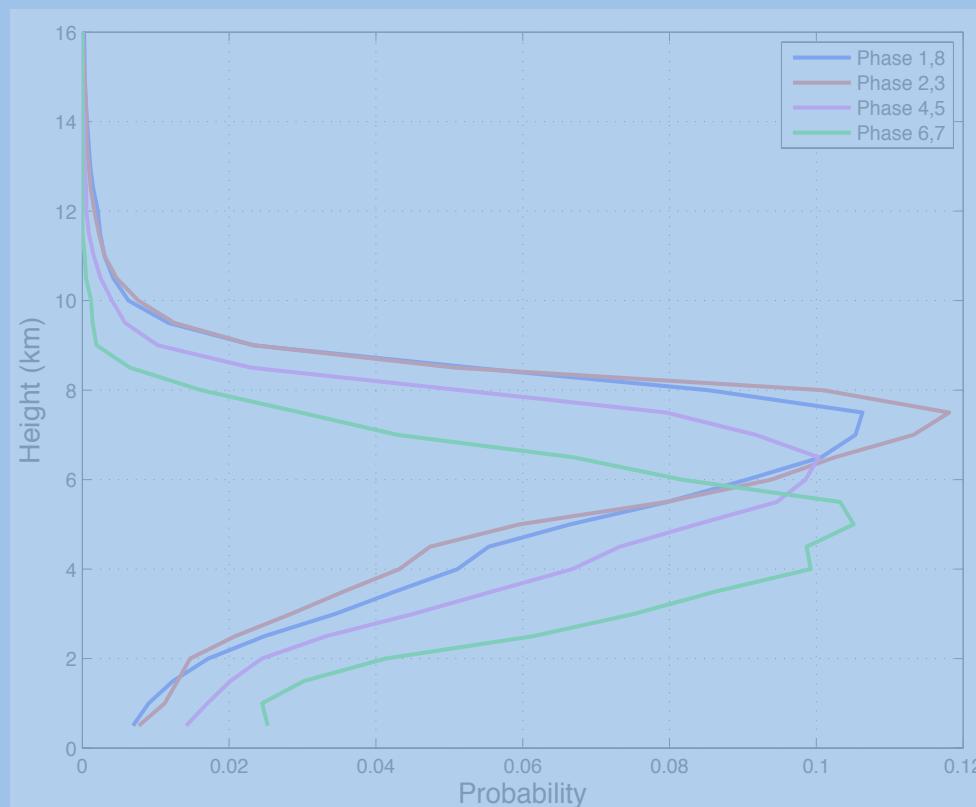


Echotop PDFs during “wet” and “dry” days of active phases

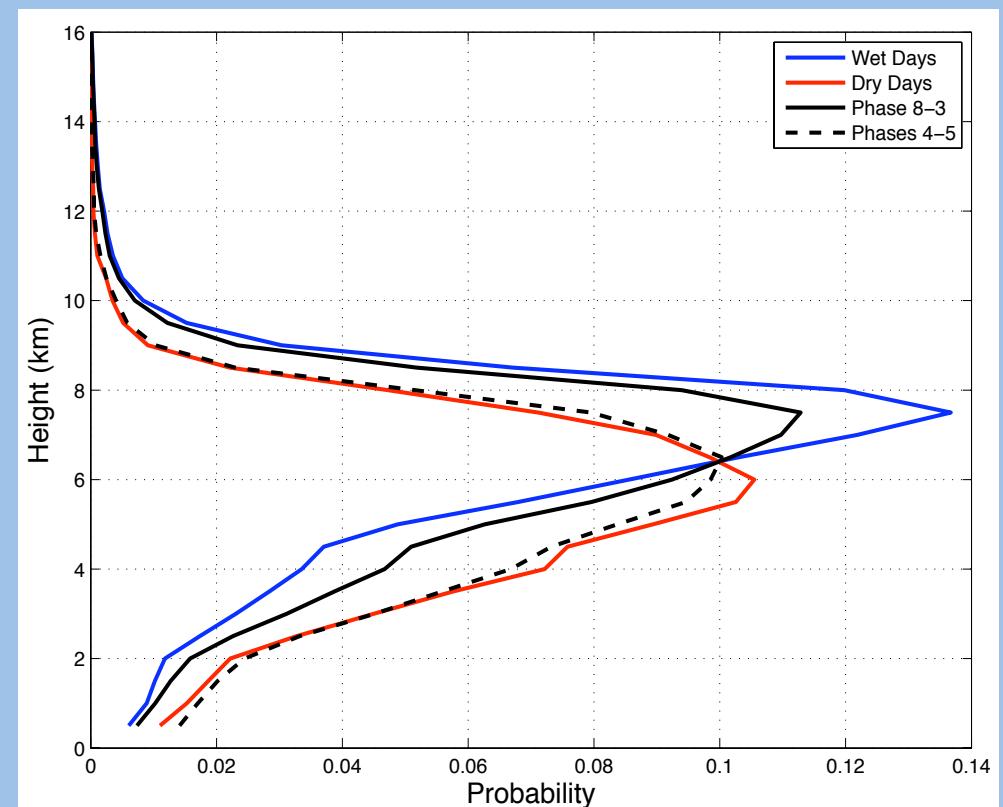


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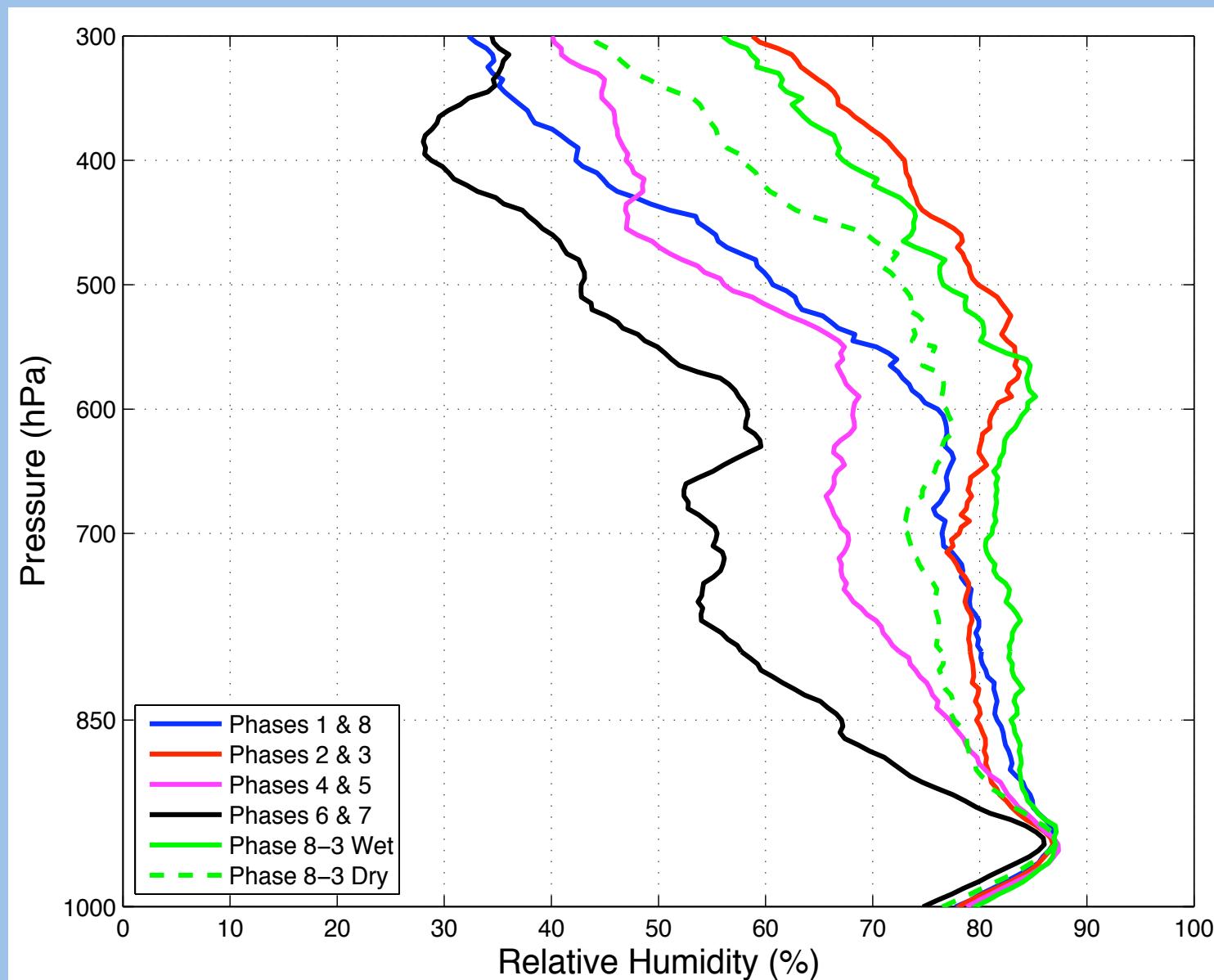
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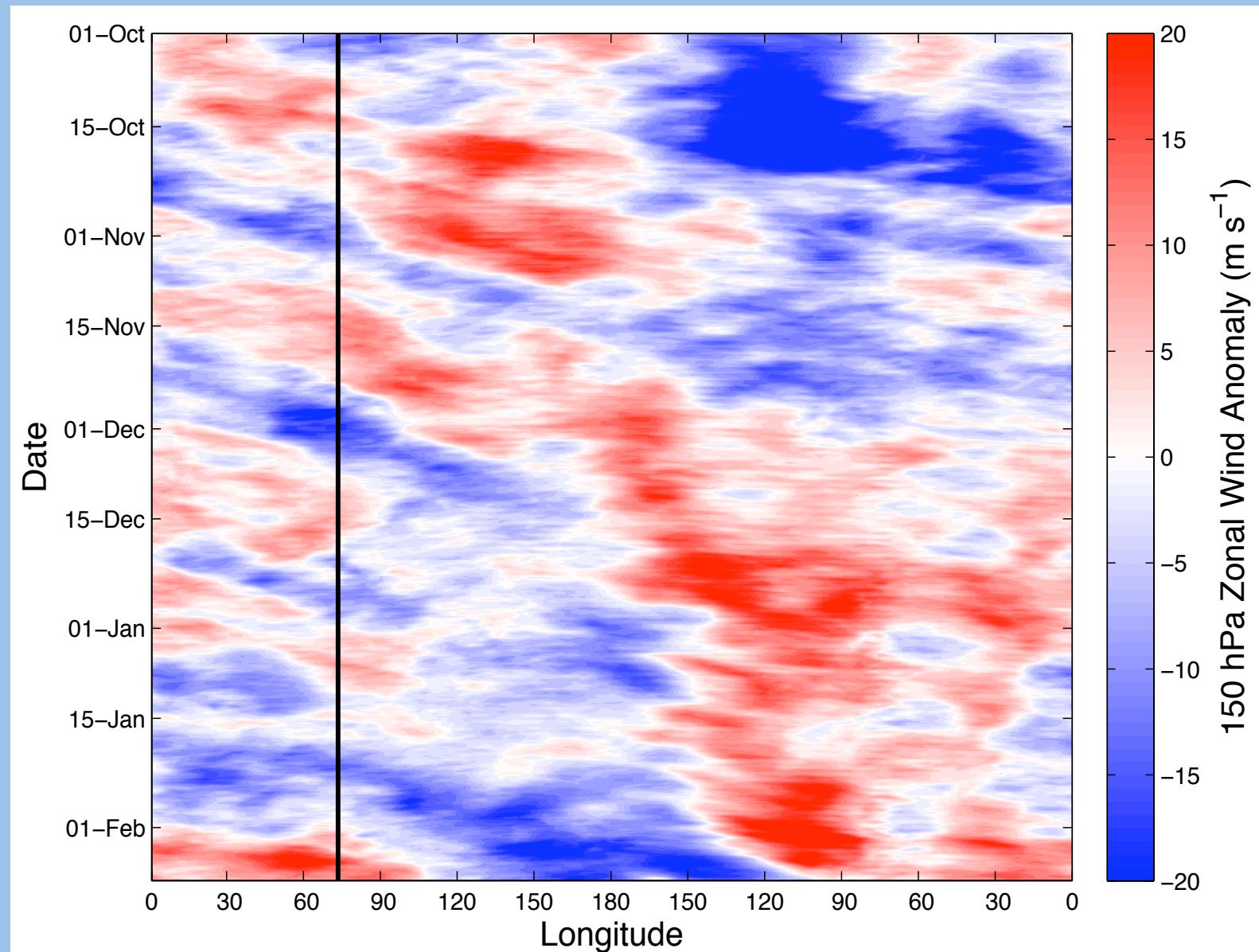
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Relative Humidity profile comparison by phase



150 hPa zonal wind anomalies in ERA-I



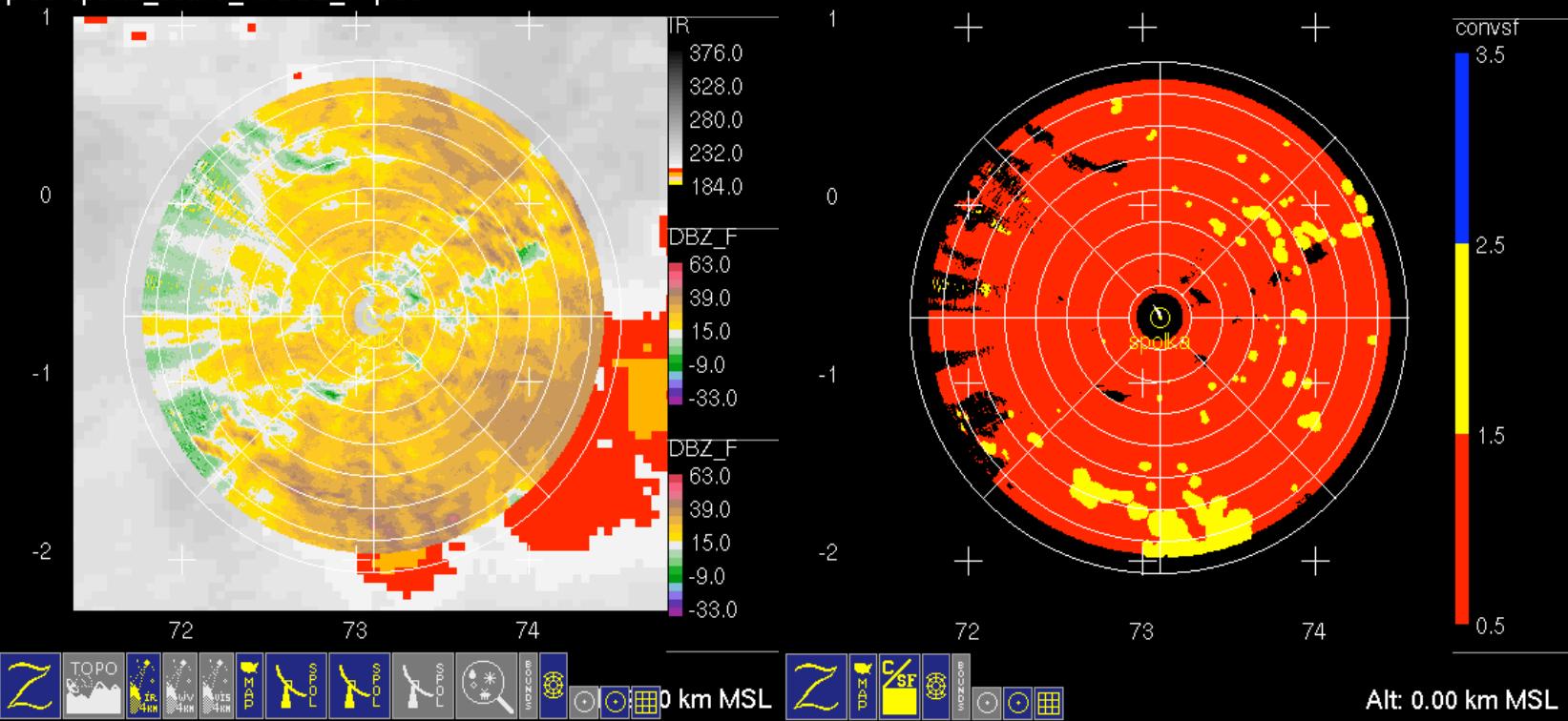
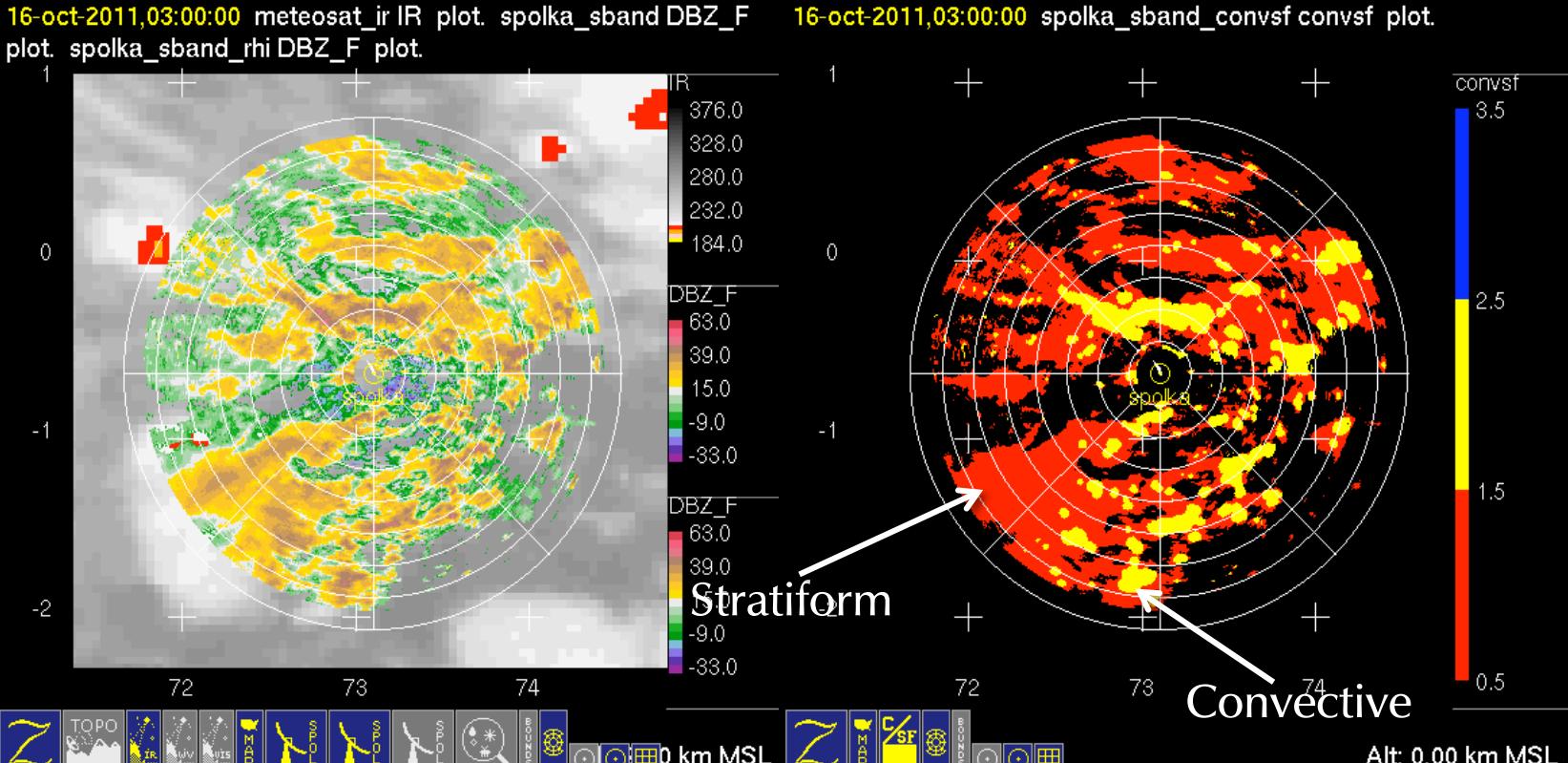
Conclusions

- Successful field campaign with an enormous radar and radiosonde dataset over the Indian Ocean
- Clouds of all depths are present during all MJO phases.
- Variability in MJO clouds dominated by changes in stratiform frequency
- Stratiform clouds likely contribute greatly to moistening prior to MJO onset.
- Environmental humidity is not the only factor that controls depth of convection.
- DYNAMO MJO cases strongly linked to 150 hPa zonal wind anomaly

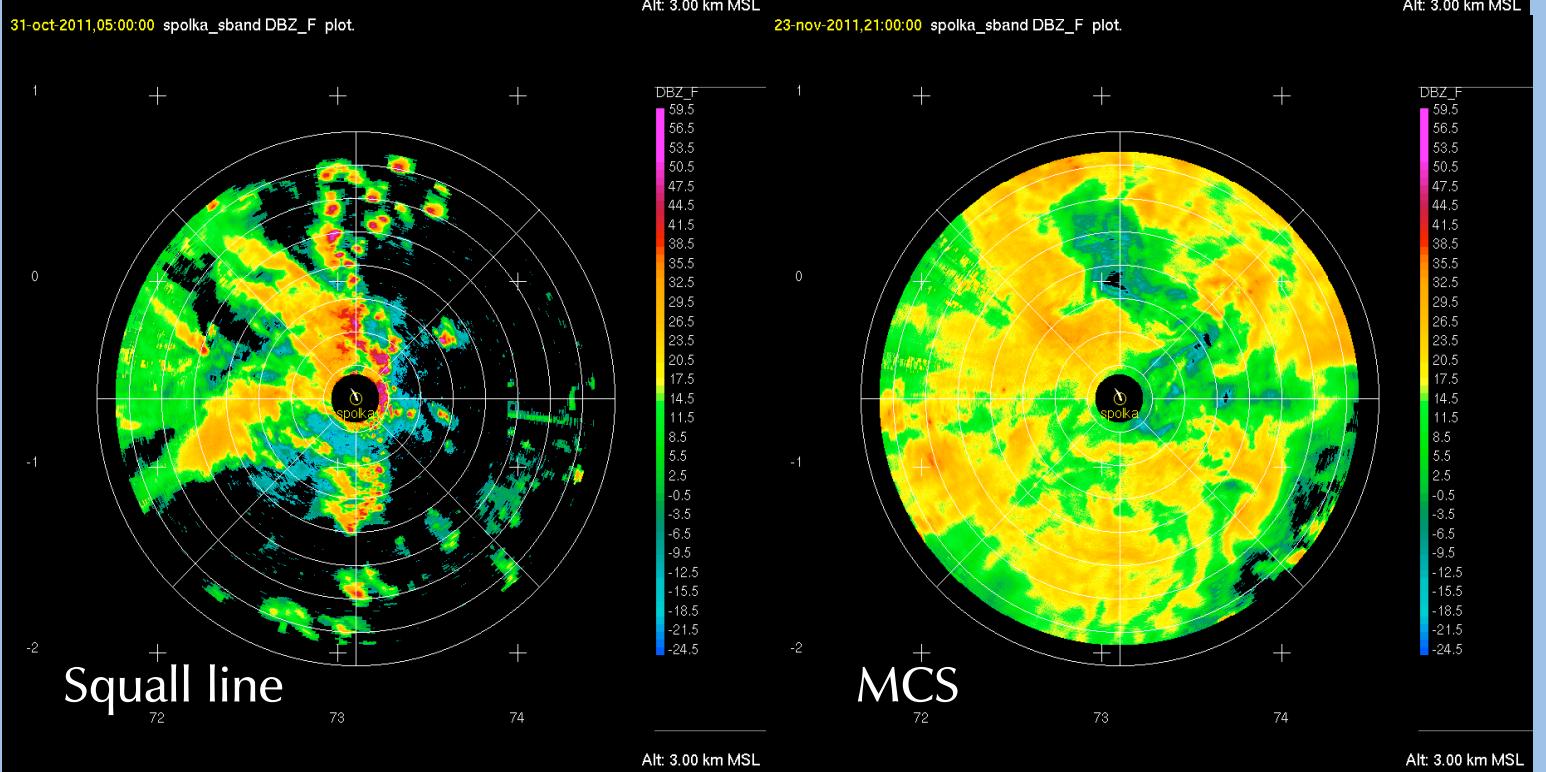
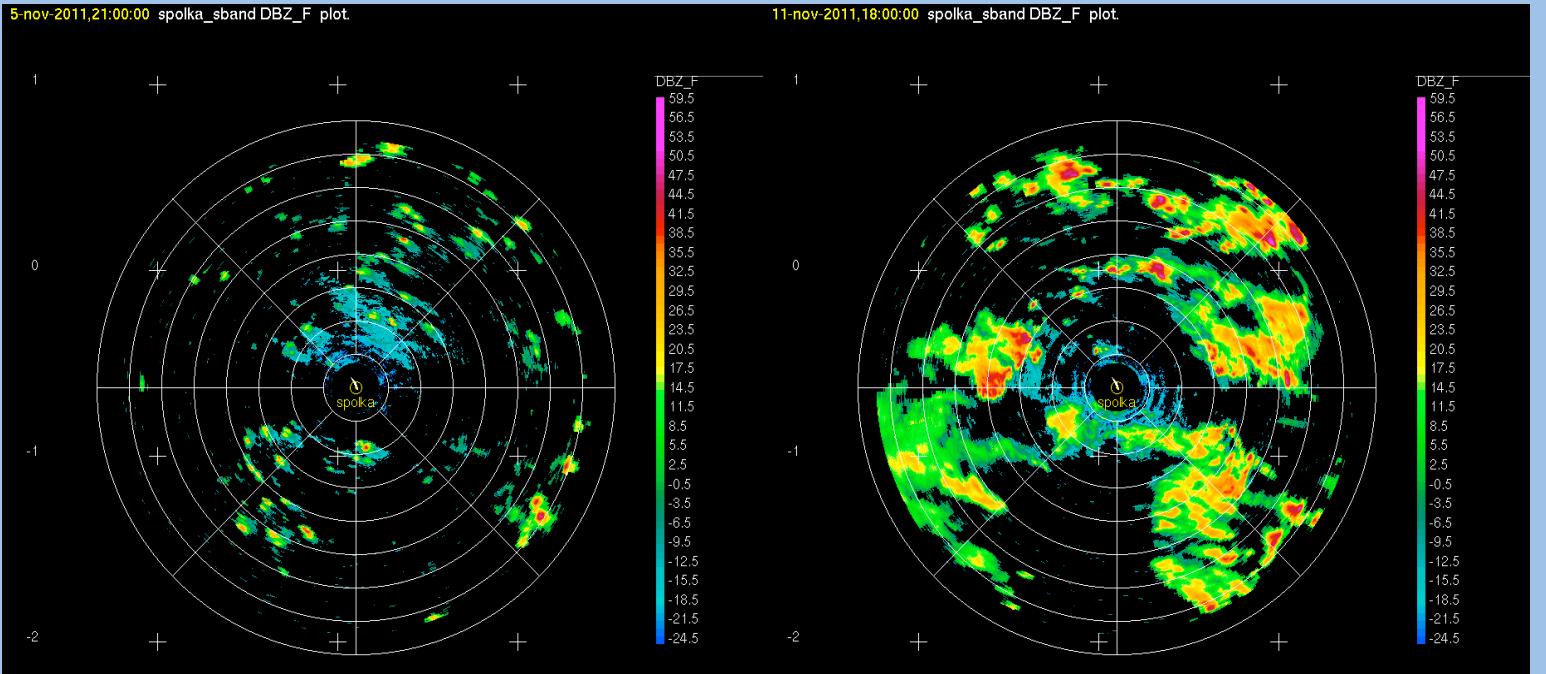
A wide-angle photograph of a sunset over a calm body of water. The sky is filled with large, dark, billowing clouds, with patches of orange and yellow light from the setting sun visible through them. The sun's reflection is a bright, circular glow on the water's surface. In the foreground, dark silhouettes of rocks or low-lying land are visible.

End
EUQ

Large mesoscale system

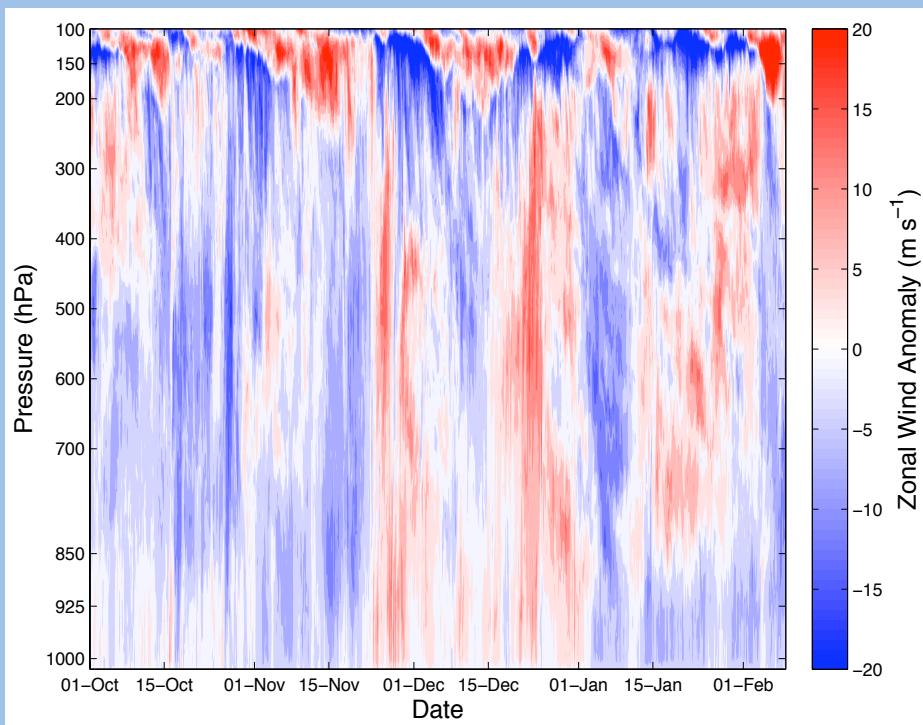


Organization of convection



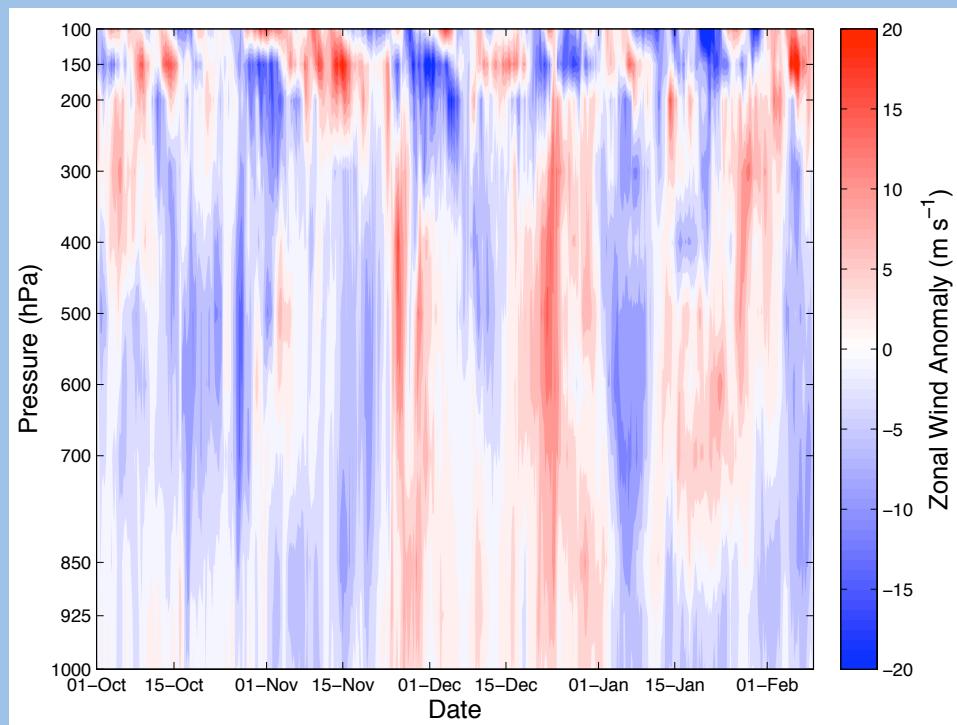
Radiosondes

u'

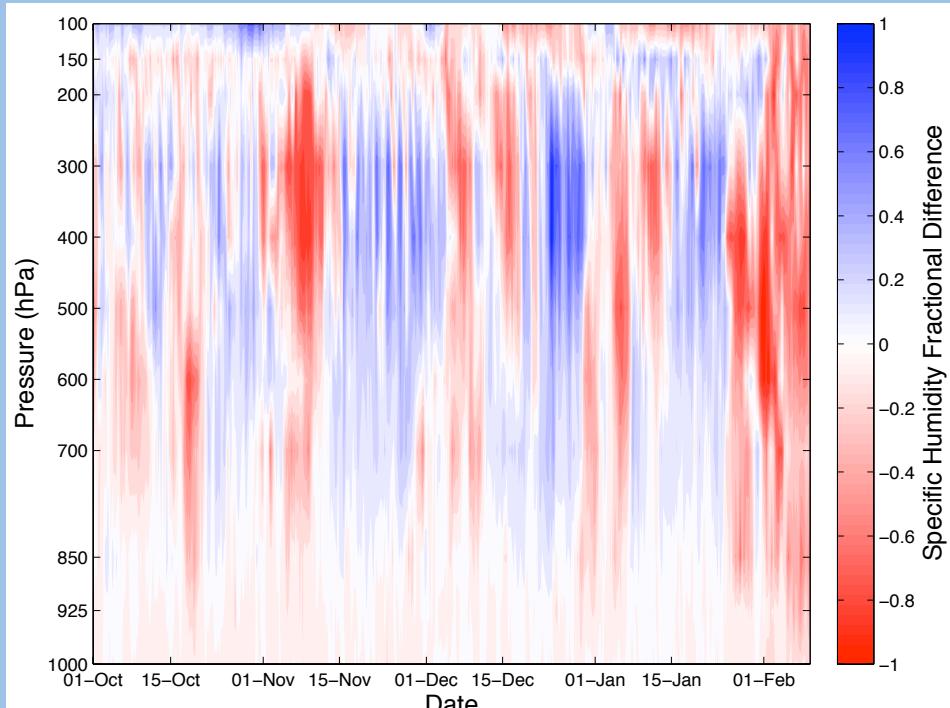
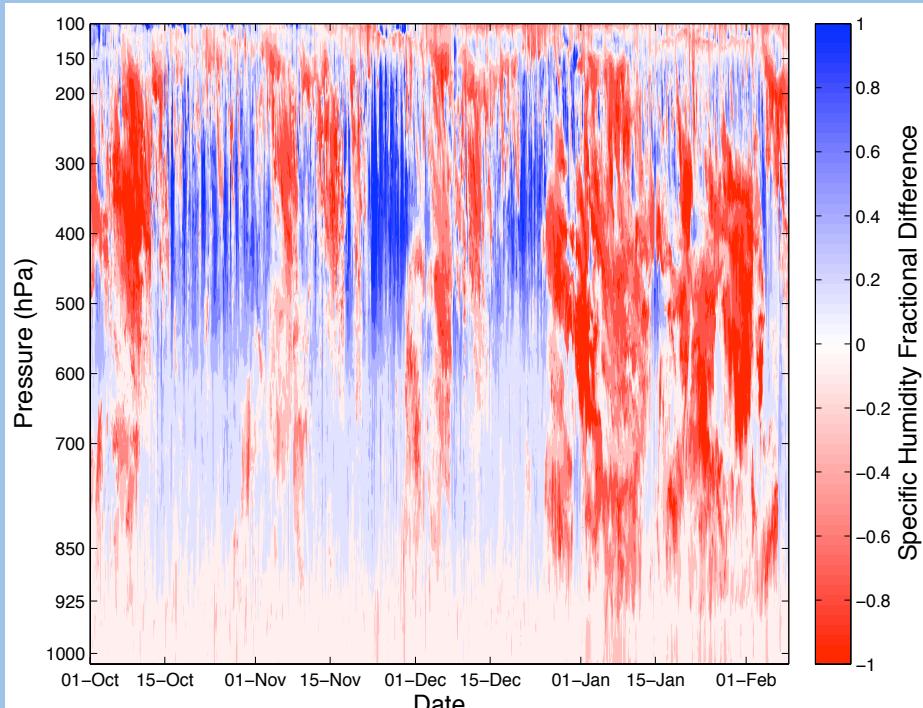


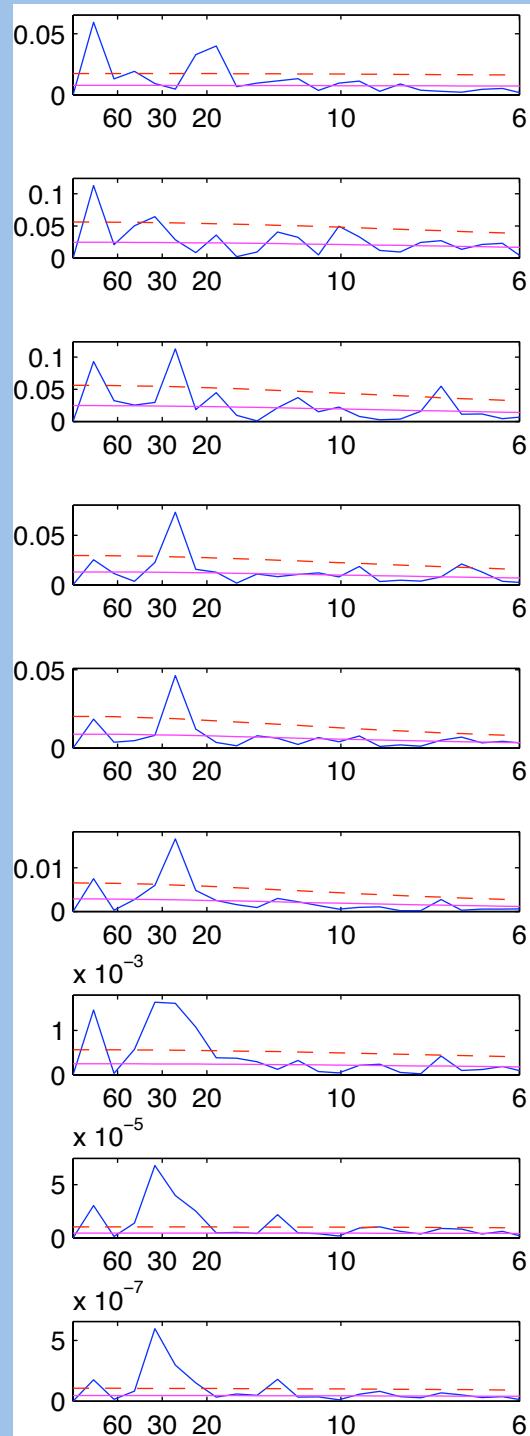
ERA-I

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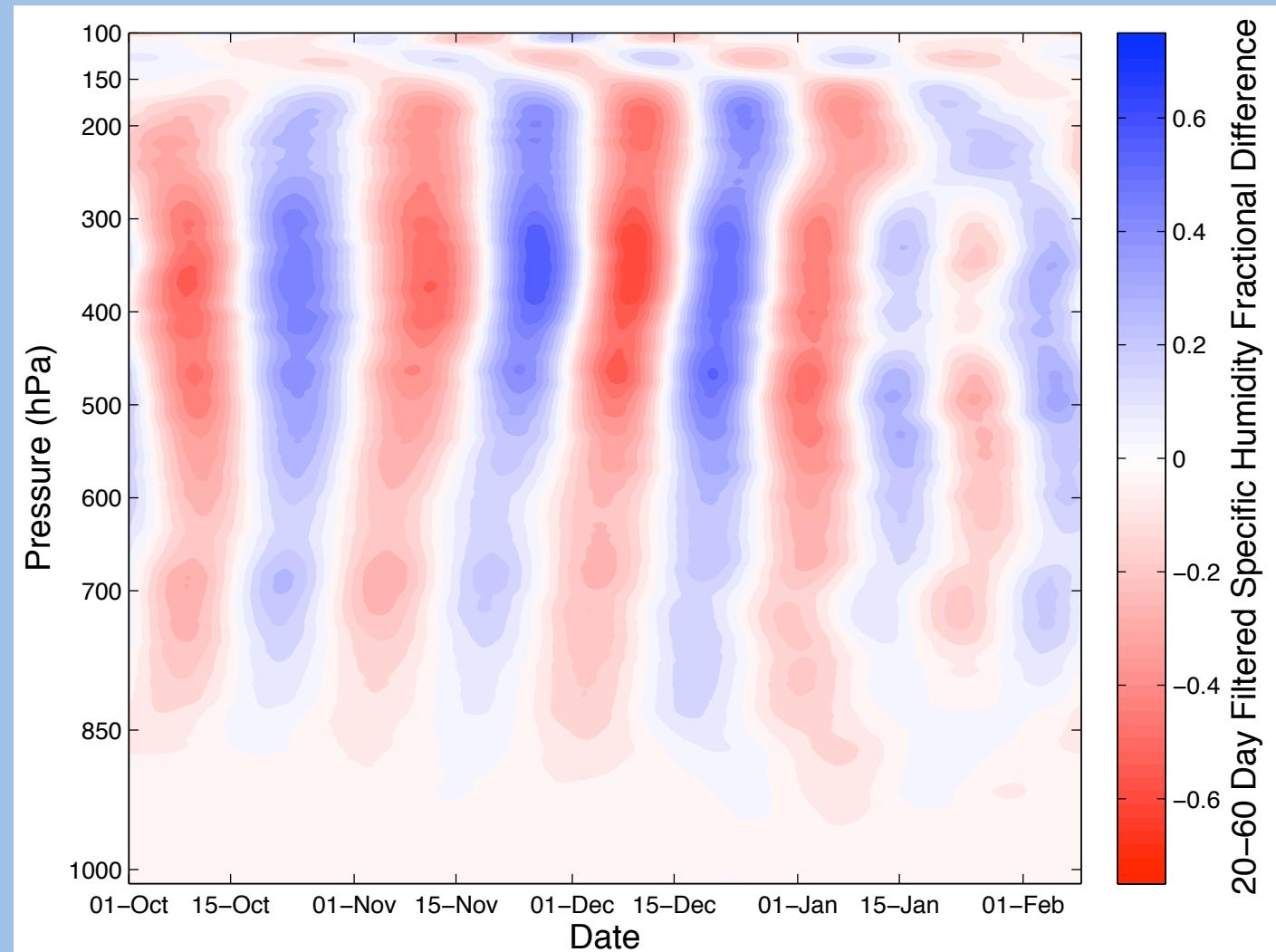


q'





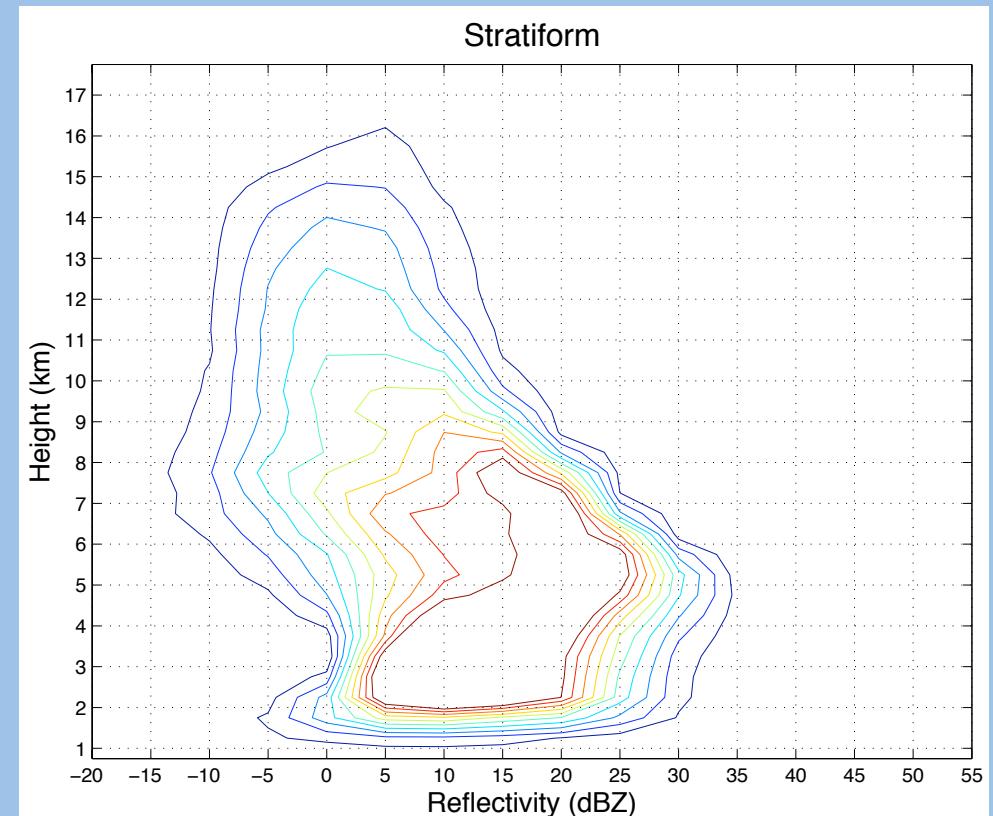
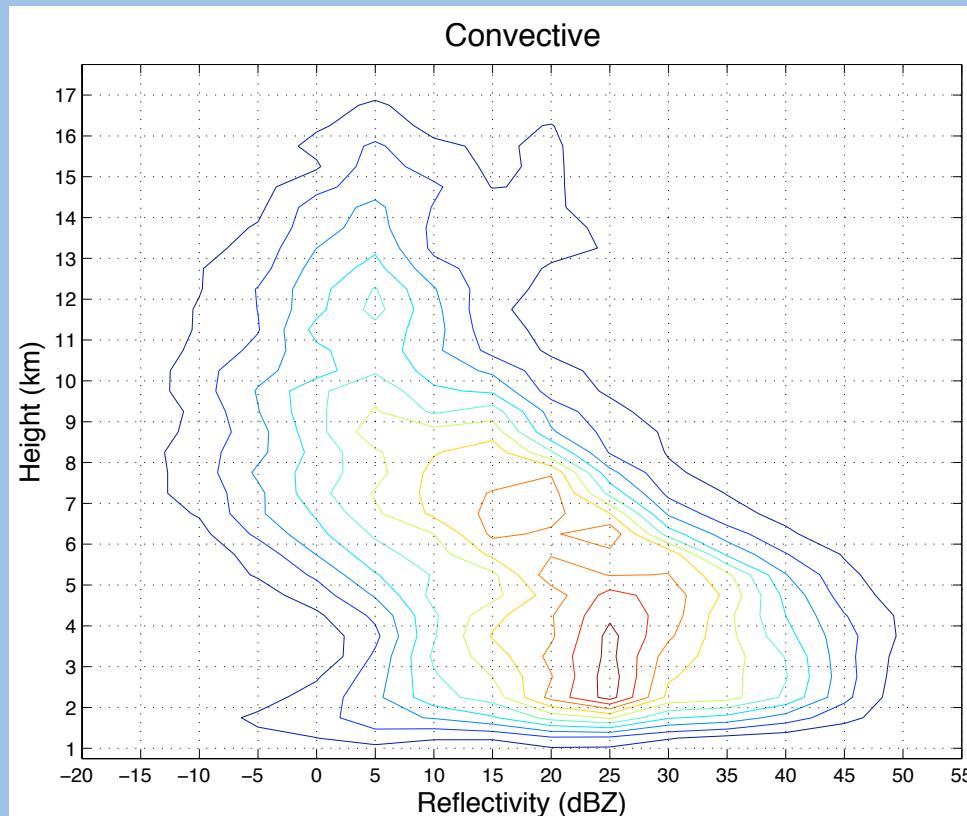
2 August 2012



S.W. Powell: Convection during DYNAMO

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Reflectivity structure of precipitating clouds



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