

Radar Analysis of the lifecycle of trade wind cumulus clouds

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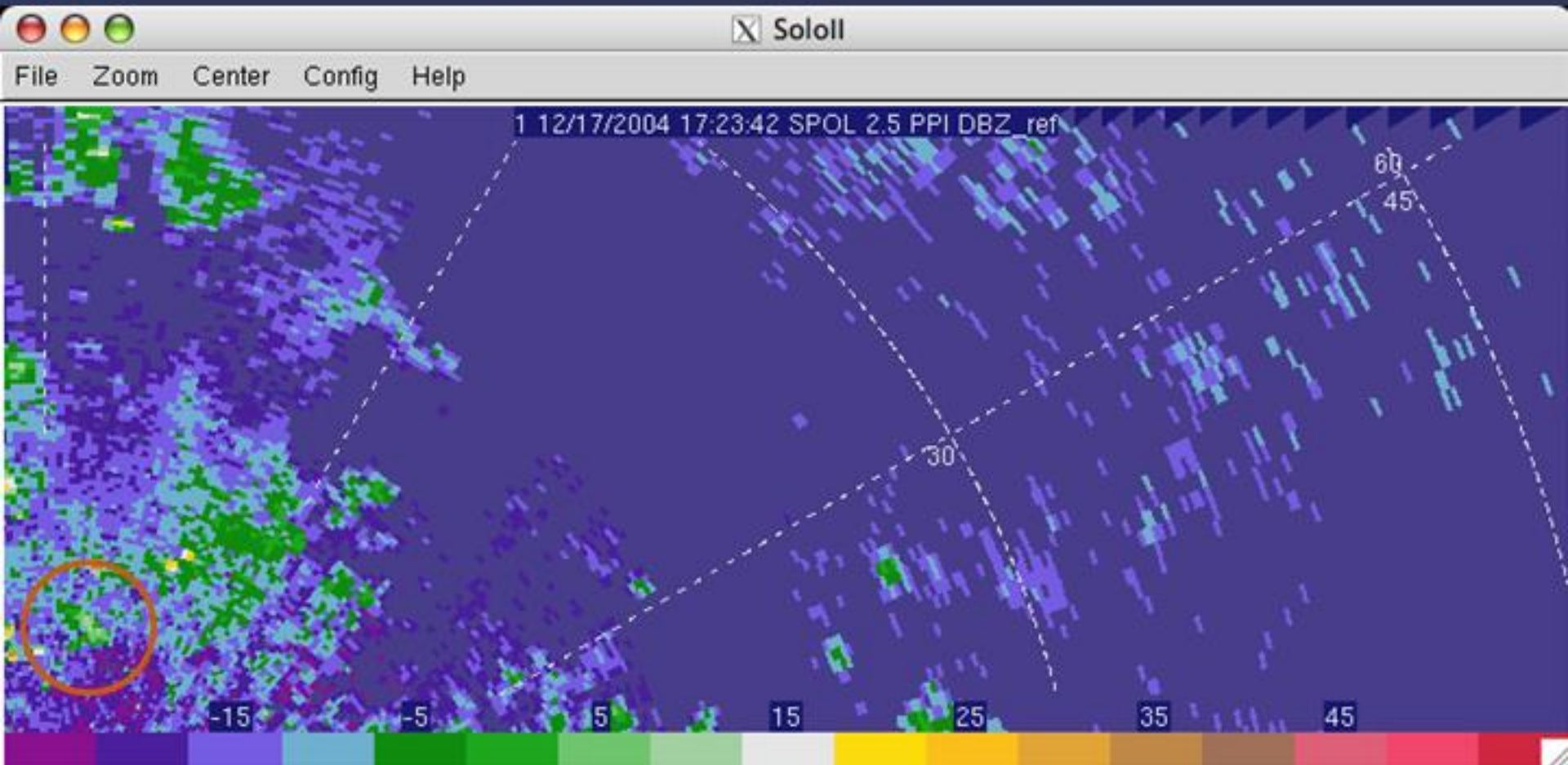
Objective

Studying the entire evolution of trade wind cumulus clouds, from early echoes until the decay, using multiparameter radar (dual-wavelength and dual-polarization).

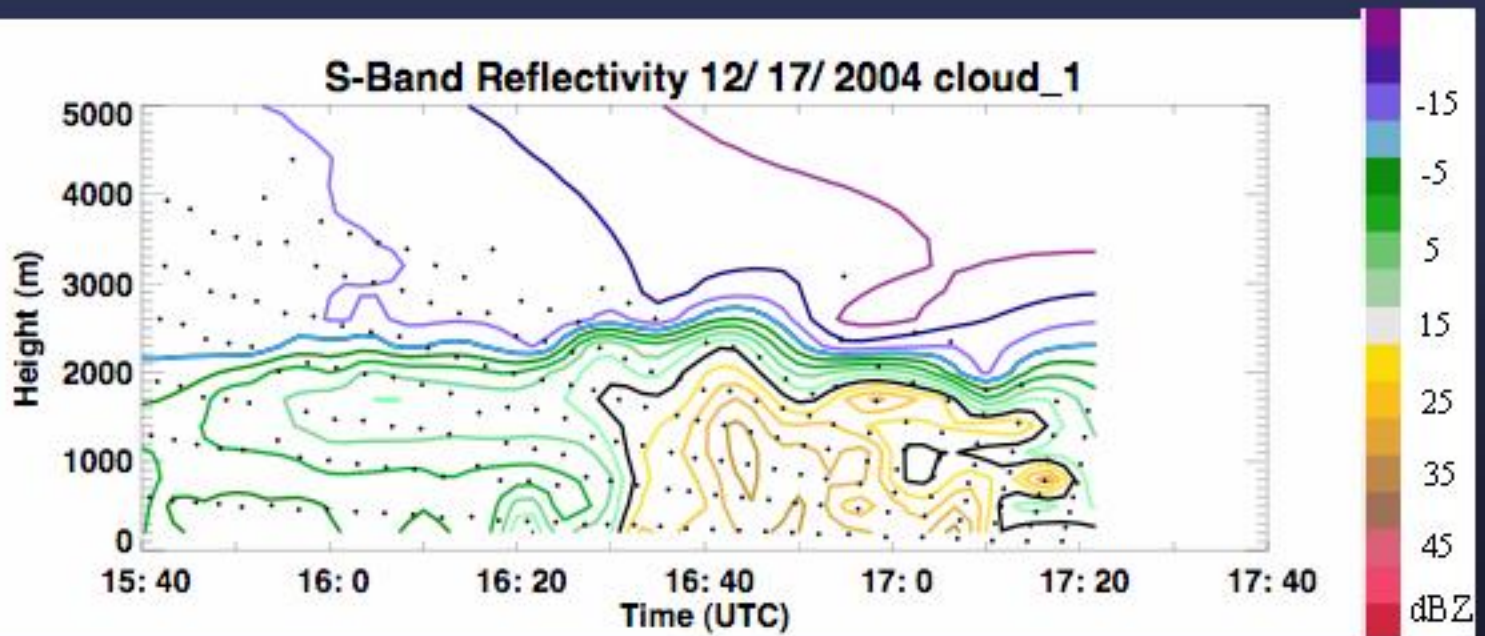
Understanding the dependency of the development time of precipitation in trade wind cumulus clouds on aerosol concentrations.

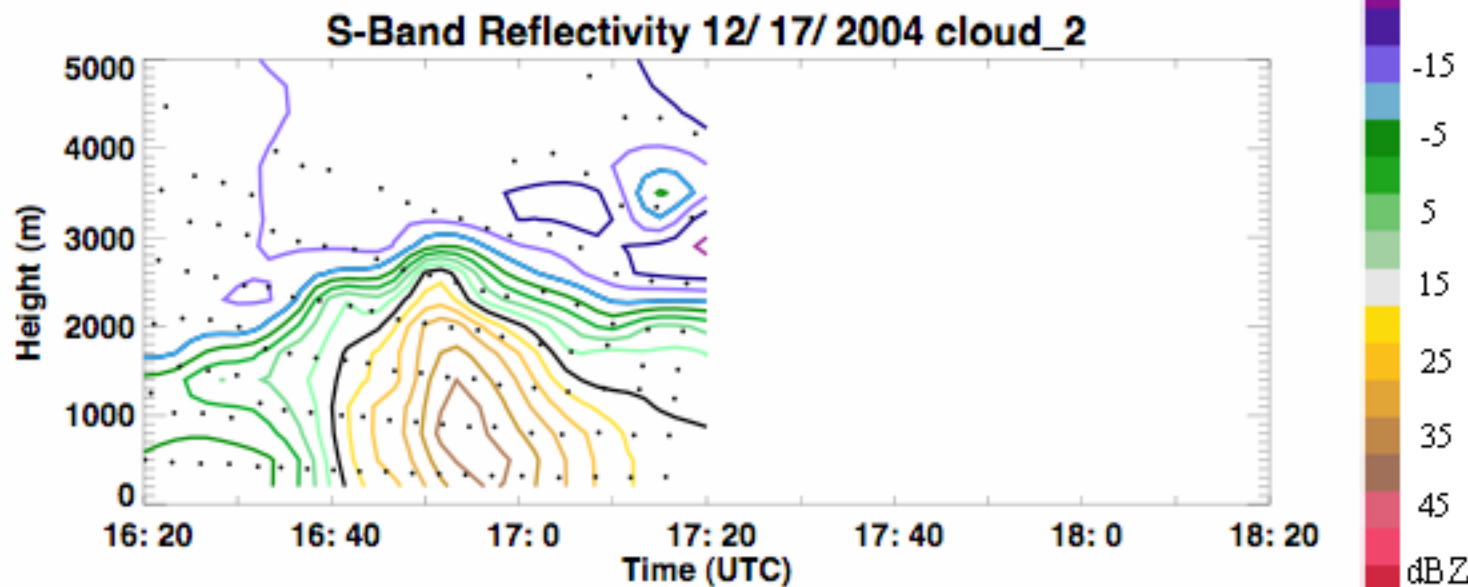
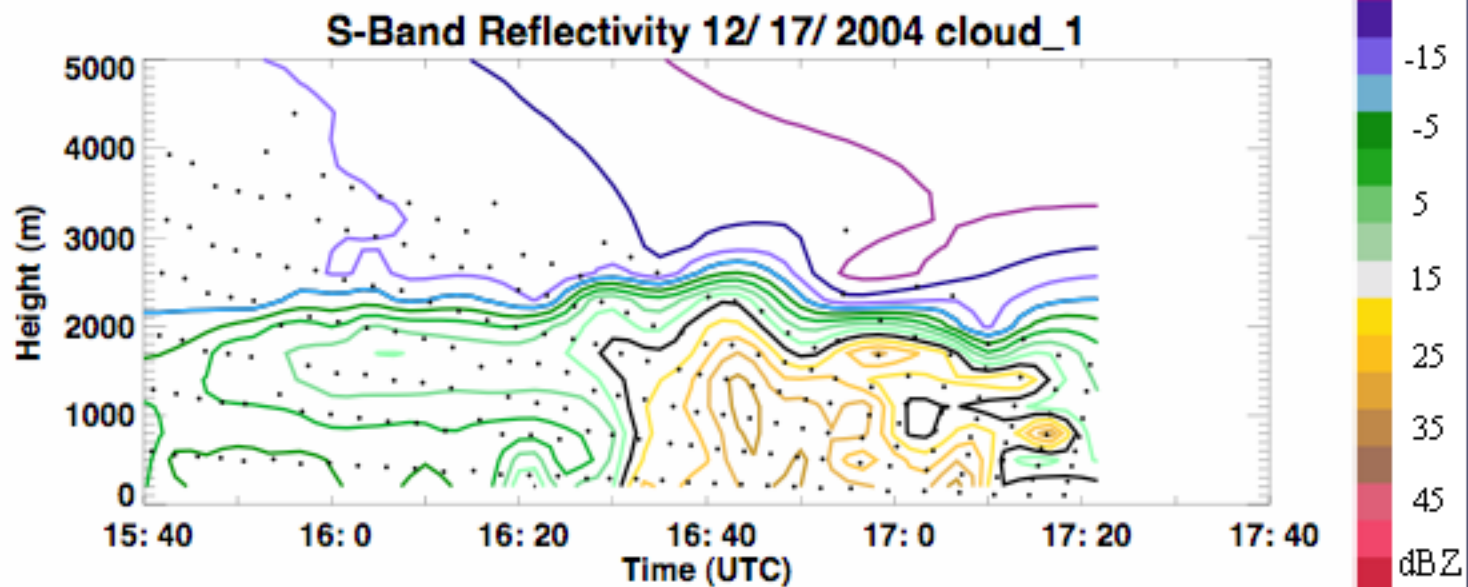
Cloud Tracking

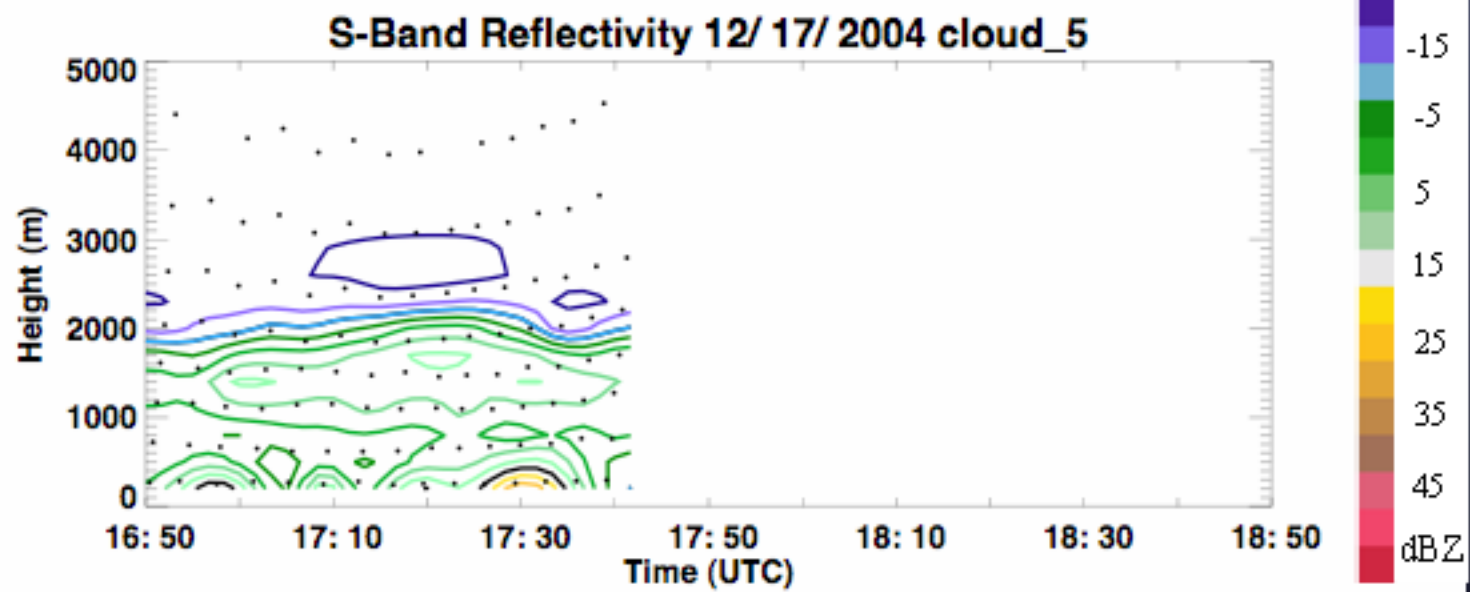
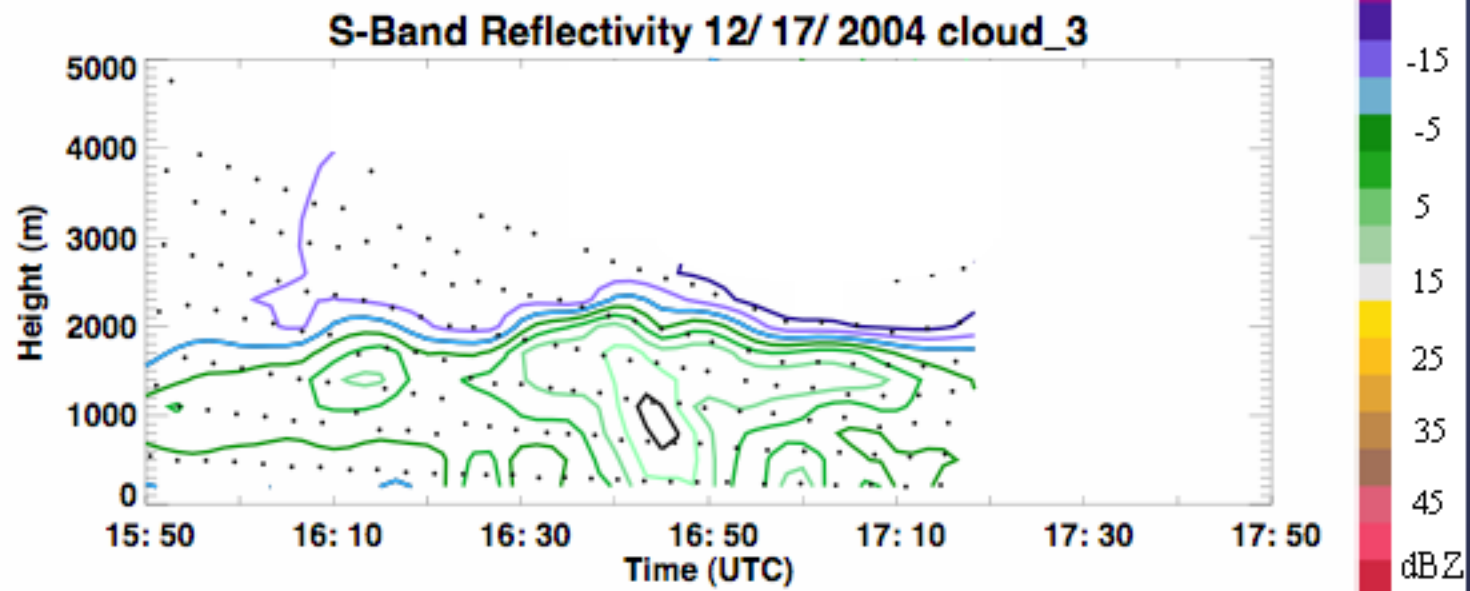
17 December 2004 (low surface wind)

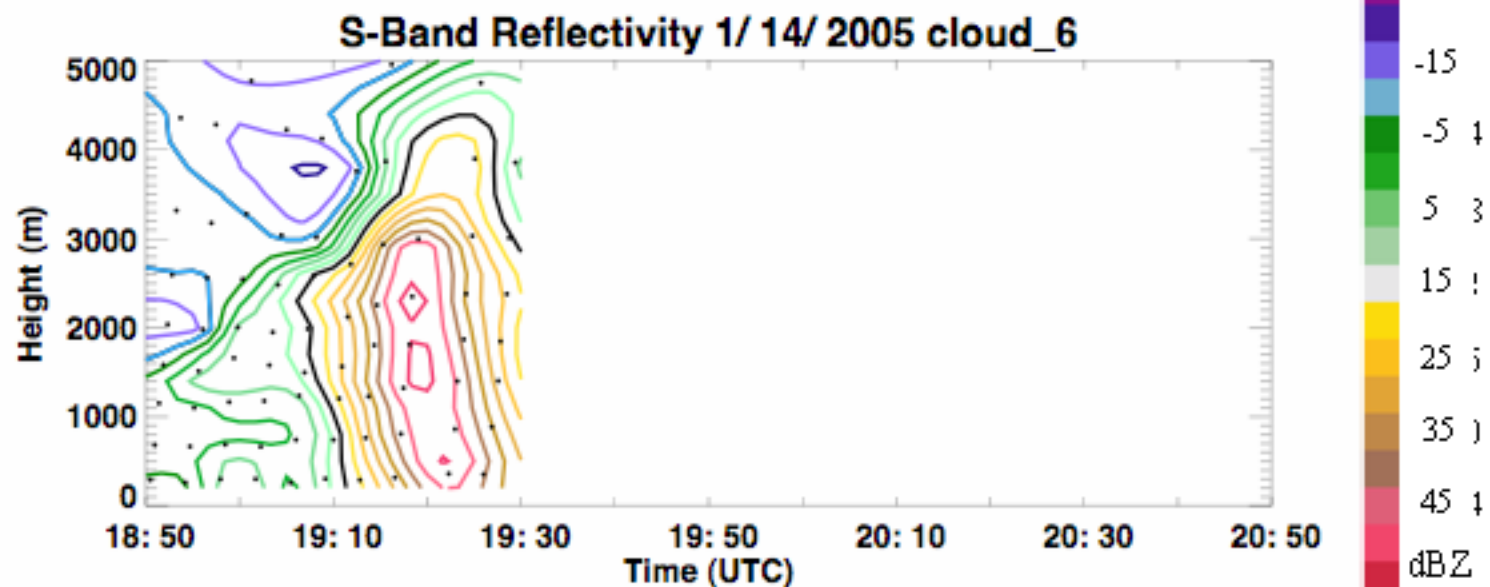
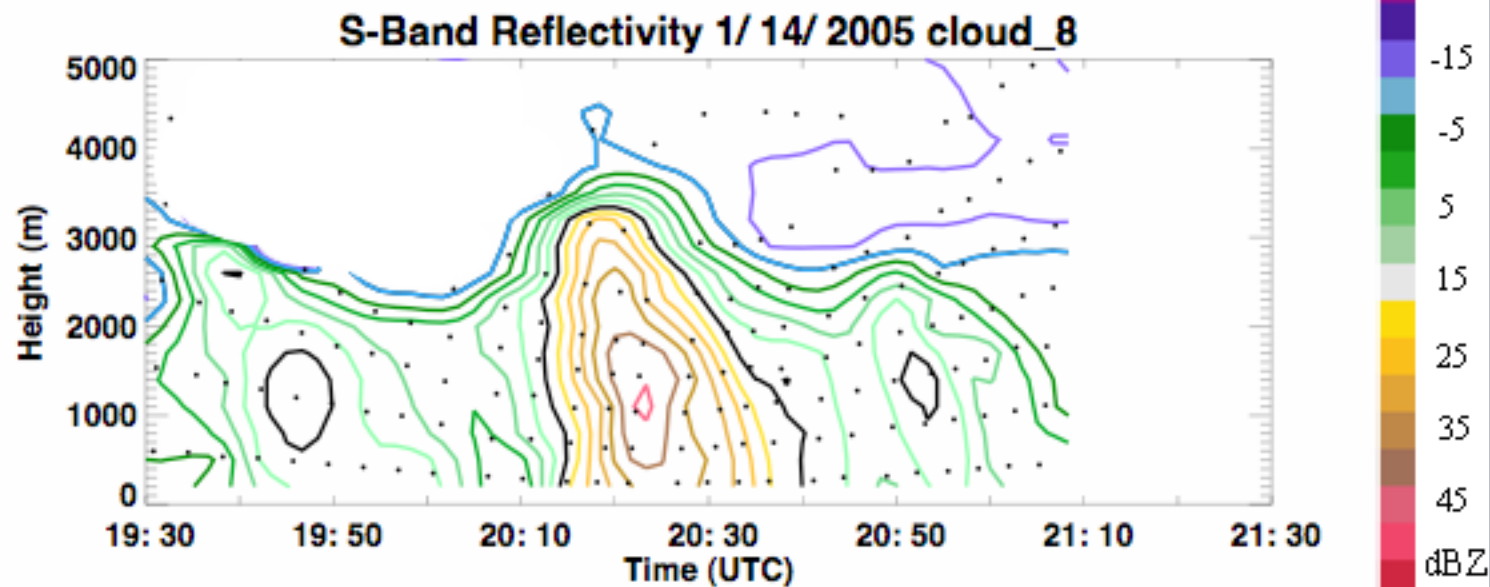


Time-height Evolution of the Maximum Reflectivity in a Single Cloud









Next Steps

- Study the cloud evolution particularly in dual wavelength (S- and Ka-band) for appropriate clouds.
- Systematically analyze all S-band radar echoes within 60 km range of the radar during selected times of C-130 operations using objective criteria to eliminate any selection bias.
- Insure that other variables such as stability, shear and moisture stratification are not biasing the interpretation.

Collaborations

Marilé Colón Robles, Eric Snodgras, Bob Rauber
University of Illinois

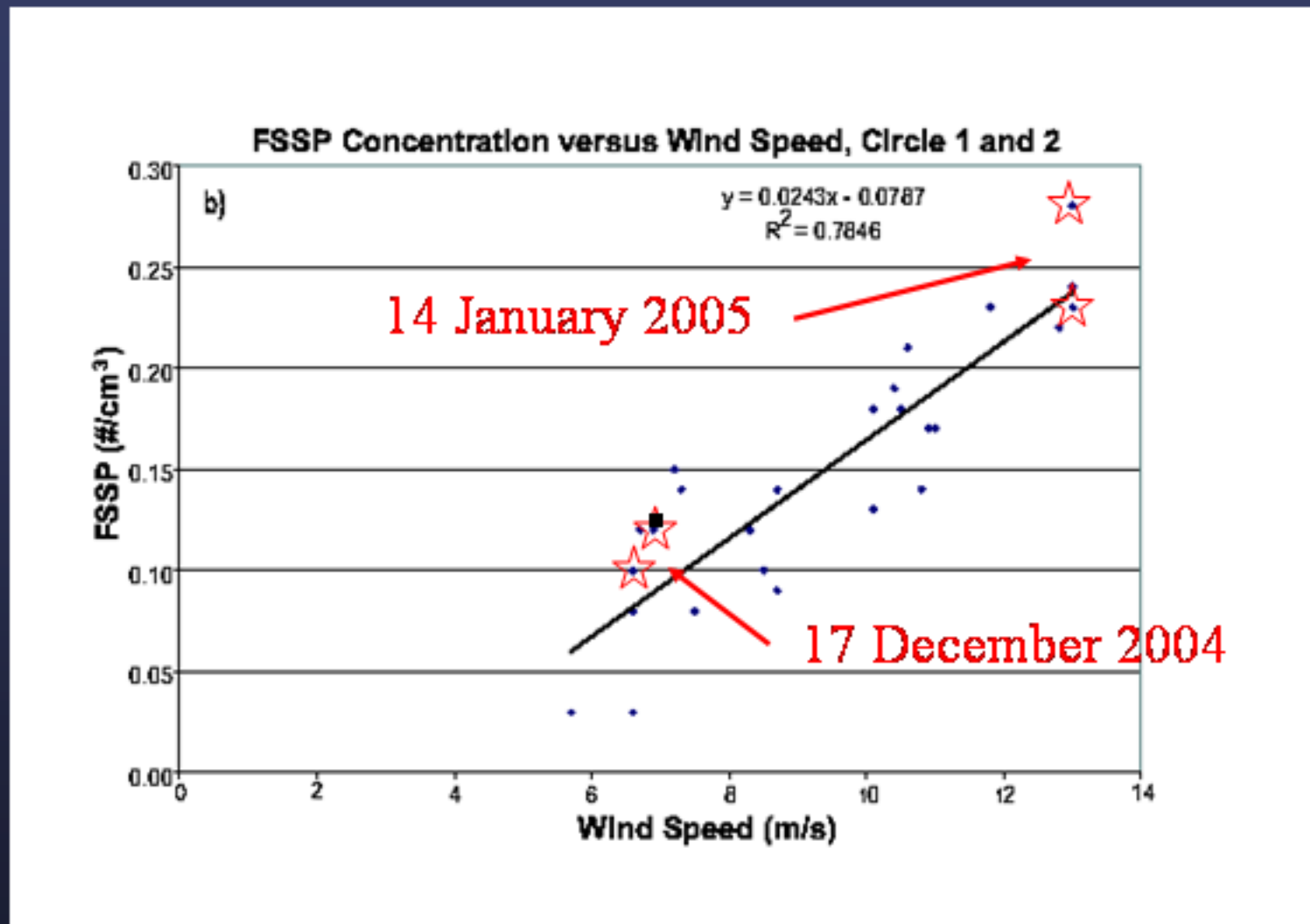
Charlie Knight
NCAR

Sonia Lasher-Trapp, Coleen Henry
Purdue University

New:

Scott Ellis, Gordon Farquharson, Bob Rilling
NCAR

Clear Air Aerosol Concentrations

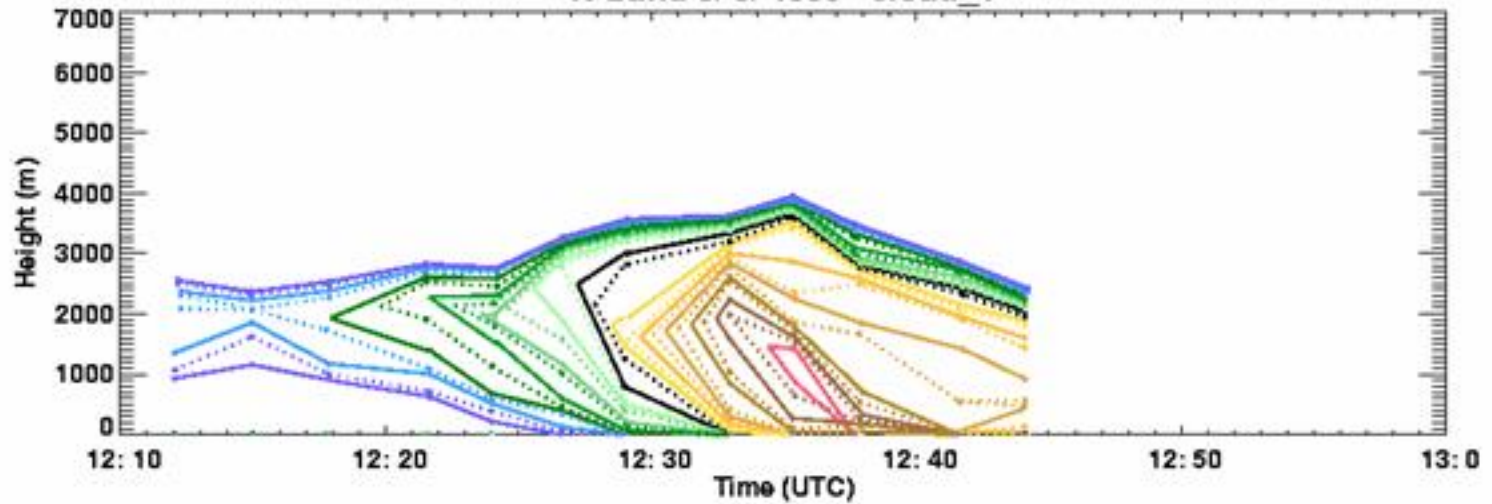


FSSP ($2\mu\text{m} - 47\mu\text{m}$)

courtesy Marilé Colón Robles

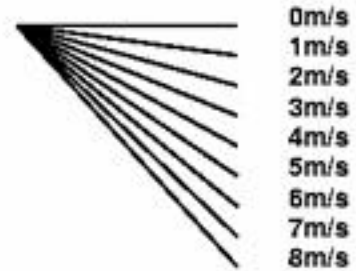
Average concentrations at 100 m altitude (near surface) elimination \square cold pools and rainshafts

X-Band 8/ 5/ 1995 cloud_1



—————	50.0000 dBZ
.....	47.5000 dBZ
—————	45.0000 dBZ
.....	42.5000 dBZ
—————	40.0000 dBZ
.....	37.5000 dBZ
—————	35.0000 dBZ
.....	32.5000 dBZ
—————	30.0000 dBZ
.....	27.5000 dBZ
—————	25.0000 dBZ
.....	22.5000 dBZ
—————	20.0000 dBZ

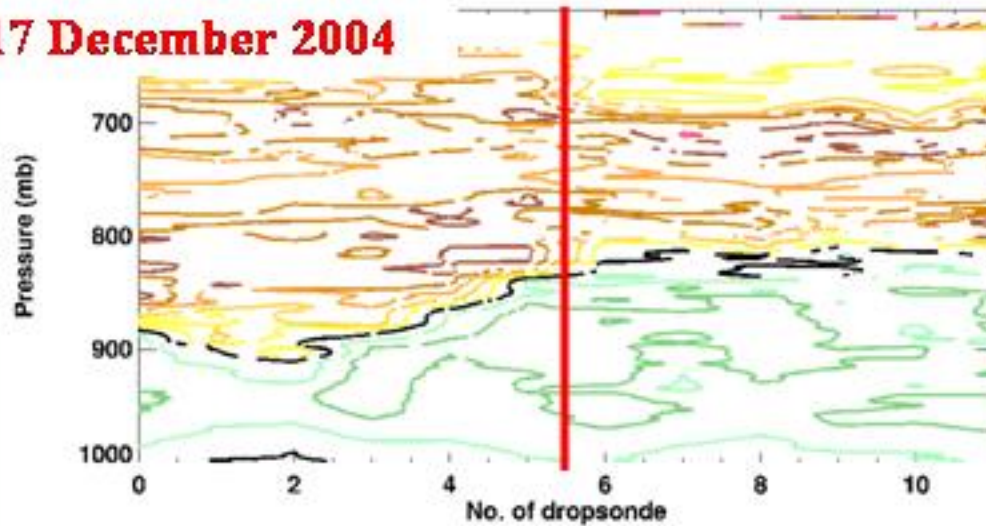
.....	17.5000 dBZ
—————	15.0000 dBZ
.....	12.5000 dBZ
—————	10.0000 dBZ
.....	7.50000 dBZ
—————	5.00000 dBZ
.....	2.50000 dBZ
—————	0.000000 dBZ
.....	-2.50000 dBZ
—————	-5.00000 dBZ
.....	-7.50000 dBZ
—————	-10.0000 dBZ
.....	-12.5000 dBZ
—————	-15.0000 dBZ



Morning circle

Afternoon circle

17 December 2004



**Relative
Humidity (%)**

10%

30%

50%

70%

90%

14 January 2005

