Preliminary multiple-Doppler analyses during MC3E

K. North[1] S. Collis[2]
S. Giangrande[3] P. Kollias[1]

[1] McGill University
[2] Argonne National Laboratory
[3] Brookhaven National Laboratory

Motivation

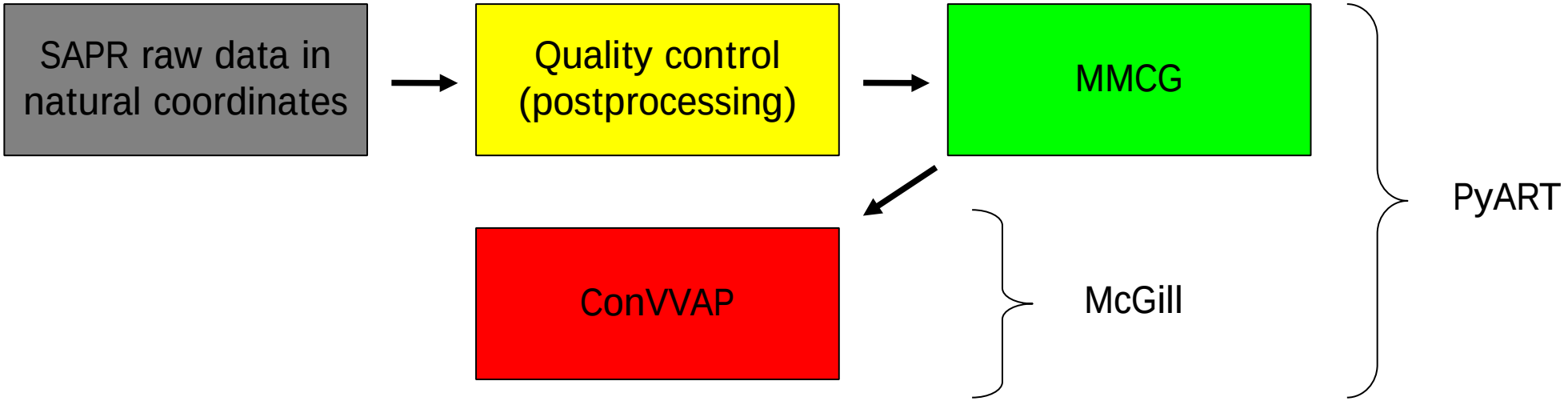
Main science goals of the Midlatitude Continental Convective Clouds Experiment (MC3E):

1. Advance our understanding of convective simulation and parameterization.
   * Convective initiation.
   * **Updraft/downdraft dynamics.**
   * Precipitation/cloud microphysics.

2. Improving rainfall estimation.

Assimilation of scanning ARM precipitation radar (SAPR) data allows us to investigate this issue.

ConVVAP

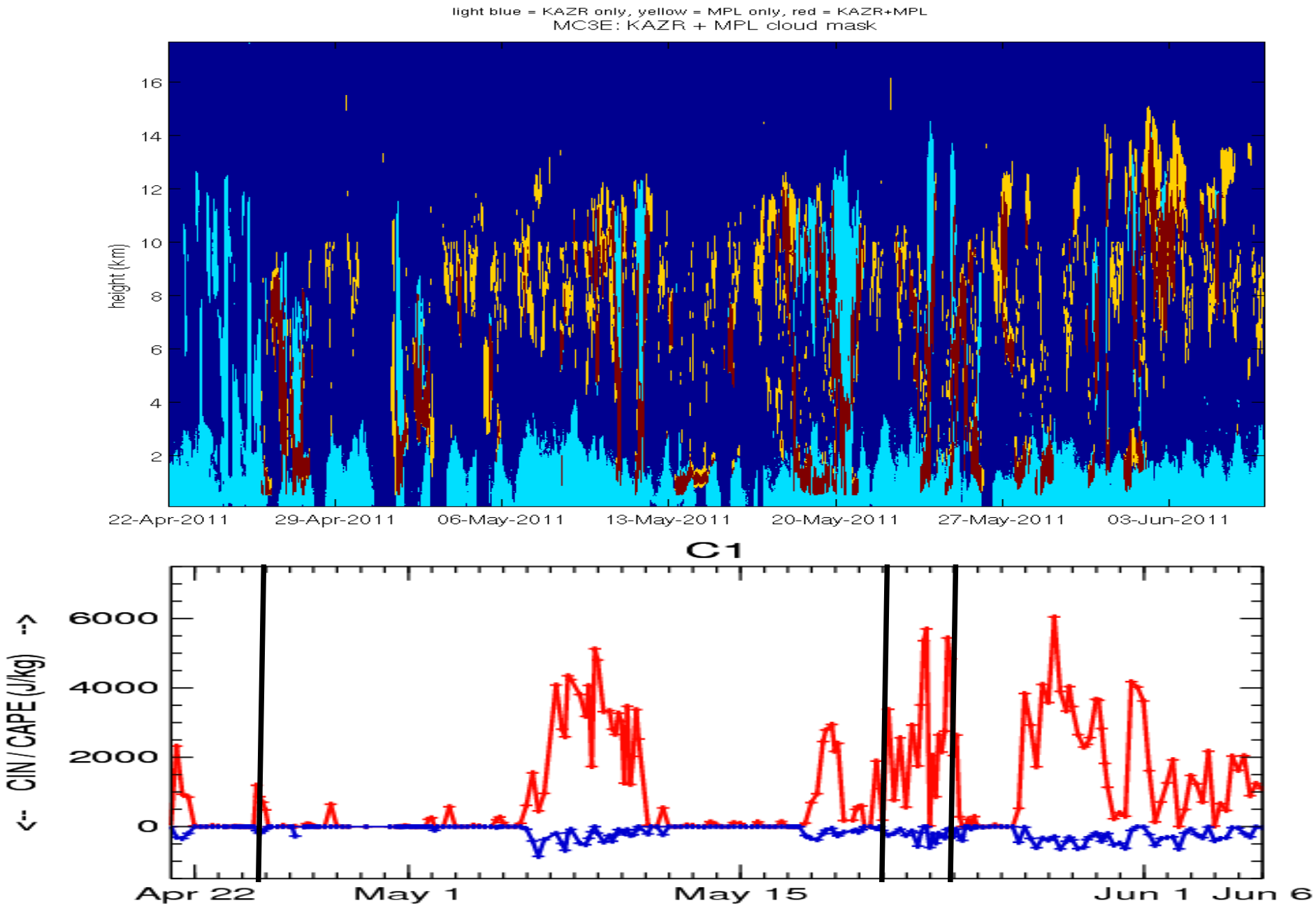


- MMCG data products are available for download on the ARM archive for multiple days during and after MC3E.

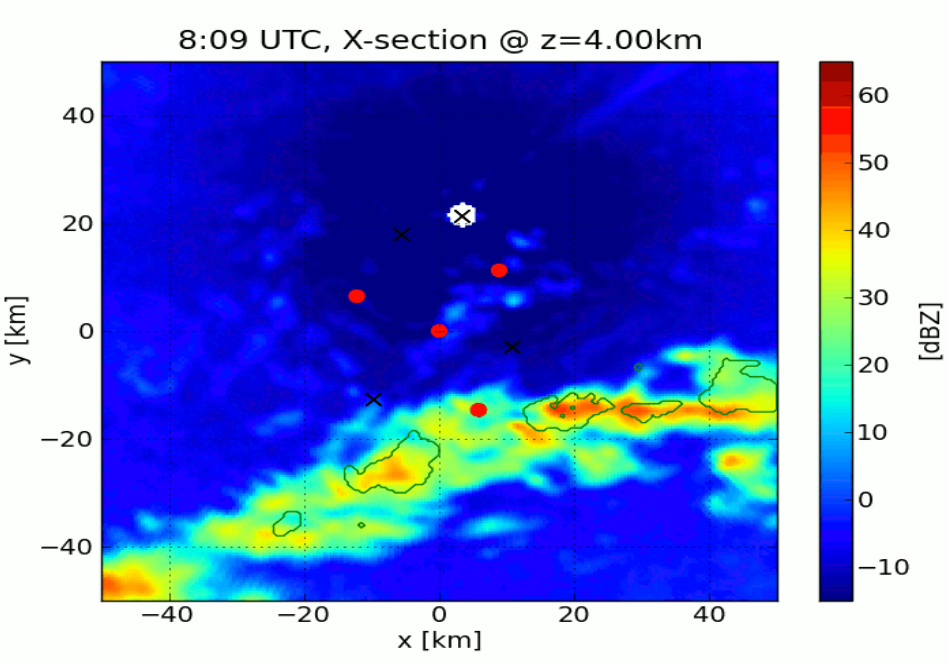
- ConVVAP data products are in their final stages of ARM DOD standards review and will be made available for download on the ARM archive on a case-by-case basis.

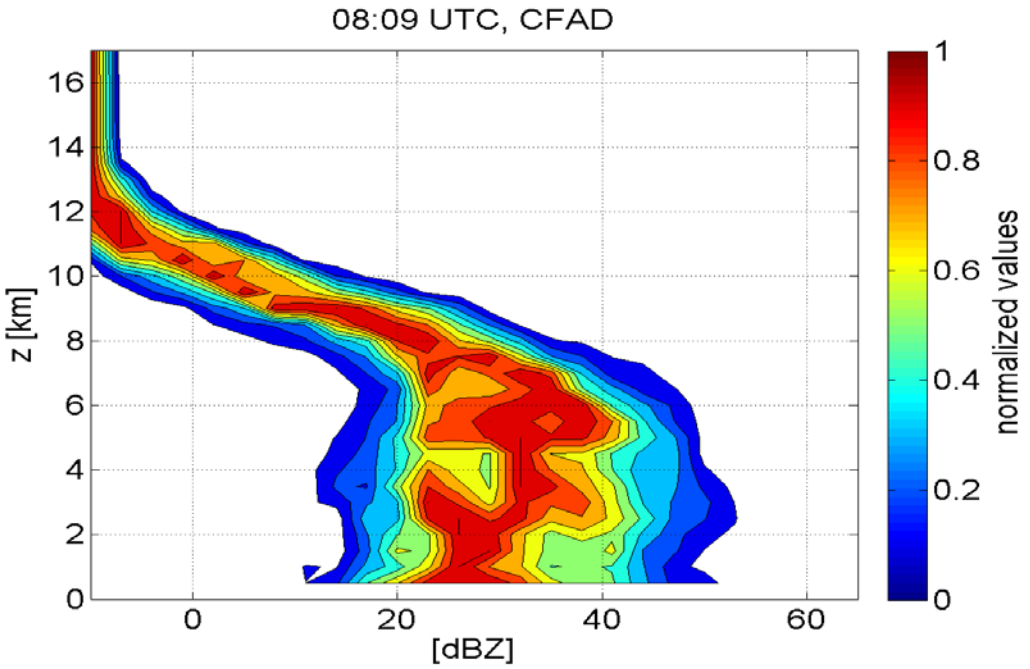
- ConVVAP data products currently consist of: (u,v,w) fields, horizontal divergence field, coverage flags and a “confidence” mask.

MC3E overview



April 25th


8:09 UTC, X-section @ z=4.00km
y [km]
x [km]
[dBZ]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z [km]
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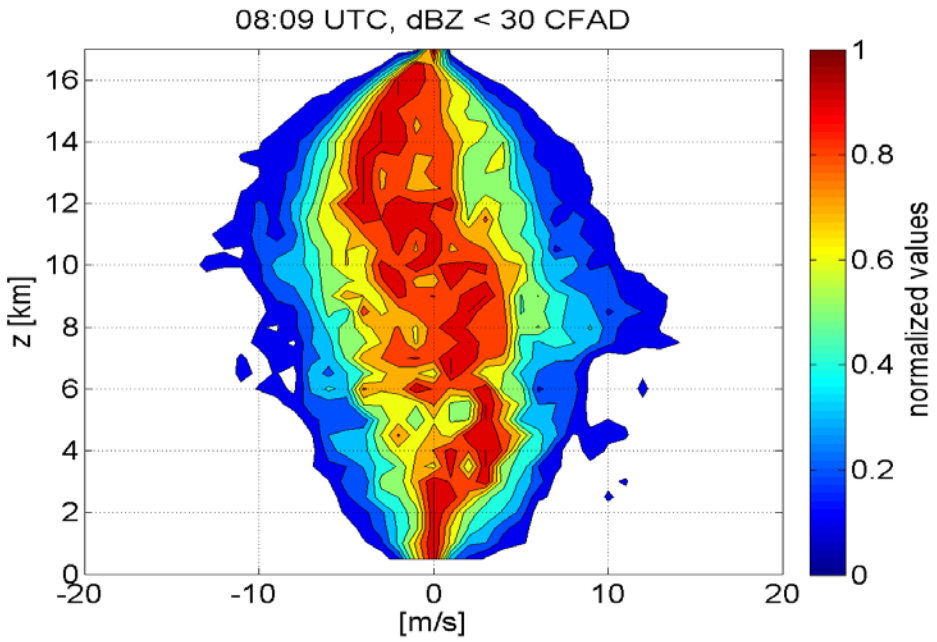
normalized values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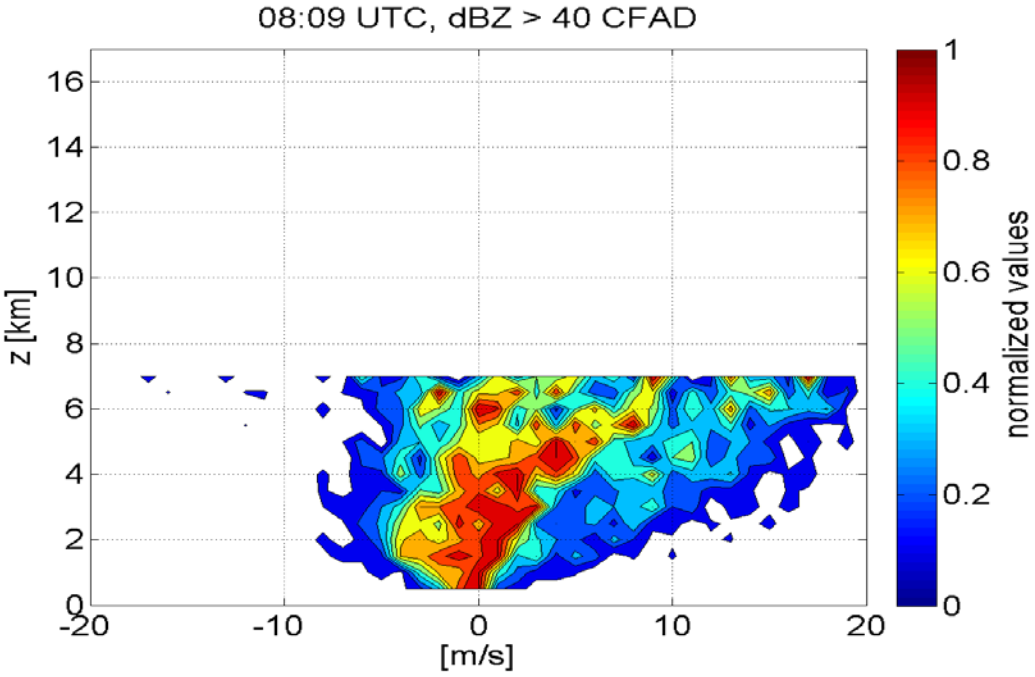
z [km]
[m/s]
normalized values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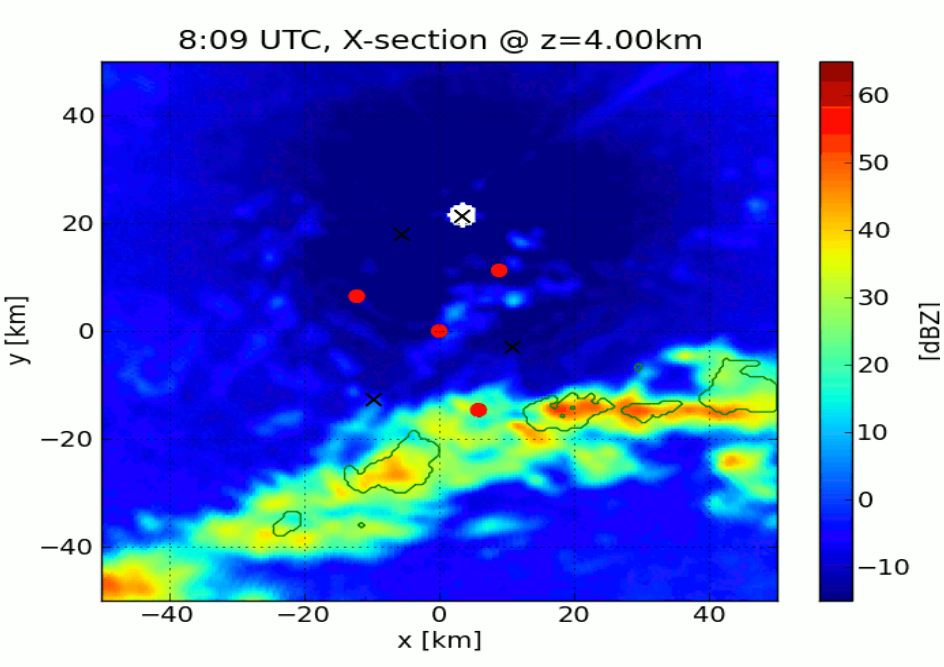
z [km]
[m/s]
normalized values

April 25th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x [km]
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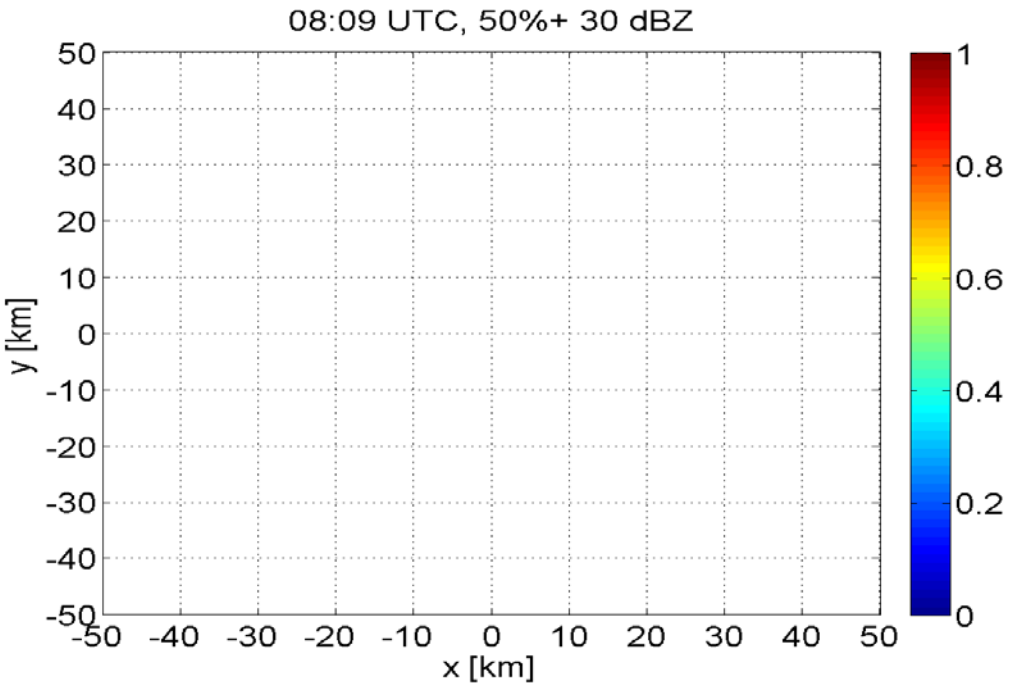
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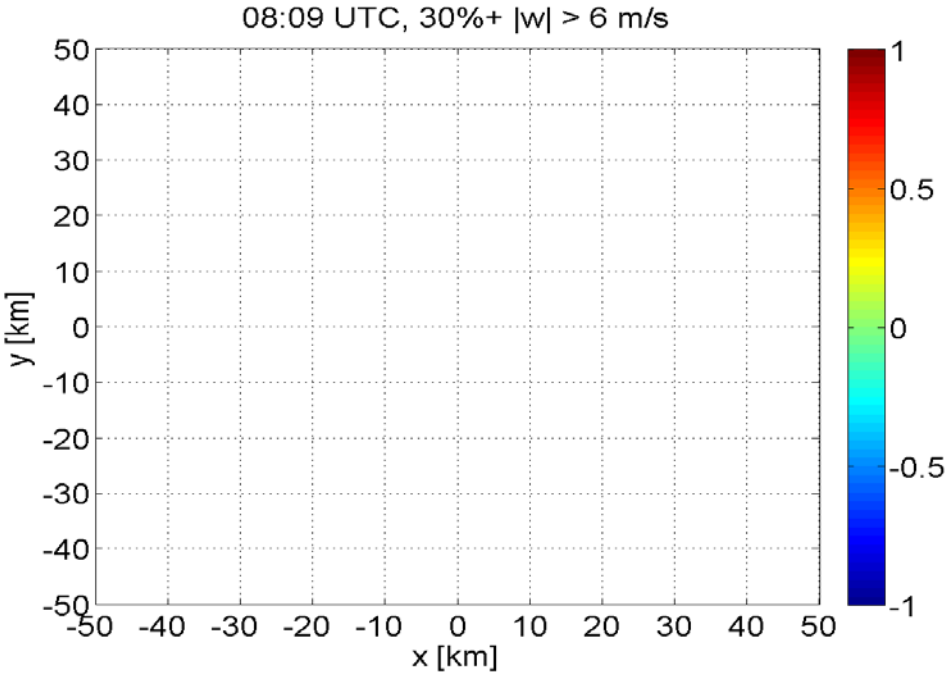
x [km]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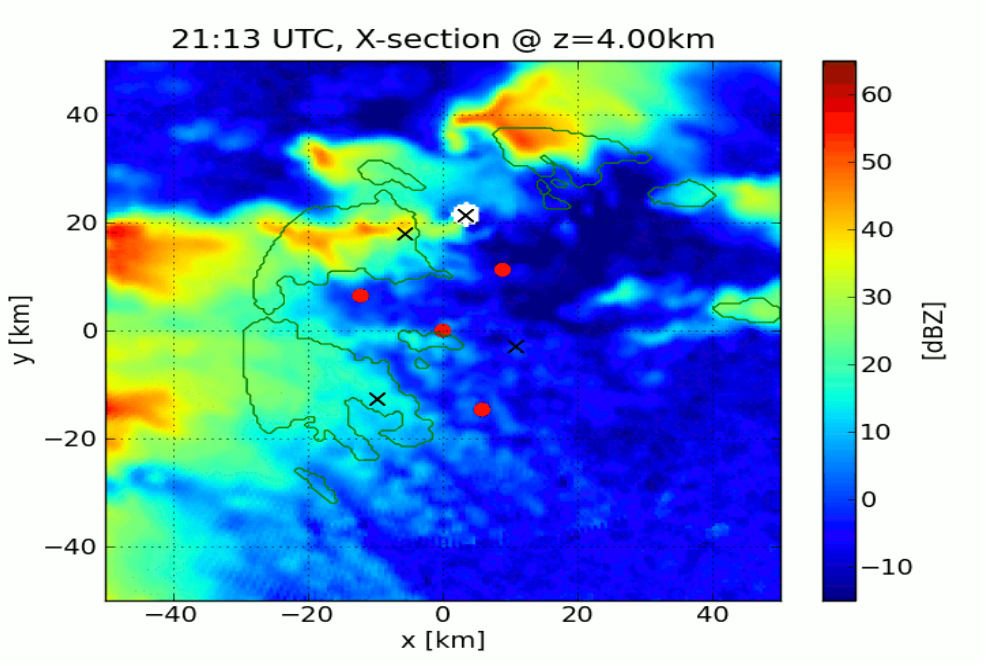
y [km]
x [km]

May 23rd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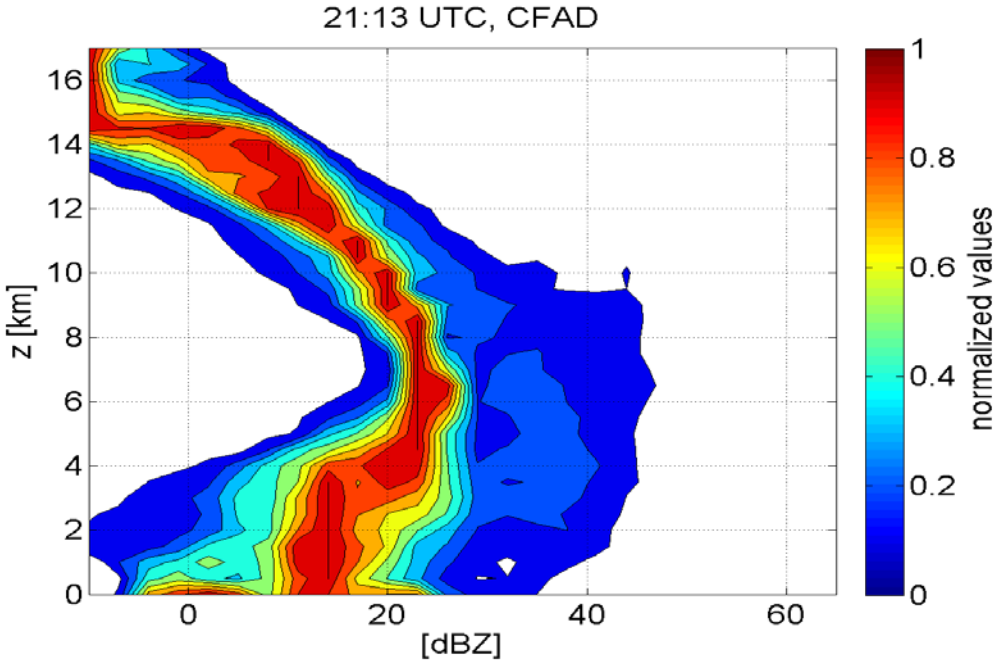
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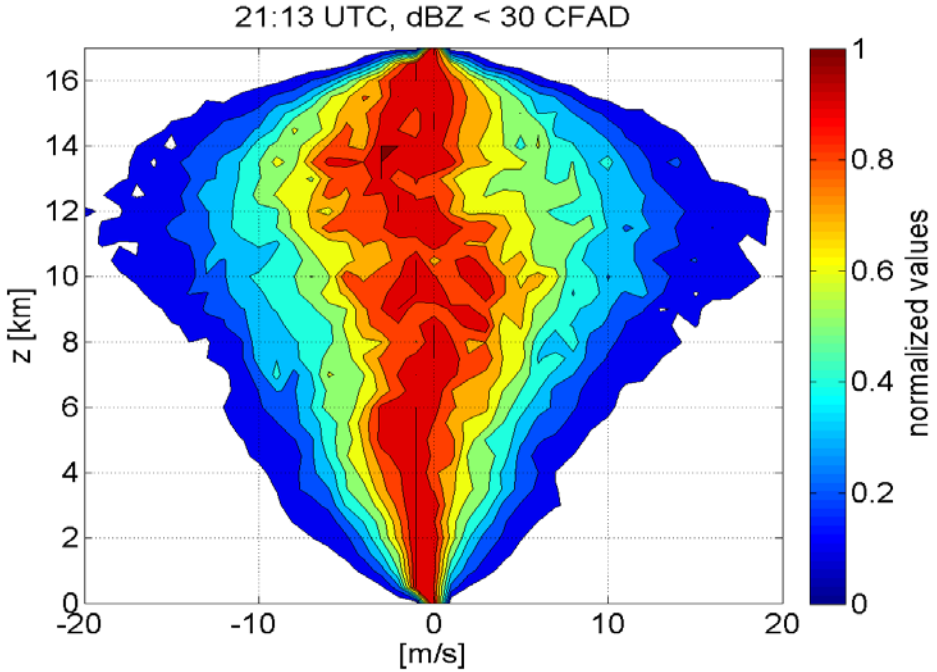
[dBZ]
normalized values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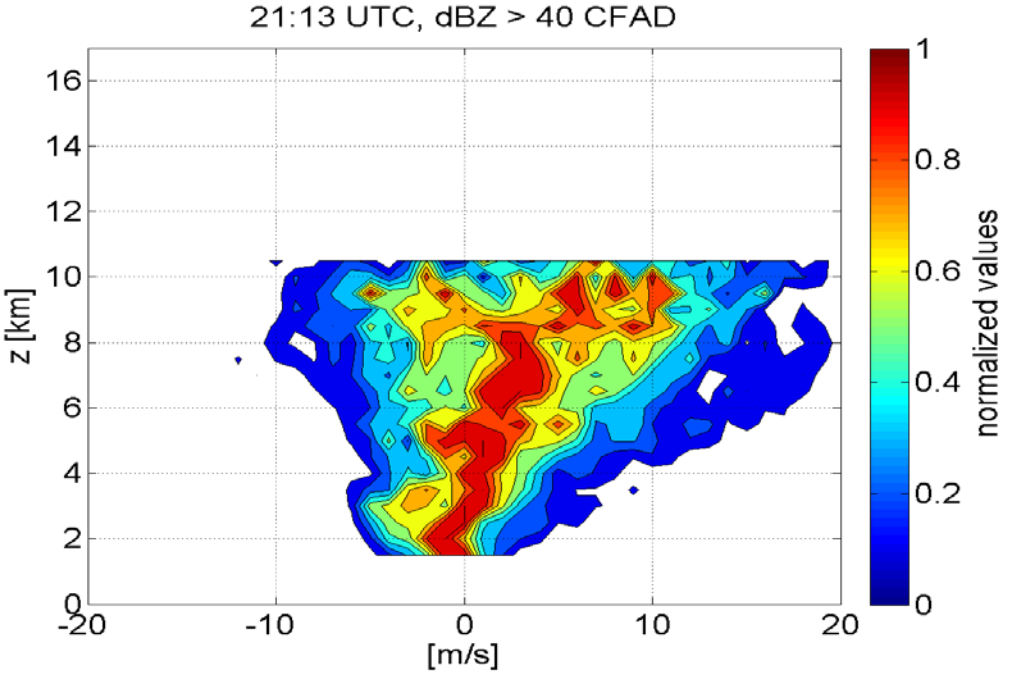
z [km]
[m/s]
normalized values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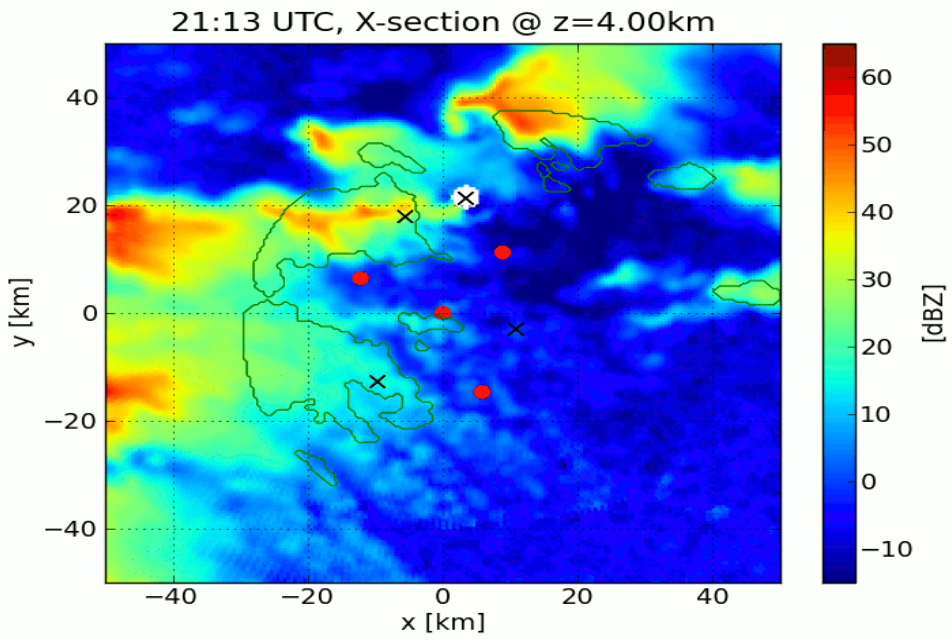
z [km]
[m/s]
normalized values

May 23rd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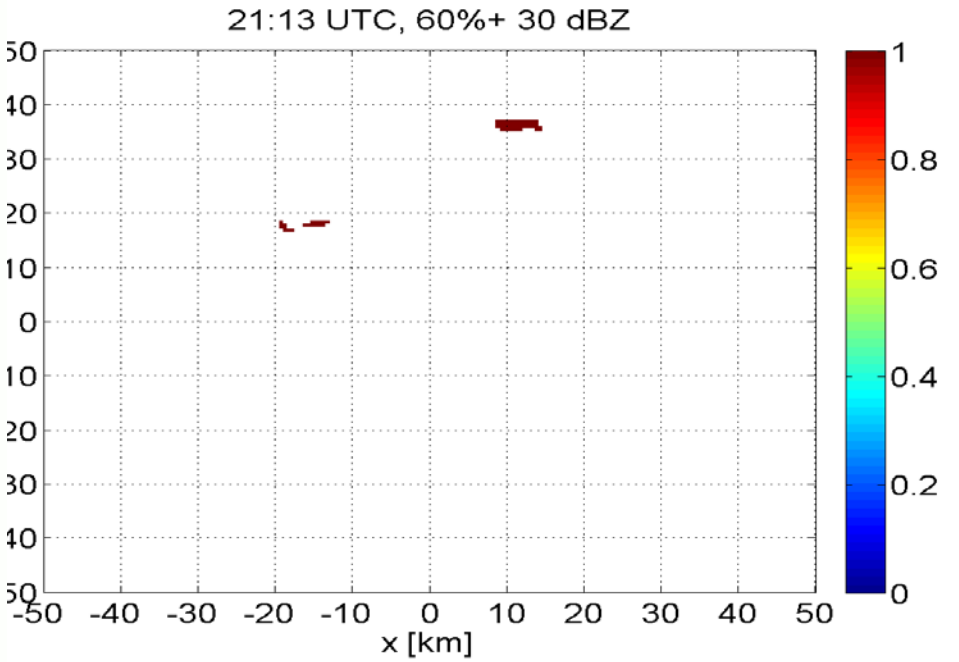
y [km]
x [km]
[dBZ]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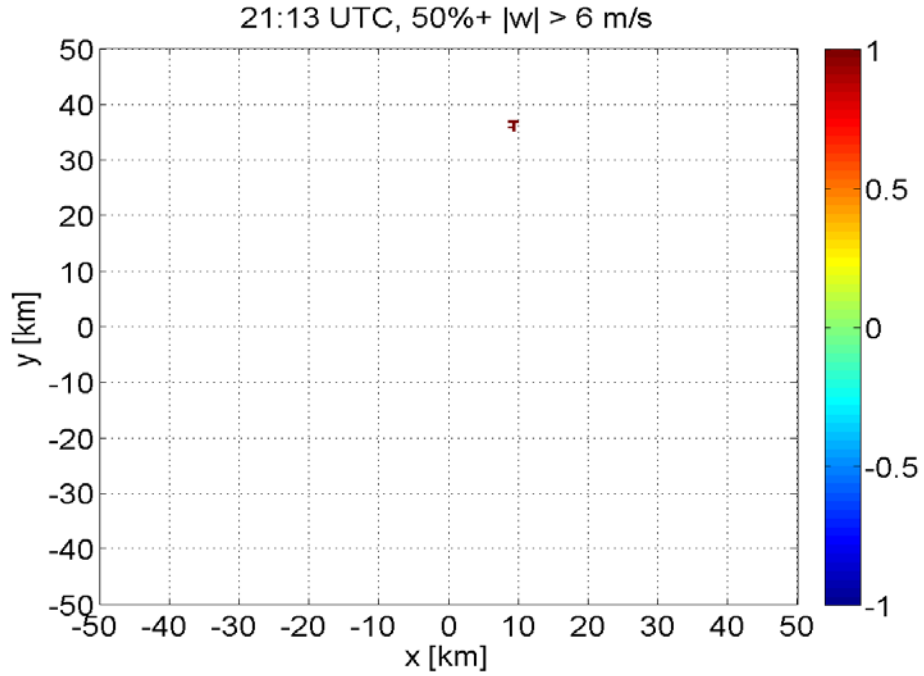
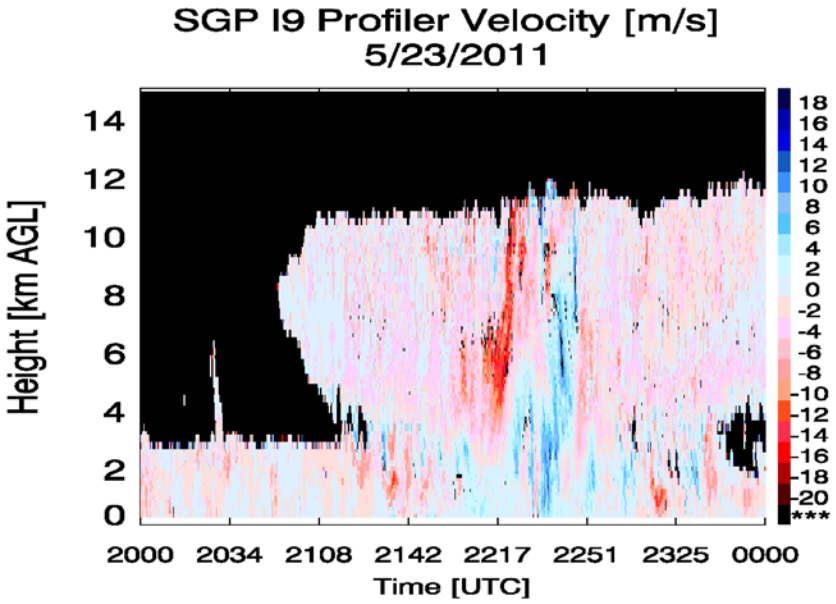
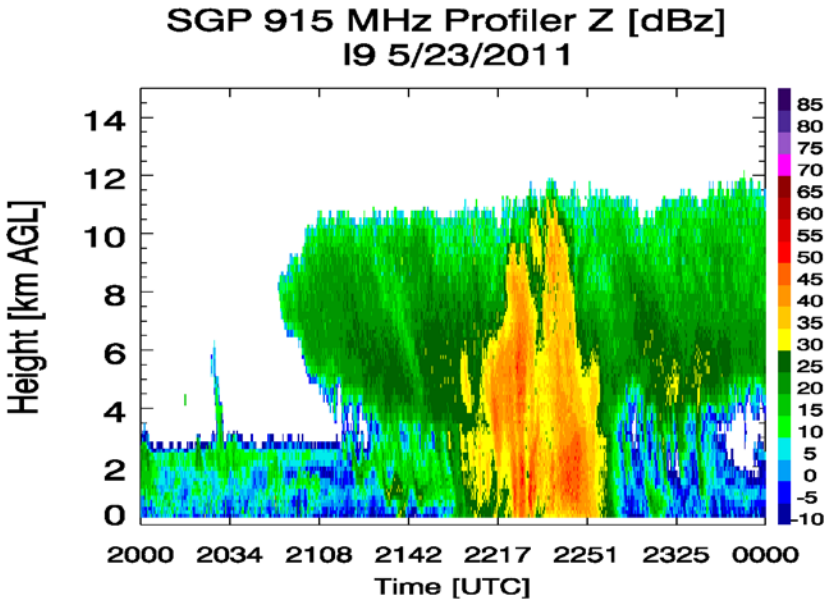
x [km]


21:13 UTC, 50%+ |w| > 6 m/s
y [km]
x [km]

May 23rd


SGP I9 Profiler Velocity [m/s]
5/23/2011
Height [km AGL]
Time [UTC]
2000 2034 2108 2142 2217 2251 2325 0000


SGP 915 MHz Profiler Z [dBz]
I9 5/23/2011
Height [km AGL]
Time [UTC]
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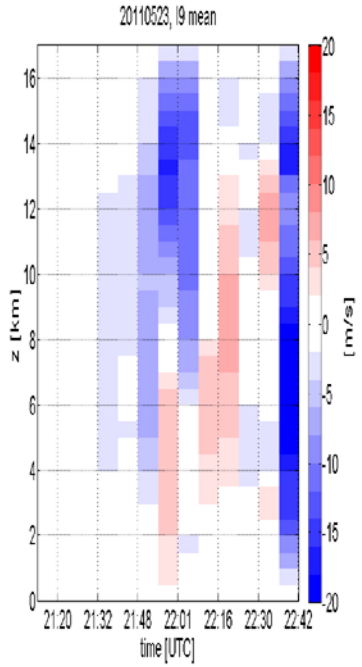
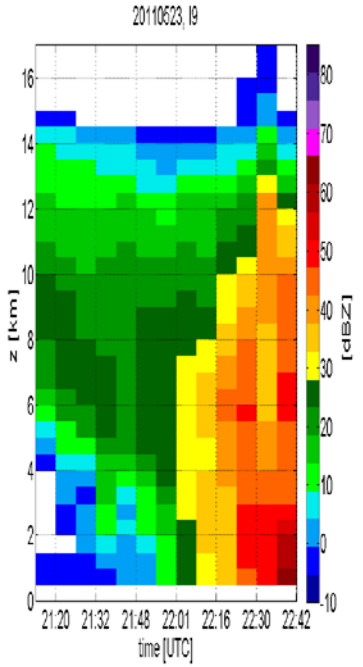
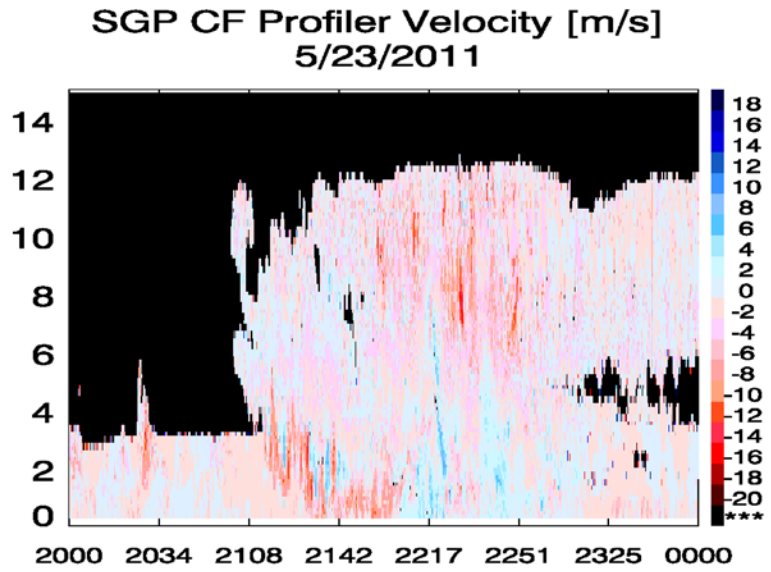
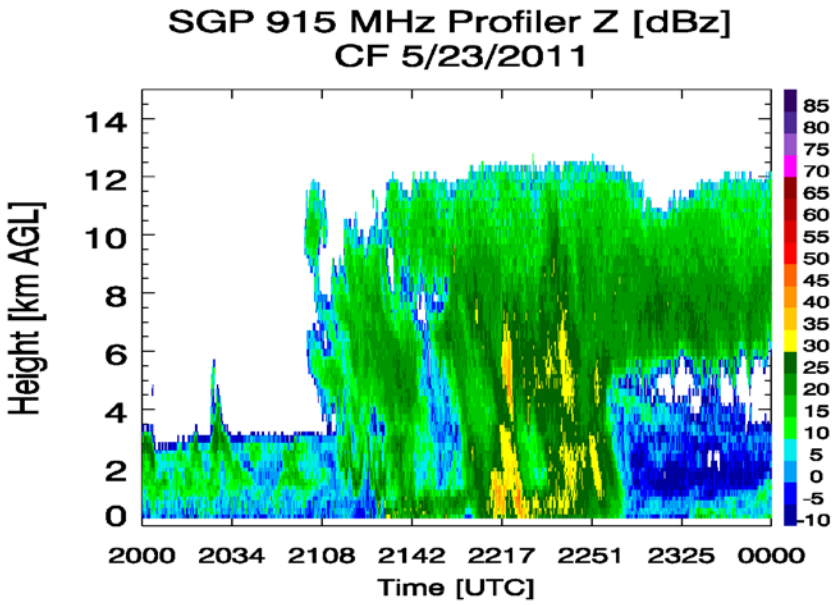
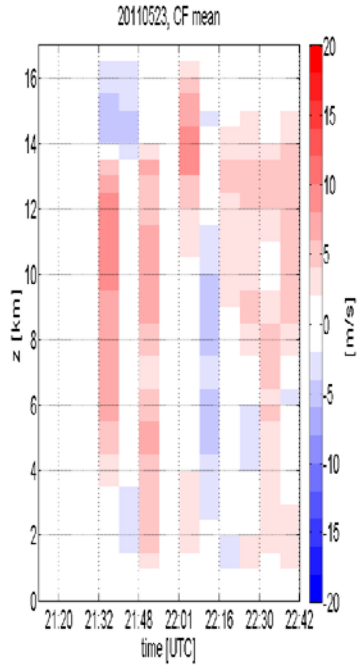

20110523, I9 mean
z [km]
time [UTC]
21:20 21:32 21:48 22:01 22:16 22:30 22:42
[m/s]


20110523, I9
z [km]
time [UTC]
21:20 21:32 21:48 22:01 22:16 22:30 22:42
[dBZ]

May 23rd


SGP CF Profiler Velocity [m/s]
5/23/2011
14
12
10
8
6
4
2
0
2000 2034 2108 2142 2217 2251 2325 0000
18 16 14 12 10 8 6 4 2 0 -2 -4 -6 -8 -10 -12 -14 -16 -18 -20 ***


SGP 915 MHz Profiler Z [dBz]
CF 5/23/2011
Height [km AGL]
14
12
10
8
6
4
2
0
2000 2034 2108 2142 2217 2251 2325 0000
Time [UTC]
85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 -5 -10


20110523, CF mean
z [km]
16
14
12
10
8
6
4
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0
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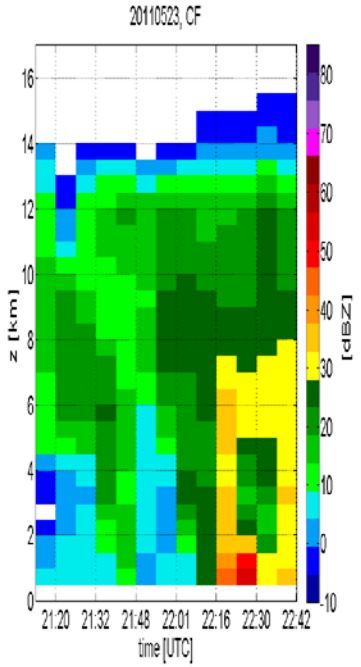
time [UTC]
20 15 10 5 0 -5 -10 -15 -20
[m/s]


20110523, CF
z [km]
16
14
12
10
8
6
4
2
0
21:20 21:32 21:48 22:01 22:16 22:30 22:42
time [UTC]
80 70 60 50 40 30 20 10 0 -10
[dBZ]

Discussion

- ConVVAP data products will be up on the ARM archive. This allows for outside scrutiny of the product itself.

- Going beyond CFADs: what other types of updraft/downdraft statistics are modellers looking for to help improve convective parameterization?

- Validation with RWPs: CFADs, P-P plots for entire events and individual cells. Are we at a minimum capturing the statistics for larger time scales?

- I will be describing the variational algorithm and its sensitivities at the VVFG tomorrow afternoon.