one year later ...

Data status:

* Both KA and WCR data were refined and new archives produced.

* Known problems with in situ data: reverse flow temp. sensor wetting; usual PMS probe questions.

* Known issues with radar data: attenuation; velocity error

Basic work done:

* Flight reports.

* Options examined for common reference frame for ground radar and aircraft.

Analyses:

january 11: long-lived cluster

january 14: statistical sampling

brief notes posted on these:

- selection of common reference frame for SPol and aircraft data
- jan 18-19 mini-cyclone
- C-130 and King Air in-trail cloud penetration for instrument intercomparison

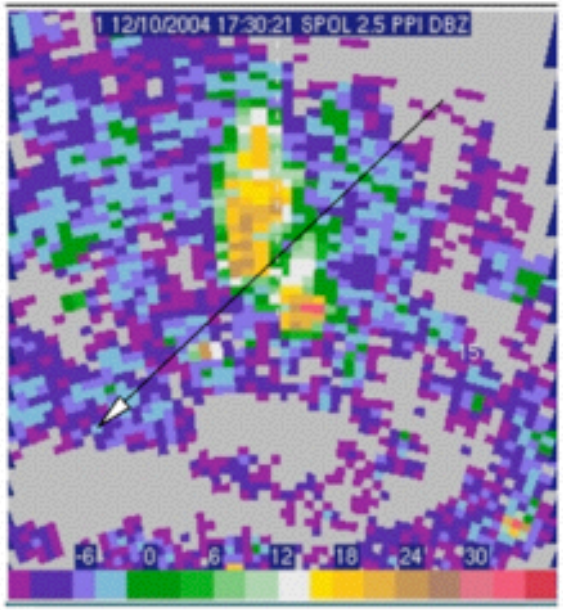
most work done so far on these:

- jan 11 - long-loved cell cluster; 13 passes
- jan 14 - “statistical” sampling of 26 clouds
- jan 17 -
-

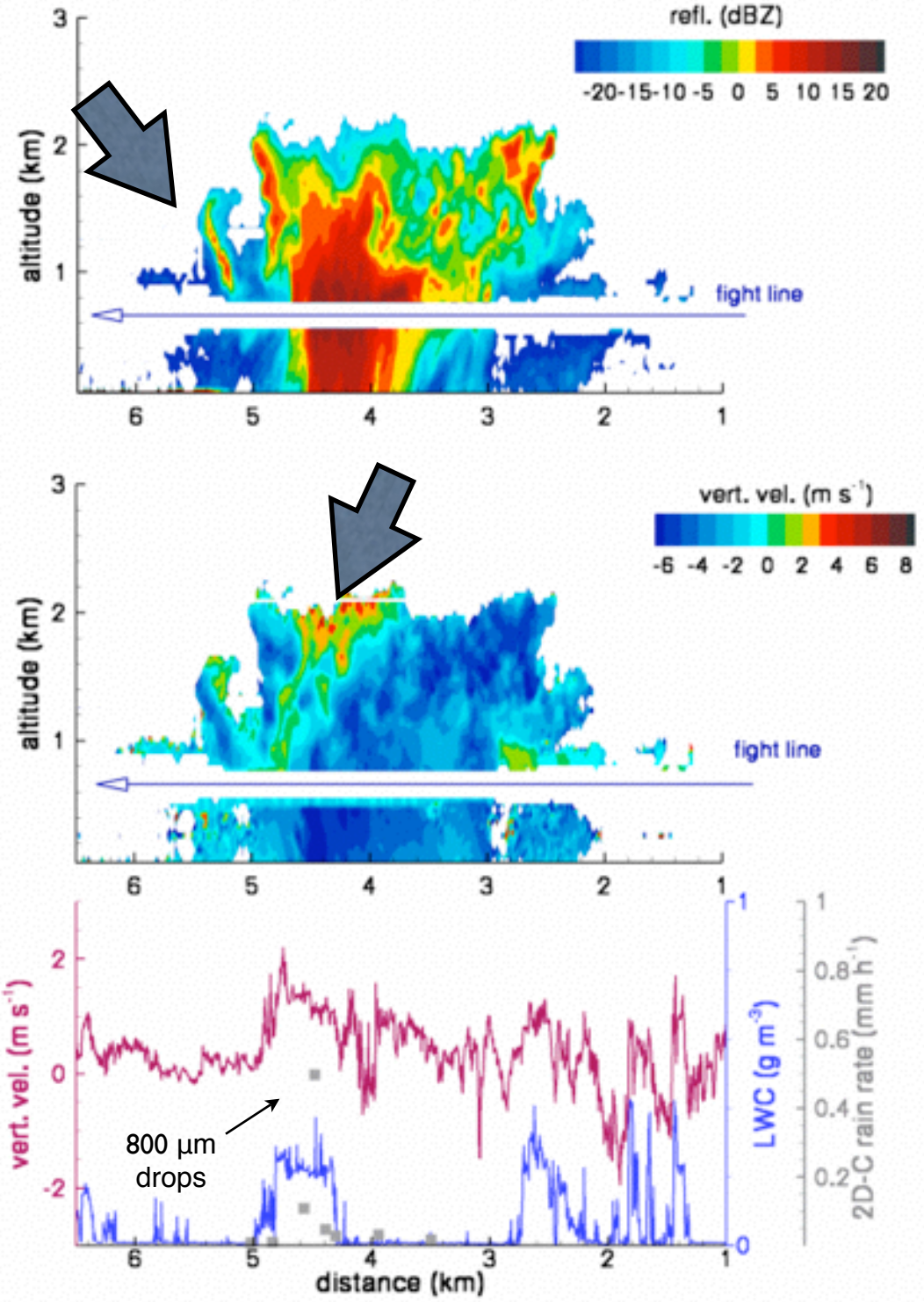
Themes to pursue:

- Updrafts are are fragmented thermals, not echo-weak, contiguous entities. Small fractions of cloud volumes are updraft.
- Frequent coincidence of updrafts and precipitation is notable. Preferred growth of large drops in updrafts is evident (e.g. jan 17, etc.).
- Erosion of horizontal momentum carried from below cloud base in thermals is slow compared to loss of LWC, hence it appears that LWC removal by precipitation is more important than entrainment.
- Clear correlation between LWC and vertical velocity.
- Buoyancy ??
- Some cloud clusters have exceptionally long lives (e.g. dec 23, jan 11, ...)
- The major puzzle: causes for mesoscale organization (e.g. jan 14, ...).

RICO 20051210 17:28:26 - 17:29:52
656 m altitude
Pass along 245° heading.



SPol 17:30:35 2.5° ~ 0.7 km



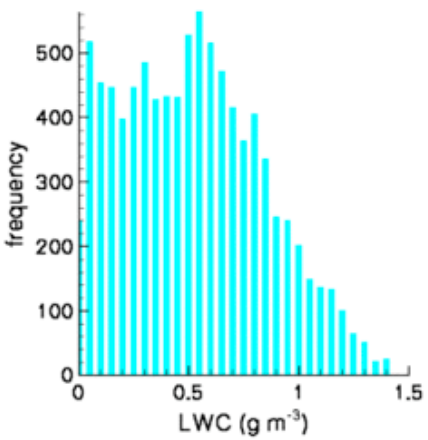
dec10/zv_1728; 16 Jan 2006 18:11:38

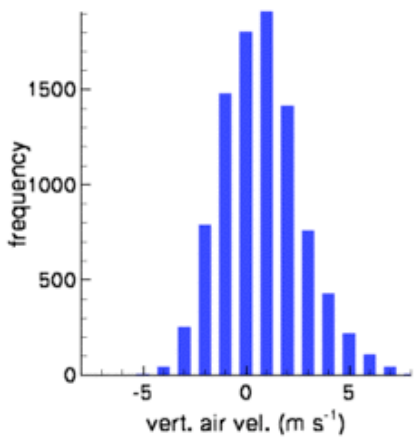
2050114 18:20-19:20
1685 m altitude
1-Hz data
33 km in cloud (14% of total path)

in situ data

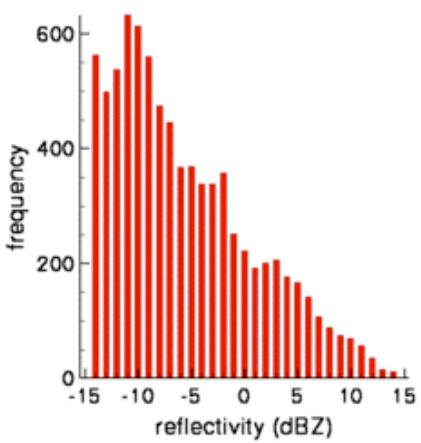
	percentile						
	1	5	10	50	90	95	99
w (m s^{-1})	-2.7	-1.7	-1.1	1.1	3.8	4.8	6.6
LWC g m^{-3}	0.037	0.070	0.12	0.53	0.99	1.1	1.3

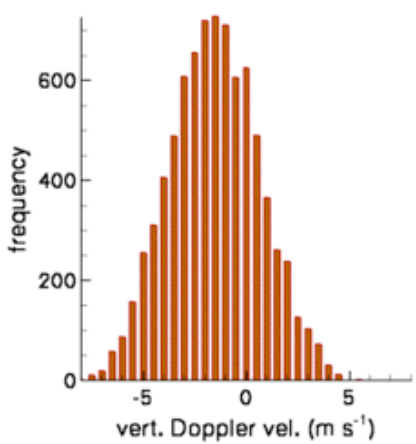
in situ measnurements along the flight line





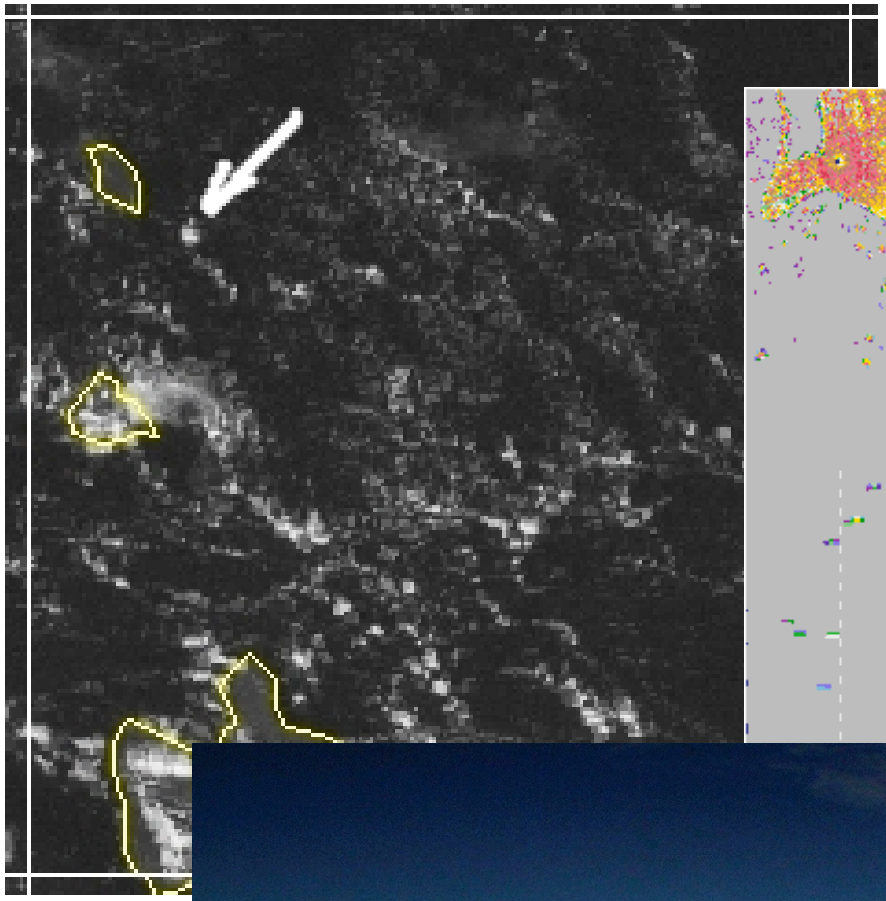
radar measurements 105 m above flight line

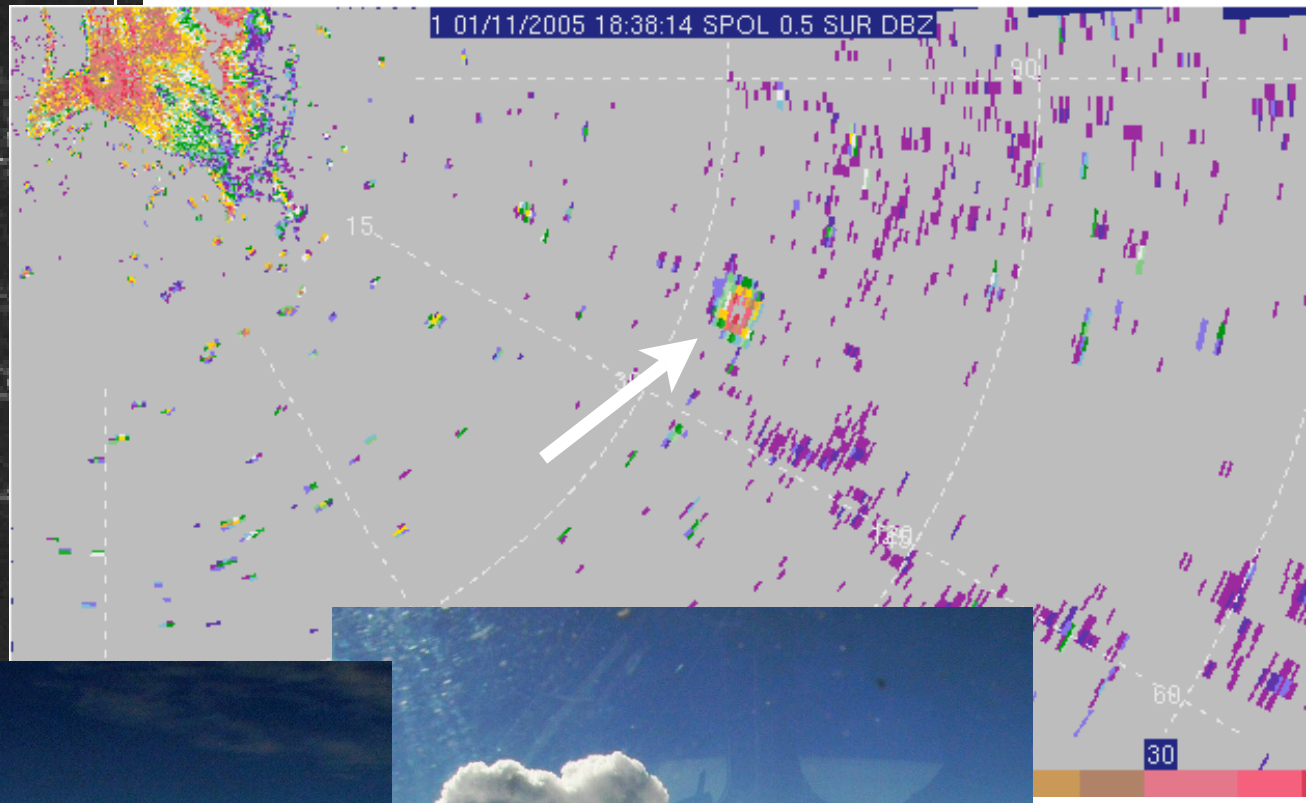




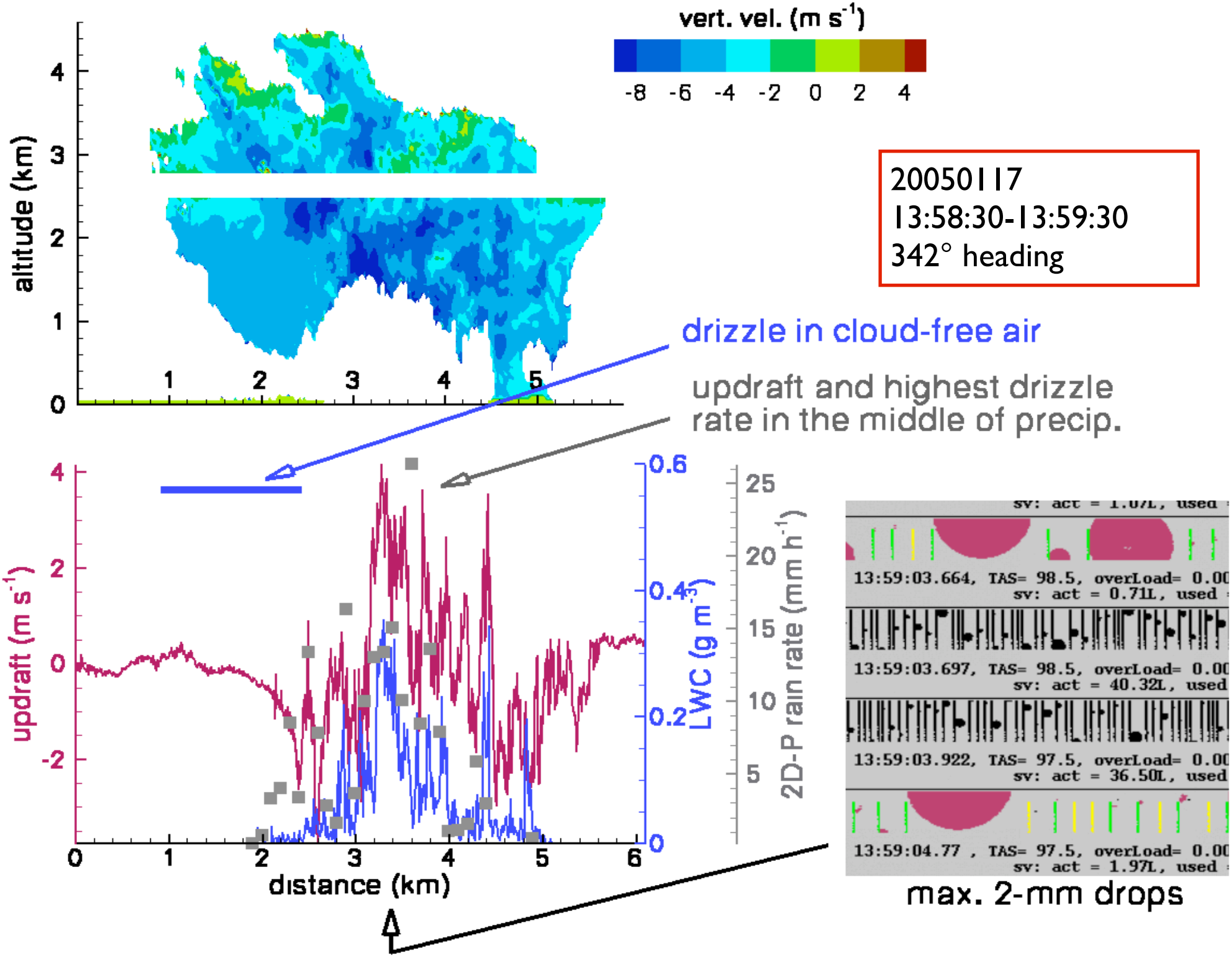
WCR data

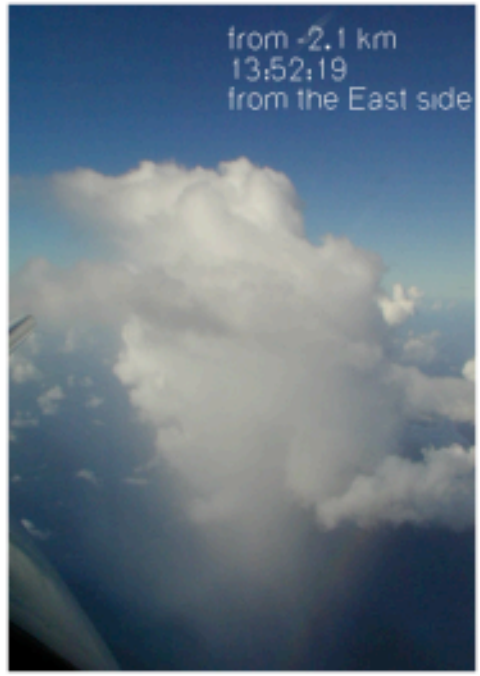
velocity threshold (m s^{-1})	fraction of echo (%) area (mean ± std. dev.)
-2	53 ± 20
-1	36 ± 18
0	21 ± 14
1	11 ± 8
2	4.8 ± 4.2
3	2.0 ± 1.6
4	0.93 ± 0.3

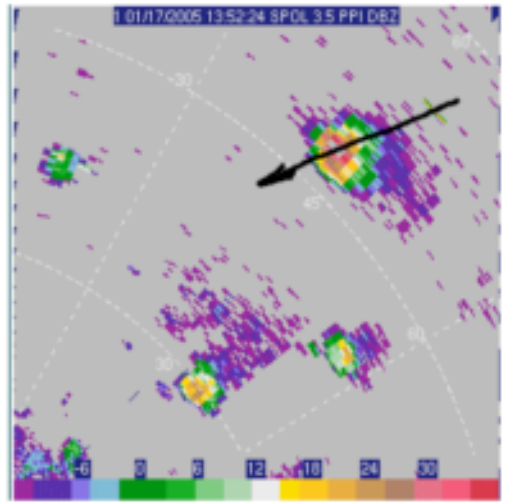




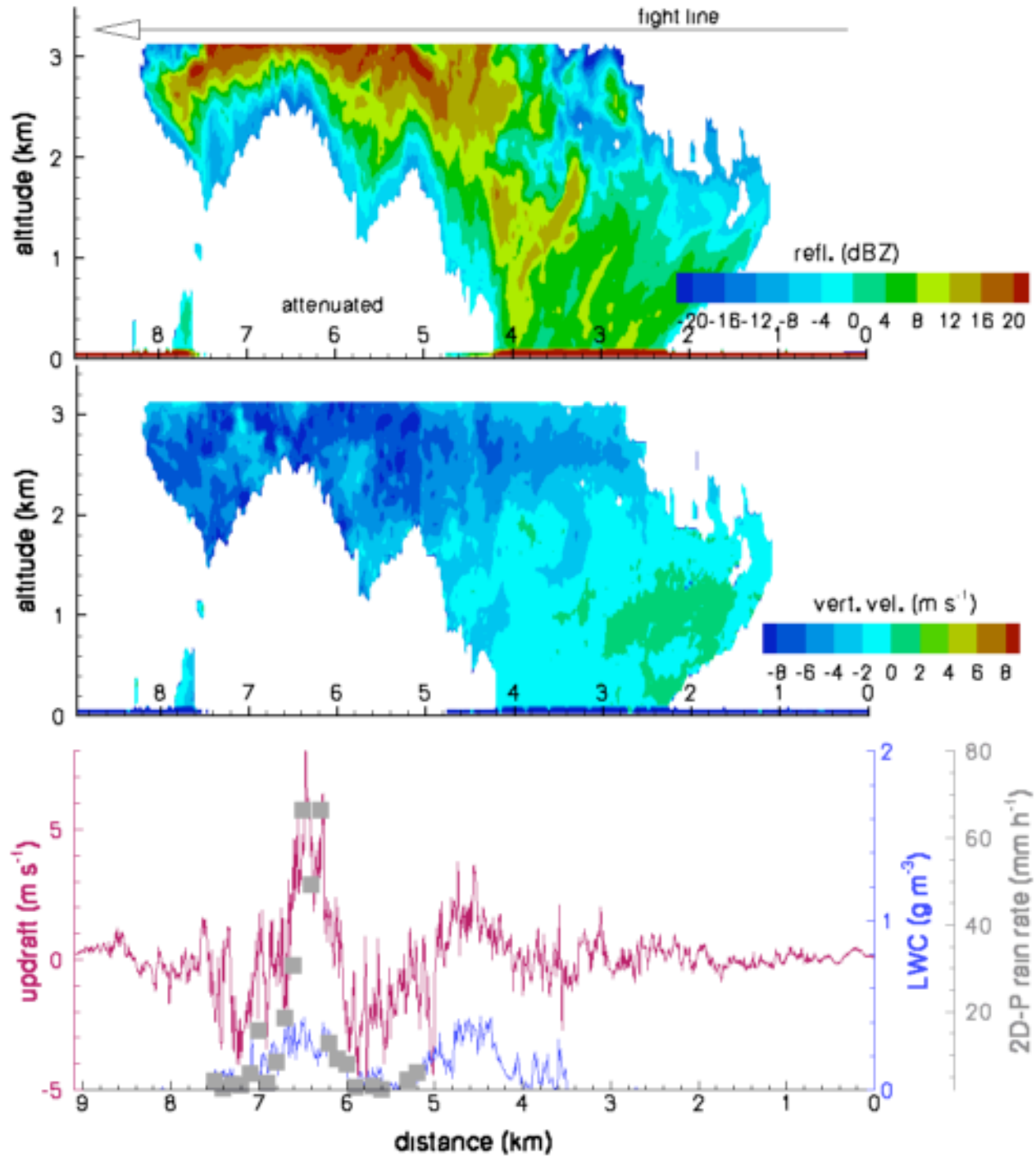
20050111 circa 18:35


vert. vel. (m s-1)
-8 -6 -4 -2 0 2 4
altitude (km)
0 1 2 3 4
1 2 3 4 5
20050117
13:58:30-13:59:30
342° heading
drizzle in cloud-free air
updraft and highest drizzle rate in the middle of precip.
updraft (m s-1)
LWC (g m-3)
2D-P rain rate (mm h-1)
distance (km)
0 1 2 3 4 5 6
13:59:03.664, TAS= 98.5, overLoad= 0.00
sv: act = 0.71L, used
13:59:03.697, TAS= 98.5, overLoad= 0.00
sv: act = 40.32L, used
13:59:03.922, TAS= 97.5, overLoad= 0.00
sv: act = 36.50L, used
13:59:04.77 , TAS= 97.5, overLoad= 0.00
sv: act = 1.97L, used
max. 2-mm drops

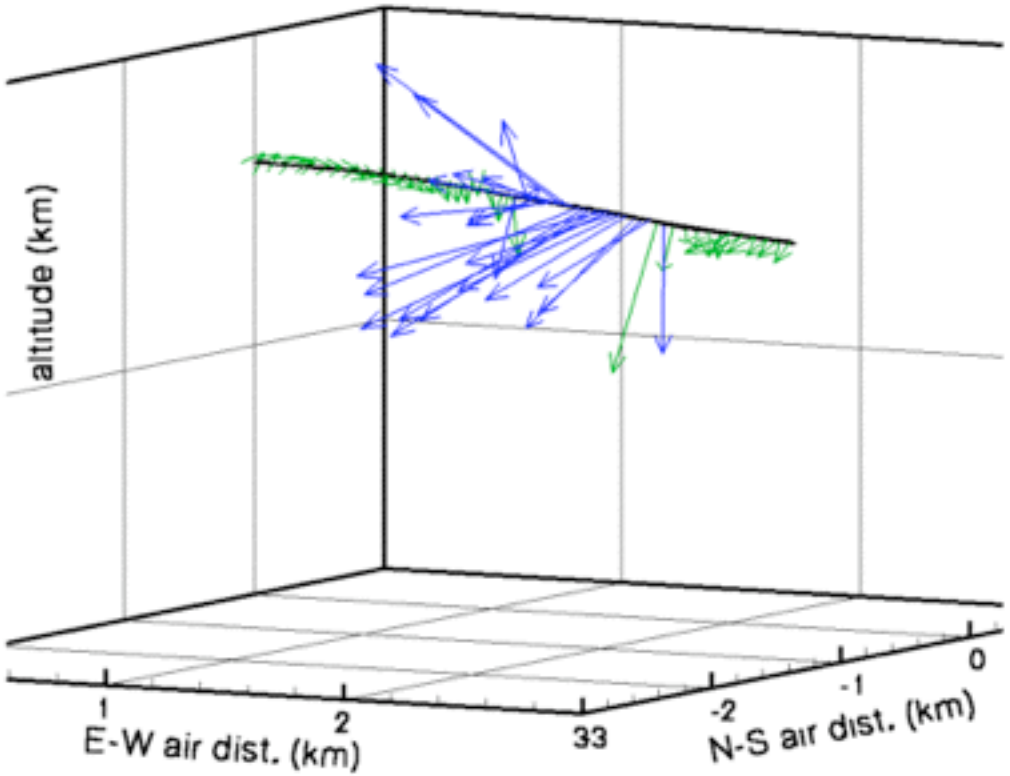


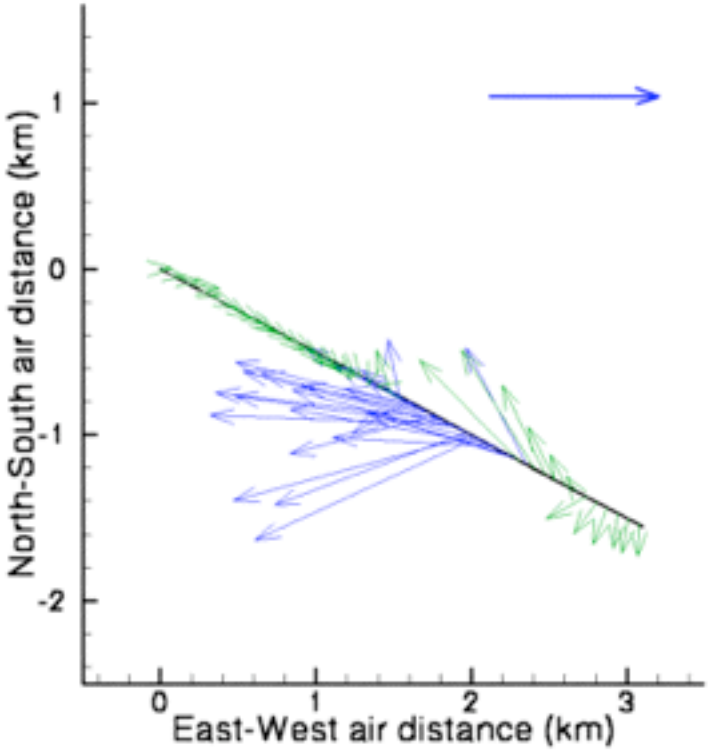


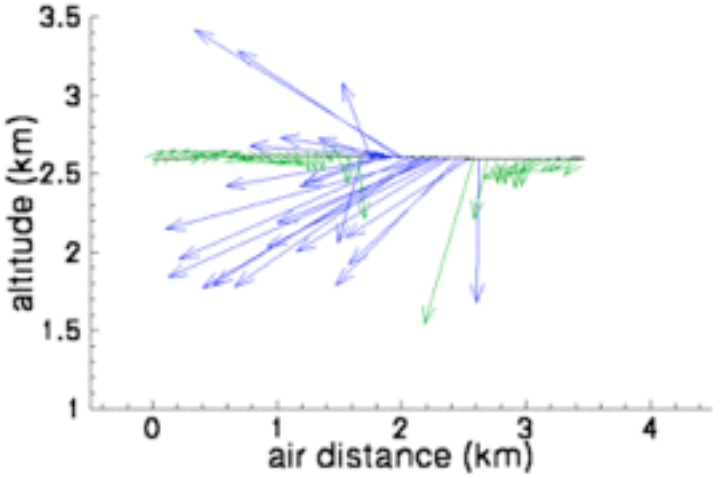
RICO 1/17/2005
3226 m altitude
13:52:40 - 13:54:10
Pass along 250° heading.



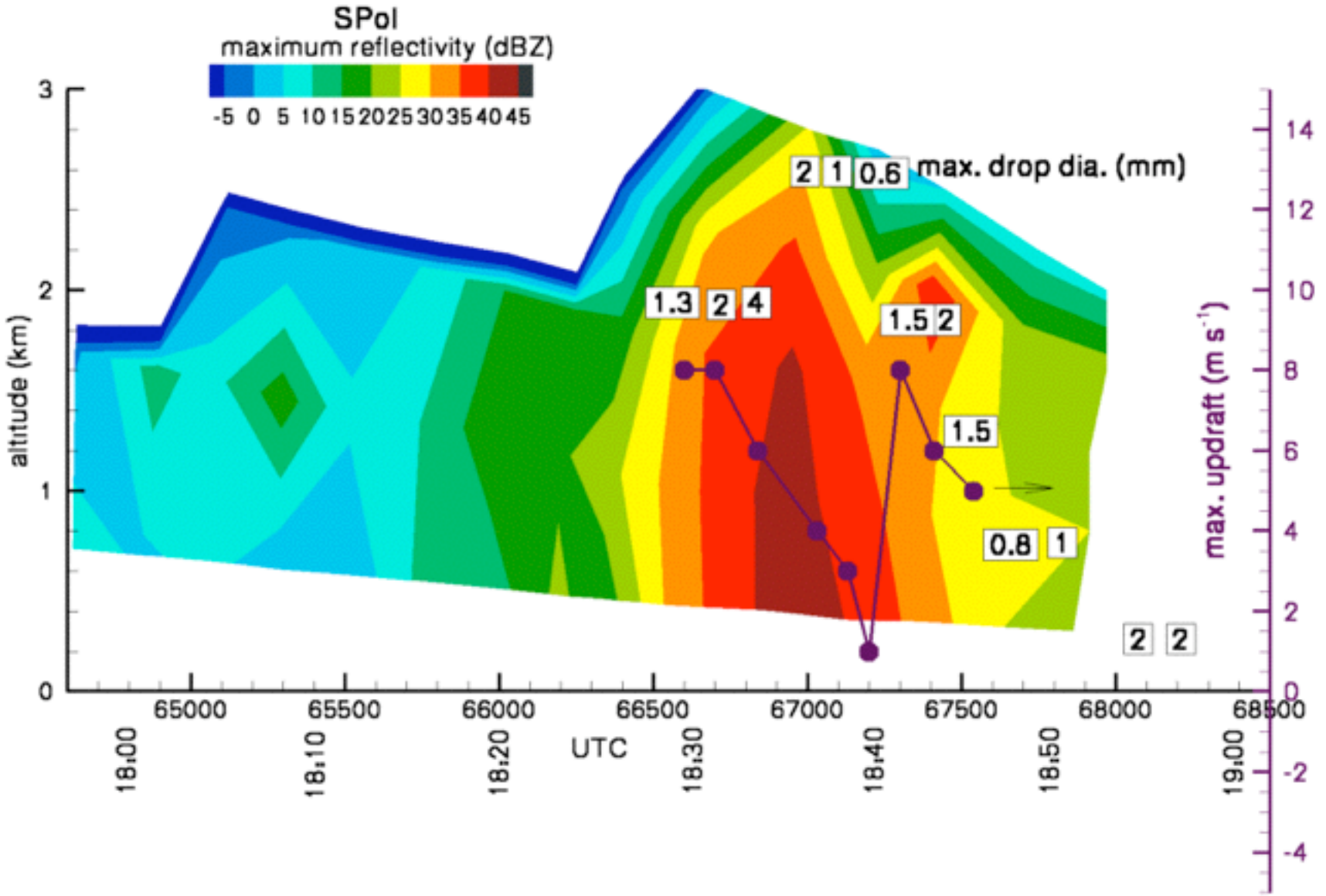
gv 13 Jan 2006 23:48:58







RICO 1/11/2005 18:38:26 - 18:39:02
2620 m altitude pass, 117° heading
air velocity with respect to advecting frame



RICO 1/11/2005 SPol and King Air data for long-lived cell cluster.
SPol maximum reflectivity as color field (can be single pixel).
King Air in situ updraft maxima on right hand scale.
Max. drop sizes from 2D-C and 2D-P probes are
indicated at the altitudes of the penetrations.

maxrefl_w_dia 13 Jan 2006 20:32:23