

King Air N2UW flight report for December 9, 2004

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Original objectives were to do 'Across-Band Flight Pattern' and 'Statistical Studies' .

C130 took off one hour ahead of KA and reported that cloud organization is less linear than expected and more cluster-like. Hence, *statistical studies were moved to first priority.*

A secondary objective was to do *radar beam calibration*, with special maneuvers. This was done at the end of the flight over Barbuda.

Most of the KA flight was conducted along the long axis of a cluster oriented roughly along a 150°-330° direction. Flight legs were varying in length, and also included some repeat sapling of clouds. Coordination with the C130 was loose, confined to assuring that we are on the same cloud cluster. C130 was doing passes along the short axis, i.e. perpendicular to KA passes.

Flight track is in Fig. 1, altitude trace with major parameters is in Fig. 2.

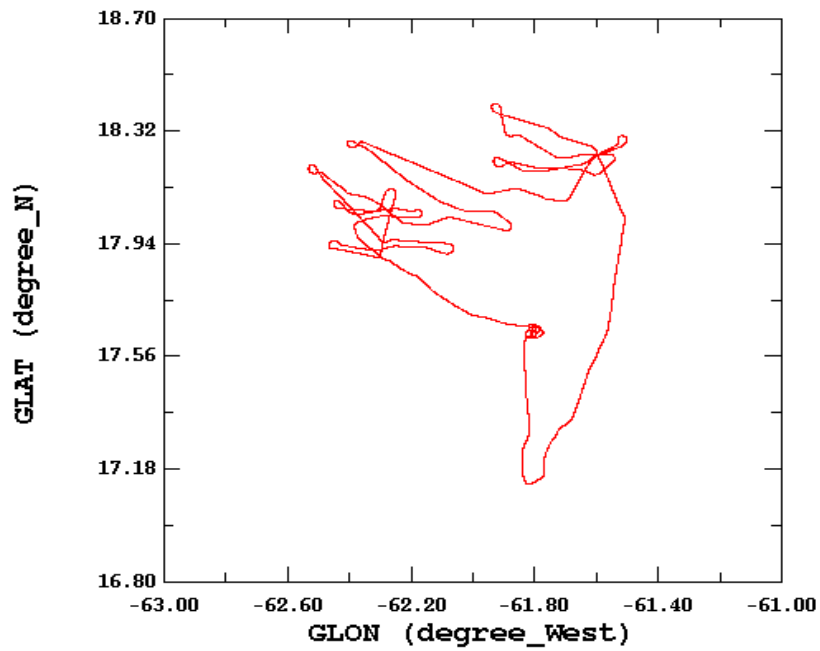
1450 start engines
1455 holding for traffic on runway
1508 T/O
1514 climb and head to target point (030°/80 = 18:23.17/61:21.03) at 6000'
1524 climb to 7000'
1532 radar noise level up, stop and reset
1541 descend to 5100'
1601 pointer set, with 1 km offset
1610 another pointer with 1 km offset
1617 enter cluster at 18:00.80/61:58.30
1630 N end; 90/270; climb to 6000' near very tops of turrets; 18:15.xx/62:19.20
C130 on SW side heading to NE
1643 down to 4000' ,urn around at SE end 18:02.32/61:54:53
1652 series of cells on nose radar – photo; SD mode aiming for the cells
1700 turn around, UD mode
1715 will swap altitudes with C130; KA to 1500'
1726 hd NE to more vigorous clds; C130 reports having seen 12 km outflow from rain shaft earlier; we didn't note any so far
TCAS has C130 indicated about 50% of time
1735 reverse to 150° heading, up to 2500'

1737 hd into echo on nose radar; two small ones
1741 rain; pointer set with 1.5 km offset
1744 return to pointer
1750 moving to Barbados for radar beam calib
1802 SS mode circle
1805 repeat, some rain in vicinity
1807 DD mode circle
1809 repeat
1825 L/D

Cloud elements were fairly vigorous. Updrafts up to 5 m/s. Droplet conc. 50-100 cm⁻³. Radar reflectivities to 20 dBZ, or more

A sample WCR quicklook radar image is shown in Fig. 3 with the corresponding in situ data (at 1 Hz) in Fig. 4. I grabbed this example randomly. This segment is from a pass toward the NW at 2200 m flight altitude. The large arrow in Image 3 indicates the flight level. There are two updraft (~3 m/s) regions of about 1-1.5 km extent. Droplet conc. 50 cm⁻³; LWC to 0.5 g/m³; 2D conc to 10 L⁻¹. The updrafts support the strongest reflectivities which extend up to about 200 m above the flight level. Highest echoes are ~500 m above the flight level. To the NW of the highest turrets, echoes are lower and weaker, and seem to indicate older collapsing turrets. A photograph from a few minutes earlier but at the same altitude is shown in Fig. 5.

RICO, Flight #2
12/9/2004, 14:47:17-18:25:21



	mean	sigma	min	max
GLAT (degree_N), 1 s/sec	17.87	0.38	17.13	18.41
GLON (degree_West), 1 s/sec	-61.96	0.29	-62.53	-61.50

Figure 1 - track

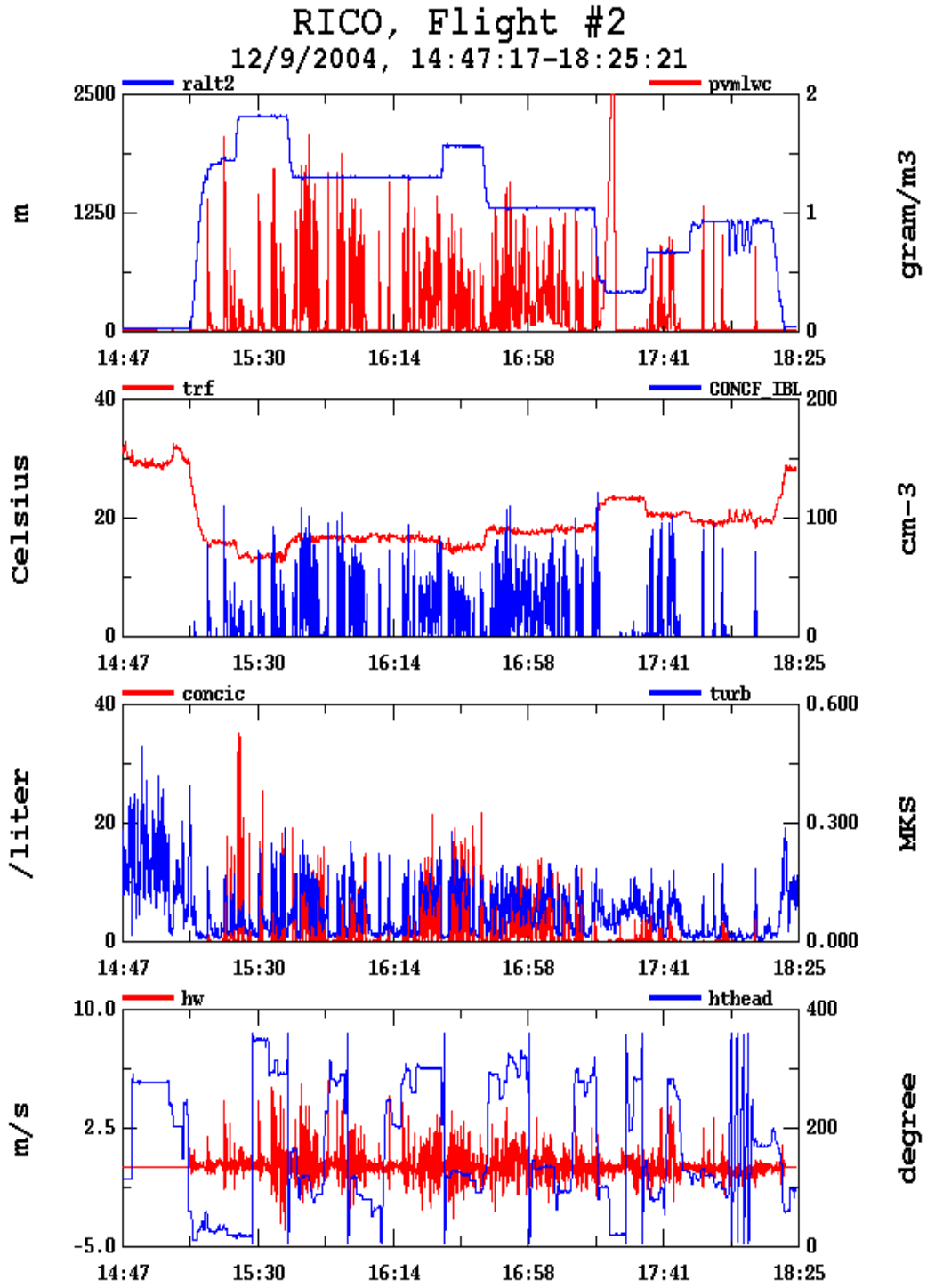


Figure 2 – time series for entire flight

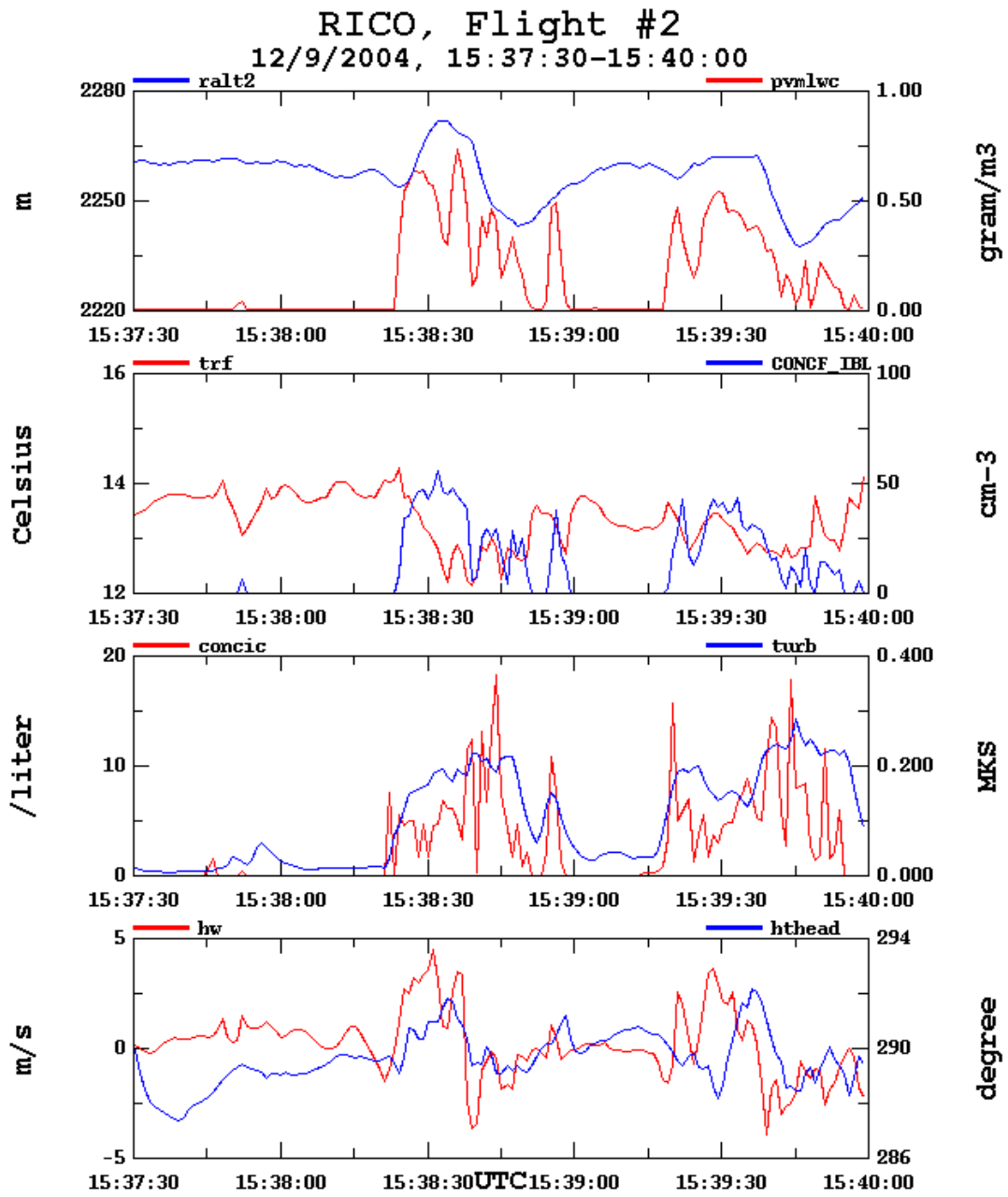
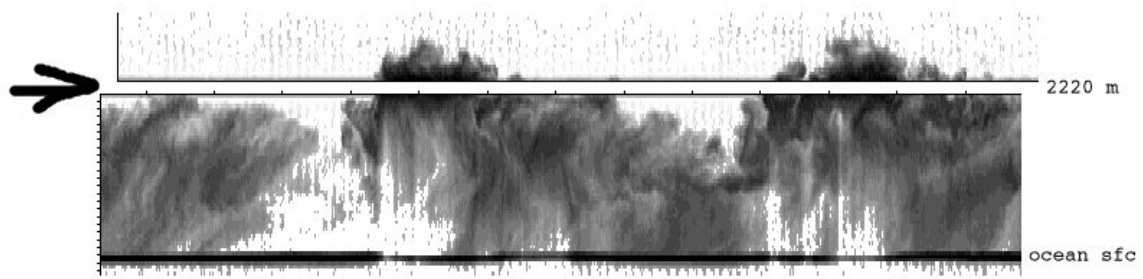


Figure 3 – WCR radar image (above) and corresponding time series of in situ data.



Figure 5. Cloud turret at 2.2 km (taken at 15:34)