Obs:

Report: Two strong cells near Miami
Anvils blowing toward western ground site
Will try E-W legs as far east as we can get

FC:

Summary: Convection should develop mid-afternoon along a synoptic-scale band of enhanced lowlevel moisture convergence extending southwestward from the disturbance in the Atlantic and across Florida. This convergence band is evident in a plethora of cumulus lines and has been a persistent feature of the regional situation since very early yesterday morning. Thus, like yesterday, there should be a tendency for cells to develop parallel to this band, and propagate southwestward across the southern Florida peninsula. Overall, however, the lower atmosphere is wetter than yesterday, so multiple lines from southeast to northwest are expected to develop, as opposed to the single line of yesterday.

Aircraft: All

Log:

1558: Take-off
Start with convective header
Small cells at 25 27 N 81 07W
Work western side
1818: Tops ~ 28kft
Coming in at 10kft for first
1828: Desend to 8kft
Fly leg to east of line
See anvil and no convection
Convection was right where we took the turn
Go to west side of storms
Problems with ATC
Too far north – north of Naples
1841: Got permission for holding pattern on eastern side of storms
Citation – over Whiskey, does spiral
Western ground site (Whiskey)
1846: Flying under anvil of stuff to east at about 33kft
Not much visible – convection mostly gone
1857: Turn towards coast
1909: Parallel to coast
1912: Back on heading – 316°
Parallel to coast
1915: Nice strong cell
Tops ~ 10km
1917: Turn around
1918: Back level
Tops ~ 11km
Strong growing cell at 25 40N 80 40W
Tops ~ 12km
1930: Turn south again to work straight line suggested by NPOL
Go south of storm and then work SW/NE line
25 41N 81 25W (Delta)

1935: Turn onto line past cells
Some cells we sampled earlier

1941: Anvil ~ 14km
Several outflow anvils visible
Tops ~ 15-16km
Have to avoid stuff building

1947: Turned around because of stuff ahead of us
Could not get strongest part of convection

1955: Turn to go on north side of cells to see anvil and cells
1957: Lineup along cells again
Flying underneath anvil

2007: Tops ~ 17km
Anvils streaming NE

2009: All convection past
Turn around over Homestead

2011: Steady on return leg
Get to deep convection again
Need to move a little further north
Storms weaker in general – strong updrafts gone, few new active cells

2020: Turn around
2022: Back on track
2027: Deep convection again
2030: Turn around
2031: Back on track
Convection weaker

2041: Will try to work north side of convection
2047: Flying under anvil on north side
2050: Flying west under anvil
2058: Turn around to avoid radiosonde drop at 25 36N 81 37W
2107: Turn on eastern point
2120: Turn around
2230: ELDORA down – has been rotating to slow for an unknown period
2246: ELDORA up
2248: Back on line under anvil
2303: Break away from anvil documentation
Go to storm to north of us at Ft Myers
2321: Approaching strong cell at Ft Myers
Tops ~ 17km still
2326: Work our way towards west side of convection
2334: Flying on line next to cells
See distinct multiple layers in cloud – mostly stratiform with precipitation, no hard core, this is stage we missed on the previous storm
Flew some distance down anvil
2344: Turn back to get stage
2346: Turn completed
Anvil tops ~ 16km
2352: Turn around and go west again
2356: All convection is gone and only upper-level anvils remain
0000: Break away to go home
0013: Fly straight and level for calibration
0048: Land

Mission Reports:
Twin Otter: The flight was shortened due to the oil door on the left engine opening in-flight. Take-off occurred at 1752Z. The aircraft flew at 5 kft to Everglades, descended to 100 ft, vertical and spiraled up to 10 kft. It then descended below the cloud base and flew to the western ground site before the problem with oil door occurred. At that point, the Twin Otter returned to KWNAF, and landed at 2008Z.

WB-57F: The aircraft took off around 1810Z, flew out west of the peninsula, and then performed a west-to-east transect across the south Florida peninsula. On take-off, the pilot had difficulty achieving the desired altitude rapidly because they were behind Proteus (which cannot ascend as quickly as the WB-57F). The aircraft got to 51 kft by the time they reached the easternmost point; the pilot and backseater reported seeing no clouds on the way out. They performed a spiral descent to approximately 49 kft and began to see clouds. They continued the descent to 40 kft and saw cirrus, below which they sampled at 39 kft. The pilot and backseater saw the aircraft’s own contrail throughout this leg. There was pretty thick cirrus throughout flight between 39 kft and 44 kft. The flight crew described flying through multiple cloud layers. They performed a spiral ascent west of the Florida peninsula up to 51 kft, popped out of the clouds at 50.5 kft, and landed KWNAF at about 2258Z. The aircraft flew through high total-water contents in relatively low cirrus, with some instruments experiencing difficulty as a result. The CAPS instrument showed symmetries in number and volume concentrations flying in and out of clouds at different altitudes, implying vertical homogeneity in sampled clouds. High ice-water content and number density were observed.

Proteus: The aircraft returned to base early because of a failure getting power to the FIRSC instrument. A concern about potential damage to the unheated instrument prompted an early return in order to prevent freezing the instrument.

ER-2: The aircraft flew a more-or-less east-west line over the peninsula between the ground sites at 65 kft. The first sonde was dropped east of the peninsula; the remaining three sondes were dropped later west of the peninsula. The pilot noted that clouds were observed to slope upwards rapidly from low levels over Miami to approximately 50 kft feet further west.

Citation: The aircraft launched at 1837Z and headed toward the western ground site. An orphan anvil base was visible at 27 kft. The flight crew performed a Lagrangian spiral up southwest of the western ground site to 33 kft through the anvil, down to 27 kft, and then back up to 34.5 kft. They estimated the cloud tops to be at 49 kft. They then flew a more-or-less W-E line along the winds carrying the anvils, sampling at various levels. The CPI and 2DC instruments retrieved a lot of good crystal imagery. The aircraft returned to KWNAF at 2253Z.

P-3: The aircraft took off at 1500Z, and flew roughly the same line under anvils on the south side of the convection as the WB-57F and Citation. The flight level was 5 kft. The flight crew tried moving to the north side of the convection, but they were blocked by ATC. Convection was observed with ELDORA to about 17 km. At 2050Z, the aircraft moved off to the west coast and underflew an anvil system. At 2300Z, they flew to a storm system north of Ft. Myers. Cloud tops were observed to 17+ km. The aircraft made two passes under the anvil, and by then the storm had dissipated. The aircraft returned to base around 0048Z.

Summary: A relatively isolated convection system and its persistent anvil were sampled extensively on this flight. This case should be useful for modeling studies. Sea-breeze convection kicked off on the east peninsula around 1600Z and developed a fast-moving anvil that traversed west rapidly over the western ground site by around 1830Z. Afternoon isolated Cbs in south central Florida began around 1930Z. A cirrus deck developed and moved west, and was sampled extensively by the WB-57F and Citation. The P-3 made measurements of the same line as the other planes on the south side of the convective activity.
Flight Path & Focus:  171730 245304, rf05
Line 1:  184930 193540  
NW-SE orientation, along west coast of south Florida south side of line 
sea-breeze convection-anvil system, anvils over western ground site 
convection 
coordination w/Citation WB-57F 
Quality:  Ok/Bad – not much 
Part 1:  184930 193540  
not much visible 
convection mostly gone 
no anvil present 
leg_1.1.1:  184930 185650  
not too much detectable 
leg_1.1.2:  185730 190300  
nothing 
leg_1.1.3:  190330 191110  
leg_1.1.4:  191140 191720  
low tops, some convection starting 
leg_1.1.5:  191740 192420  
strong core 
leg_1.1.6:  192450 193010  
strong core 
leg_1.1.7:  193030 193540  

Line 2:  200150 230400  
E-W orientation, south Florida near west coast 
convection-anvil system 
no coordination 
some previous sampled stuff 
Quality:  Good – nice anvil 
Part 1:  200150 204050  
E-W orientation 
convection 
leg_2.1.1:  200150 201010  
higher tops from Line 1 
leg_2.1.2:  201040 202110  
a little outflow 
leg_2.1.3:  202120 203010  
hard core 
leg_2.1.4:  203020 204050  
hard core 
Part 2:  204920 230400  
E-W orientation, move north 
anvil 
shorter legs 
anvil at parts and anvil plus convection at other parts 
leg_2.2.1:  204930 205720  
nice anvil 
leg_2.2.2:  205750 210810  
some convection under anvil 
leg_2.2.3:  210830 211840  
leg_2.2.4:  211910 212930  
lengthen legs between 4-5 - move to avoid dropsonde 
leg_2.2.5:  213000 215430  
anvil detached, flying under anvil 
leg_2.2.6:  215500 221600  
nothing at west end – end lengthened to 
leg_2.2.7:  221630 223230  
mammatus, ELDORA down 
leg_2.2.8:  223300 224700  
ELDORA down 
leg_2.2.9:  224730 230400  
convection gone 

Line 3:  233520 240000  
Ft Myers area, SWW-NEE orientation 
convection-anvil system 
no coordination 
Quality:  Excellent 
Part 1:  233520 240000  
very nice 
layered clouds 
leg_3.1.1:  233520 234500  
strong convection, outflow at top both sides 
leg_3.1.2:  234530 235130  
anvil detached
CRYSTAL-FACE, Flight #rf05
07/16/2002, 18:49:30-19:35:40

LATC (deg)  |  mean  |  sigma  |  min  |  max
---         |  ---   |  ---    |  ---  |  ---
1 s/sec     |  25.41 |  0.11   |  25.15|  25.61

LONC (deg)  |  mean  |  sigma  |  min  |  max
---         |  ---   |  ---    |  ---  |  ---
1 s/sec     |  -81.24|  0.13   |  -81.49|  -80.98
CRYSTAL-FACE, Flight #rf05
07/16/2002, 20:01:50-23:04:00

LATC (deg)
-83.00 -82.40 -81.80 -81.20 -80.60 -80.00

LONC (deg)
25.85 25.31 25.77 25.23 24.69 24.15

LATC (deg), 1 s/sec
LONC (deg), 1 s/sec
{xmw, sigma, min, max}
25.53 0.08 25.34 25.69
-81.38 0.50 -92.47 -80.38
CRYSTAL-FACE, Flight #rf05
07/16/2002, 23:35:20-24:00:00

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