

**NOAA G-IV N49RF ERROR SUMMARY**  
**HURRICANE 2010**  
**31 Aug 2010 Hurricane Earl (NHC Surveillance)**  
**TBPB →KMCF**

**Flight ID: 100831N**

| <u>Sensor or system</u> | <u>Number or Name</u> |
|-------------------------|-----------------------|
| Accelerometer           | ACINS                 |
| Altitude                | PALT                  |
| Attack Angle            | AKRD2                 |
| Dew Point Probe         | DPR                   |
| Dynamic Pressure        | QC2M                  |
| Geopotential Altitude   | GPGALT                |
| Inertial Selected       | VEW, VNS              |
| Static Pressure         | PS2M                  |
| Slip Angle              | SSRD1                 |
| Temperature Probe       | AT3/TT3               |
| True Airspeed           | TAS2                  |
| Constants File          | 49cal093              |
| Project Directory       | acdata/2010/MET       |

|                            |                 |                 |
|----------------------------|-----------------|-----------------|
| Local Met Data             | Takeoff (1716z) | Landing (0133z) |
| Aircraft Static Pressure   | 1002.2 mb       | N/A mb          |
| Tower Pressure (corrected) | 1002.8 mb       | 1015.4 mb       |

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**Notes:**

Near the end of the mission (at 00:13:41z) the MADS data system crashed. Over the next 30 minutes, the system came back up and repeatedly crashed again and again. The R.nc file ends at the first crash time listed above. There was no effort to collect the flight level data fragments from the remaining data system archive files.

All Inertial 2 (PITR) and Honeywell 2 GPS (SG2) values spiked to zero for at least 3 seconds at 18, 19, 20, 21, 22, 23, and 0000z. After 0000z there is no data from any of these sources. Inertial 1 is default.

DADC Pressure Altitude (ADCPALT) was consistently approx 100 meters higher than NACA Pressure Altitude (PALT) during cruise. The APN-232 Radar derived Geopotential Altitude (HGALT) was 100 meters or more lower than Collins GPS derived Geopotential Altitude (GPALT) during cruise. HGALT also spiked occasionally with 300-500 meter downward spikes (that gradually worked back to level). There were two much larger downward spikes of

almost 9000 meters between 1810 and 1812z.

The Left Dew Point sensor (DPL) again read far too high through the entire flight. At times it read 15C or more higher than AT3, and 20-25C or more higher than DPR (which compared favorably to rawinsonde data). There were four instances of brief slight supersaturation (around 1804z, 2116z, 2345z and 0040z during descent prior to landing) where the RH exceeded 100%. The Air Data Computer Attack Angle (ADCAOA) was again consistently 0.5 degrees higher than the Left and Right Attack Angle sensors (AKRD1 and AKRD2).

The bottom Sideslip Angle (SSRD2) shows about a +1.25 degree bias throughout the flight. SSRD1 (the top Sideslip Angle probe) is the default and displays a mean value of -0.15 degrees through most of the cruise portion of flight. However, there was one major deviation of SSRD1 (that was not correlated with any aircraft roll or other unusual maneuver) that began at 00:17:35z. SSRD1 first dropped from near zero to -47.7 degrees then spiked up to +116.9 degrees then settled back to near zero by 00:17:41z.

Vertical Winds look fine during the cruise portion of flight but then show a high bias (+1.31 in the accompanying figure) during descent prior to landing (cal flight needed).

All other flight level instruments worked optimally during the flight.

There were 33 drop points originally assigned by NHC. In addition, Jason Dunion of HRD requested three additional drops for research data on our return leg north of the Bahamas (between NHC Drop Pts 30 and 33). Forty one AVAPS I dropsondes (41) were deployed during the mission. Of those 41 drops, 33 were good and transmitted to Miami for ingestion into the 01/0000z model runs (there were six fast falls and two sonde failures). So all 33 points ended up being covered, however, two of the three extra drops that were to be HRD research sondes needed to be used to cover two of the points near the end so HRD was only charged for one sonde.

Of the 33 good sondes, 19 coded surface winds, another 13 coded a "LAST WIND" remark of between 12 and 20 meters above the surface. The sonde at Pt #22 had no winds below 109 meters.

Flight Directors: Richard Henning and Jack Parrish (813) 828-3310 ext. 3086

**U.S. Dept. of Commerce / NMAO / NOAA / Aircraft Operations Center**

8+17  
8+36

|                            |                                     |                          |
|----------------------------|-------------------------------------|--------------------------|
| Flt ID: <b>100831N</b>     | From: <b>TBPB</b>                   | To: <b>KMCF</b>          |
| Flt. No: <b>10 - 099</b>   | Blk In: <del>0143</del> <b>0143</b> | Time On: <b>0133</b> z   |
| ETD: <b>17302</b> z        | Blk Out: <b>1707</b> z              | Time Off: <b>1716</b> z  |
| ETE: <b>8.5</b>            | Blk Time: <b>8.6</b> Hrs            | Flt Time: <b>8.3</b> Hrs |
| Sponsoring Org: <b>DLH</b> | Program: <b>Surveillance</b>        | Purpose: <b>H-Ear</b>    |

**AOC Flight Crew**

|                                       |                              |
|---------------------------------------|------------------------------|
| Aircraft Commander: <b>Gloue</b>      | Data System: <b>DeFo</b>     |
| Co-Pilot: <b>Twining</b> <b>Tooth</b> | AVAPS: <b>Miller</b>         |
| Navigator: <b>TDR</b>                 | System Eng: <b>Goldstein</b> |
| Flight Eng: <b>Parrish</b>            | A A: <b>Henning</b>          |
| Flight Director: <b>Henning</b>       | A A: <b>Henning</b>          |
| Avionics: <b>Henning</b>              | Crew Chief: <b>Henning</b>   |

**Participating Scientists / Visitors**

| Name (Last, First) | Activity on Aircraft | Affiliation |
|--------------------|----------------------|-------------|
|                    |                      |             |
|                    |                      |             |
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|                    |                      |             |
|                    |                      |             |

**Remarks (Storm Name, Mission ID, Recco Times, Fix Times)**

Storm Name: **Earl**      takeoff alt **29.80** **Q1009** **TBPB**

Mission ID: **00AA9 0707A**

Penetration number and time: **Planned 33 drops**      **060/13 29.99**      landing wx **KMCF**  
**1692 31/25 1010**      **27/24**

(See reverse for additional remarks)

Page 1  
CH#

FLIGHT ID/Storm *Earl D08312*

AVAPS OPERATOR

FLIGHT DIRECTOR

*Upning  
arr 15*

| Drop# | Ob # | Launch Time | Sonde ID | Sig Wx           | Splash Pressure | Transmission Time | Notes                                     |
|-------|------|-------------|----------|------------------|-----------------|-------------------|-------------------------------------------|
| ①     | 1    | 180729      | 9048     | sct TCU          | 1010.4          | 182948            | dry 68% <i>025/15</i>                     |
| ②     | 2    | 182547      | 9129     | broken altocir   | 1011.4          | 184918            | more moist <i>105/19</i>                  |
| ①     | 3    | 184125      | 9023     | few cu           | 1012.7          | 190148            | 65% 2500 ft <i>100/24</i>                 |
| ②     | 4    | 185907      | 9015     | in soup          | 1010.7          | 192918            | <i>118/11.2</i>                           |
| ①     | 5    | 190924      | 9047     | undercast        | 1010.1          | 193632            | LST WND 015 <i>(None)</i>                 |
| ②     | 6    | 192415      | 9152     | undercast        | 1010.9          | 194353            | <i>108/13.3</i>                           |
| ①     | 7    | 193443      | 9132     | "                | 1012.7          | 195250            | <i>102/13.2</i>                           |
| ②     | 8    | 194419      | 9113     | thin undercast   | 1014.7          | 200413            | <i>100/22.6</i>                           |
| ①     | 9    | 195844      | 9116     | undercast        | 1013.1          | 201624            | Moist 23K-38K <i>100/27</i>               |
| ②     | 10   | 200709      | 9147     | "                | 1014.9          | 202528            | dry 600-3500 ft <i>105/19</i>             |
| ①     | 11   | 201751      | 9056     | "                | 1014.6          | 203903            | Strong winds high <i>090/23</i>           |
| ②     | 12   | 202947      | 9032     | "                | 1013.2          | 205137            | <i>095/23</i>                             |
| ⑤     | 13   | 2046        | 9128     | Top of undercast | 1011.6          | 210434            | L5 <i>090/24</i>                          |
| ①     | 14   | 205657      | 9045     | Fast fall        |                 |                   |                                           |
| ②     | 15   | 205918      | 9028     | In the soup      | 1009.5          | 212627            | LST WND 13 <i>100 SE wind</i>             |
| ⑤     | 16   | 2108        | 9045     | Over undercast   | 1008.3          | 213410            | LST WND 12 <i>100 SE wind</i>             |
| ①     | 17   | 212017      | 9097     | Undercast        | 1007.4          | 214358            | LST WND 10 <i>16' SE wind</i>             |
| ②     | 18   | 213114      | 9060     | Fast fall        |                 |                   | <i>177</i>                                |
| ④     | 19   | 213304      | 9036     | Bad Temp No ATU  |                 |                   | <i>177</i>                                |
|       | 20   | 213545      | 9116     | IMC              | 1004.6          | 215910            | L5 260/41 <i>177</i>                      |
| ①     | 21   | 214252      | 9006     | FAST FALL        |                 | 223928            | <i>178</i>                                |
| ②     | 22   | 214448      | 9122     | IMC              | 1002.3          | 220409            | 215/25 <i>178</i>                         |
| ④     | 23   | 215345      | 9046     | IMC              | 1004.3          | 221455            | LST WND 20 <i>19</i>                      |
| ①     | 24   | 220636      | 9113     | Over low         | 1003.0          | 222647            | LST WND 14 <i>Light cat.</i>              |
| ②     | 25   | 221338      | 9055     | Over low         | 1002.4          | 223343            | LST WND 13 <i>"</i>                       |
| ②     | 26   | 222406      | 9025     | "                | 1005.1          | 224626            | Lost wind below 8000 ft <i>10 SE wind</i> |
| ①     | 27   | 223427      | 9011     | Overcast         | 1007.9          | 225713            | LST WND 18 <i>10 SE wind</i>              |
| ②     | 28   | 224418      | 9014     | Top of CDO       | 1008.3          | 230305            | 24/17                                     |
| ④     | 29   | 225347      | 9166     | "                | 1010.3          | 231317            | LST WND 14                                |
| ①     | 30   | 230353      | 9057     | Undercast        | 1010.7          | 232517            | LST WND 12 <i>10 SE wind</i>              |
| ②     | 31   | 231536      | 9008     | Thin undercast   | FAST FALL       |                   |                                           |
| ④     | 32   | 231746      | 9012     | FAST FALL        |                 |                   |                                           |
| L5    | 33   | 231945      | 9009     | Dark             | 1014.4          | 233931            | L5 085/24                                 |
| ①     | 34   | 232623      | 9049     | ↓                | 1014.4          | 234639            | LST WND 13                                |
| ②     | 35   | 234454      | 9007     | ↓                | 1012.6          | 000617            | LST WND 16                                |

| FLIGHT ID/Storm |      | AVAPS OPERATOR      |          | FLIGHT DIRECTOR |                 |                   |                |
|-----------------|------|---------------------|----------|-----------------|-----------------|-------------------|----------------|
| Drop#           | Ob # | Launch Time         | Sonde ID | Sig Wx          | Splash Pressure | Transmission Time | Notes          |
| ① 36            | 30   | 235342              | 9016     | Right           | 1012.8          |                   | HAD Sonde 1    |
| ① 37            | 31   | 000016              | 9004     | FASTFALL        |                 |                   |                |
| ② 38            | 30   | 000225              | 9109     | Right           | 1011.7          | 0021352           | Obd/24         |
| 39              | 31   | 000201              | 9114     | ↓               | 1012.8          | 002805            | HAD Sonde 2-17 |
| 40              | 32   | 002412              | 9056     | Right           | 1010.6          | 004906            | HAD Sonde 3    |
| 7               |      | Winds crashed again |          |                 | 00272           |                   |                |
| ② 41            | 33   | 004536              | 9053     | Right           | 1014            | 010706            | Very dry       |
| 9               |      |                     |          |                 |                 |                   |                |
| 10              |      |                     |          |                 |                 |                   |                |
| 11              |      |                     |          |                 |                 |                   |                |
| 12              |      |                     |          |                 |                 |                   |                |
| 13              |      |                     |          |                 |                 |                   |                |
| 14              |      |                     |          |                 |                 |                   |                |
| 15              |      |                     |          |                 |                 |                   |                |
| 16              |      |                     |          |                 |                 |                   |                |
| 17              |      |                     |          |                 |                 |                   |                |
| 18              |      |                     |          |                 |                 |                   |                |
| 19              |      |                     |          |                 |                 |                   |                |
| 20              |      |                     |          |                 |                 |                   |                |
| 21              |      |                     |          |                 |                 |                   |                |
| 22              |      |                     |          |                 |                 |                   |                |
| 23              |      |                     |          |                 |                 |                   |                |
| 24              |      |                     |          |                 |                 |                   |                |
| 25              |      |                     |          |                 |                 |                   |                |
| 26              |      |                     |          |                 |                 |                   |                |
| 27              |      |                     |          |                 |                 |                   |                |
| 28              |      |                     |          |                 |                 |                   |                |
| 29              |      |                     |          |                 |                 |                   |                |
| 30              |      |                     |          |                 |                 |                   |                |
| 31              |      |                     |          |                 |                 |                   |                |
| 32              |      |                     |          |                 |                 |                   |                |
| 33              |      |                     |          |                 |                 |                   |                |
| 34              |      |                     |          |                 |                 |                   |                |
| 35              |      |                     |          |                 |                 |                   |                |

NOT  
xmt  
PT 30  
PT 30  
PT 31  
0.91 xmt  
075  
116 xmt.

## NOAA • AOC • SED

## N49RF AVAPS DROP LOG

Lead Tech: Gabe Defeo

Project : Hurricane '10 Mission: HURR EARLFlight ID: 100831NTake Off: 170

Landing: \_\_\_\_\_

Flt Dir: PARISH

| Drop # | Sonde Serial #                       | Rcvr # | Press Offset | Launch Time | Winds Time | Operator | Charge \$\$ To | Comments                 | Good ? |
|--------|--------------------------------------|--------|--------------|-------------|------------|----------|----------------|--------------------------|--------|
| 1      | 0924 <sup>29</sup> <del>92</del> 048 | 1      | 0            | 1807        | 7          | GD       | NHC            |                          |        |
| 2      | 092429 129                           | 2      | 0            | 1825        | 6          | GD       |                |                          |        |
| 3      | 092439 023                           | 1      | 0            | 1841        | 8          | GD       |                |                          |        |
| 4      | 092429 015                           | 2      | 0            | 1859        | 4          |          |                |                          |        |
| 5      | 092429 047                           | 1      | 0            | 1909        | 6          |          |                |                          |        |
| 6      | 092429 152                           | 2      | 0            | 1924        | 5          |          |                |                          |        |
| 7      | 092819 132                           | 1      | 0            | 1934        | 6          |          |                |                          |        |
| 8      | 092329 113                           | 2      | 0            | 1944        | 5          |          |                |                          |        |
| 9      | 092429 116                           | 1      | 0            | 1958        | 7          |          |                |                          |        |
| 10     | 091849 147                           | 2      | 0            | 2007        | 6          |          |                |                          |        |
| 11     | 091849 056                           | 1      | 0            | 2017        | 8          |          |                |                          |        |
| 12     | 091849 032                           | 2      | 0            | 2029        | 5          |          |                |                          |        |
| 13     | 0923 <sup>29</sup> <del>92</del> 128 | 5      | 0            | 2046        | 5          |          |                | FREQ MISMATCH<br>GOOD LS |        |
| 14     | 091849 045                           | 1      | 0            | 2056        | 5          |          |                | FAST FALL                |        |
| 15     | 091929 028                           | 2      | 0            | 2059        | 8          |          |                |                          |        |
| 16     | 092819 105                           | 5      | 0            | 2108        | 5          |          |                | FREQ MISMATCH<br>GOOD LS |        |
| 17     | 0923 <sup>29</sup> <del>92</del> 097 | 1      | 0            | 2120        | 13         |          |                |                          |        |
| 18     | 091929 066                           | 2      | 0            | 2131        | —          |          |                | FAST FALL                |        |
| 19     | 092349 036                           | 5      | 0            | 2133        |            |          |                | PTH NOGOOD               |        |
| 20     | 092819 116                           | 1      | 0            | 2135        |            |          |                |                          |        |
| 21     | 091849 006                           | 1      | 0            | —           |            |          |                | FAST FALL                |        |
| 22     | 092929 122                           | 2      | 0            | 2144        | 5          |          |                |                          |        |
| 23     | 092429 046                           | 4      | 0            | 2153        | 7          |          |                |                          |        |
| 24     | 091849 055                           | 2      | 0            | 2213        | 5          |          |                |                          |        |
| 25     | 092349 025                           | 4      | 0            | 2224        | 2:00       |          |                | LATE WINDS               |        |
| 26     | 092439 011                           | 1      | 0            | 2234        | 23         |          |                |                          |        |
| 27     | 092329 014                           | 2      | 0            | 2244        | 17         |          |                |                          |        |
| 28     | 092429 166                           | 4      | 0            | 2253        | 6          |          |                |                          |        |
| 29     | 091929 057                           | 1      | 0            | 2303        | 1:13       |          |                |                          |        |
| 30     | 092439 008                           | 2      | 0            | 2315        | 8          |          |                | FAST FALL                |        |
| 31     | 091849 012                           | 4      | 0            | 2317        | —          |          |                | FAST FALL                |        |
| 32     | 092439 009                           | 1      | 0            | 2319        | 50         |          |                | BACK UP                  |        |
| 33     | 092349 049                           | 1      | 0            | 2326        | 6          |          |                |                          |        |
| 34     | 092439 007                           | 2      | 0            | 2344        | 5          |          |                |                          |        |

| 100831n.log     | Latitude   | Longitude  | Press  | Temp  | DP    | WD    |
|-----------------|------------|------------|--------|-------|-------|-------|
| 16:36:58        | 13 04.64'N | 59 29.44'W | 1002.9 | 33.9  | 21.5  | 344.6 |
| 17:16:59        | 13 05.81'N | 59 25.08'W | 904.7  | 22.4  | 16.8  | 24.5  |
| off at 1716Z    |            |            |        |       |       |       |
| 17:33:35        | 14 49.43'N | 59 34.57'W | 348.0  | -22.5 | -37.6 | 11.2  |
| 18:07:29        | 19 00.10'N | 60 00.28'W | 179.0  | -55.6 | -64.6 | 35.4  |
| 18:25:47        | 21 00.06'N | 60 59.43'W | 179.1  | -56.0 | -65.1 | 315.8 |
| 18:41:25        | 22 53.32'N | 61 03.87'W | 176.4  | -56.0 | -65.8 | 258.8 |
| 18:59:08        | 21 59.40'N | 63 00.84'W | 170.9  | -58.2 | -66.3 | 193.4 |
| 19:09:26        | 21 10.09'N | 63 56.28'W | 171.1  | -58.5 | -65.4 | 240.5 |
| 19:24:21        | 23 00.65'N | 63 57.71'W | 171.1  | -57.9 | -65.9 | 263.0 |
| 19:34:44        | 24 00.33'N | 62 59.69'W | 171.1  | -58.5 | -63.1 | 260.9 |
| 19:44:34        | 24 58.37'N | 62 11.63'W | 163.2  | -59.4 | -67.3 | 251.3 |
| 19:58:46        | 25 09.22'N | 63 50.34'W | 163.1  | -60.6 | -67.9 | 236.5 |
| 20:07:11        | 26 00.60'N | 63 05.11'W | 163.3  | -60.0 | -68.8 | 244.6 |
| 20:17:51        | 26 54.38'N | 64 00.75'W | 163.4  | -60.9 | -69.3 | 224.1 |
| 20:29:54        | 25 59.57'N | 65 01.26'W | 163.4  | -61.4 | -67.4 | 207.0 |
| 20:46:07        | 25 06.91'N | 66 44.00'W | 163.3  | -61.1 | -66.1 | 174.7 |
| 20:56:57        | 24 05.21'N | 66 00.09'W | 159.3  | -61.2 | -64.7 | 171.5 |
| fall            |            |            |        |       |       |       |
| 20:59:22        | 23 49.10'N | 65 56.02'W | 155.5  | -62.1 | -65.6 | 178.0 |
| (2nd try)       |            |            |        |       |       |       |
| 21:08:21        | 22 47.49'N | 65 42.54'W | 155.4  | -60.8 | -65.8 | 193.4 |
| 21:20:21        | 21 24.38'N | 65 56.24'W | 154.9  | -62.1 | -65.0 | 180.9 |
| Offset Pt 16    |            |            |        |       |       |       |
| 21:31:16        | 20 26.98'N | 66 50.99'W | 155.5  | -61.2 | -63.8 | 201.0 |
| fast fall       |            |            |        |       |       |       |
| 21:33:09        | 20 20.67'N | 67 03.45'W | 155.4  | -60.8 | -63.8 | 195.6 |
| 2nd try no good |            |            |        |       |       |       |
| 21:35:47        | 20 12.30'N | 67 21.30'W | 155.5  | -60.8 | -64.3 | 199.4 |
| 3rd try         |            |            |        |       |       |       |
| 21:42:53        | 19 52.99'N | 68 09.86'W | 155.7  | -60.7 | -64.1 | 217.9 |
| Fast Fall       |            |            |        |       |       |       |
| 21:44:44        | 19 53.04'N | 68 23.47'W | 155.6  | -60.8 | -64.4 | 223.8 |
| 2nd try         |            |            |        |       |       |       |
| 21:53:50        | 19 57.17'N | 69 30.81'W | 155.7  | -59.2 | -64.1 | 235.5 |
| 22:06:41        | 20 49.02'N | 70 51.30'W | 155.6  | -58.5 | -63.8 | 255.2 |
| 22:13:37        | 21 30.71'N | 71 23.62'W | 155.4  | -59.9 | -65.4 | 228.6 |
| 22:24:06        | 22 48.45'N | 71 41.41'W | 152.0  | -60.6 | -68.2 | 202.8 |
| 22:34:29        | 24 07.12'N | 71 22.79'W | 151.6  | -61.1 | -69.0 | 171.7 |
| 22:44:18        | 25 09.00'N | 70 32.85'W | 148.1  | -62.7 | -71.1 | 179.4 |
| 22:53:47        | 25 42.45'N | 69 21.11'W | 148.2  | -61.5 | -70.8 | 180.0 |
| 23:03:53        | 25 45.93'N | 68 01.78'W | 148.2  | -66.0 | -73.4 | 163.1 |
| 23:15:40        | 27 01.62'N | 67 04.72'W | 148.3  | -61.2 | -71.9 | 233.4 |
| Fast Fall       |            |            |        |       |       |       |
| 23:17:46        | 27 14.23'N | 67 14.05'W | 148.3  | -61.9 | -71.8 | 230.4 |
| (2nd try FF)    |            |            |        |       |       |       |
| 23:19:47        | 27 24.96'N | 67 24.80'W | 148.2  | -61.8 | -72.0 | 235.0 |
| (3rd try)       |            |            |        |       |       |       |
| 23:26:26        | 27 56.14'N | 68 02.05'W | 148.3  | -62.3 | -72.3 | 233.5 |
| 23:44:52        | 27 00.49'N | 70 00.86'W | 148.1  | -62.3 | -72.6 | 205.0 |
| 23:53:48        | 27 00.25'N | 71 09.59'W | 148.1  | -60.0 | -71.9 | 214.8 |
| #1              |            |            |        |       |       |       |
| 00:00:17        | 27 00.04'N | 72 00.45'W | 148.3  | -61.3 | -71.2 | 224.2 |

|         |         |         |         |       |       |       |       |          |          |  |
|---------|---------|---------|---------|-------|-------|-------|-------|----------|----------|--|
| 100831n |         |         |         |       |       |       |       |          |          |  |
| WS      | MSL Alt | G Alt   | Heading | Track | TAS   | GS    | V Vel | Event    | Comments |  |
| 11.3    | 43.6    | 43.6    | 344.3   | 225.0 | 11.3  | 0.1   | 0.01  | test     |          |  |
| 3.0     | 946.4   | 944.6   | 54.4    | 56.2  | 120.1 | 117.5 | 3.10  | Out at   | 1707Z    |  |
| 2.1     | 8644.9  | 8618.8  | 355.1   | 354.7 | 226.8 | 224.7 | 7.48  | Climbing |          |  |
| 14.8    | 13233.2 | 13186.4 | 346.7   | 344.0 | 229.3 | 219.7 | 0.09  | Sonde 1  |          |  |
| 5.0     | 13247.5 | 13202.2 | 346.9   | 346.9 | 229.8 | 225.5 | 0.13  | Sonde 2  |          |  |
| 15.1    | 13339.7 | 13295.5 | 300.0   | 303.7 | 230.3 | 219.4 | 2.68  | Sonde 3  |          |  |
| 11.0    | 13536.3 | 13490.3 | 232.4   | 235.9 | 228.5 | 220.3 | 0.74  | Sonde 4  |          |  |
| 14.9    | 13507.2 | 13460.7 | 294.8   | 296.1 | 229.9 | 221.1 | 0.24  | Sonde 5  |          |  |
| 14.3    | 13518.1 | 13473.1 | 22.4    | 24.8  | 227.6 | 234.8 | -0.37 | Sonde 6  |          |  |
| 14.9    | 13510.0 | 13466.0 | 40.9    | 43.1  | 226.6 | 238.2 | 0.21  | Sonde 7  |          |  |
| 19.0    | 13827.6 | 13782.7 | 306.1   | 311.8 | 227.1 | 217.1 | 0.32  | Sonde 8  |          |  |
| 20.6    | 13812.6 | 13768.0 | 19.6    | 20.7  | 227.5 | 243.9 | -0.48 | Sonde 9  |          |  |
| 24.1    | 13808.5 | 13764.8 | 351.4   | 357.7 | 227.1 | 235.4 | 0.09  | Sonde 10 |          |  |
| 32.6    | 13803.4 | 13760.6 | 261.0   | 267.3 | 225.3 | 200.4 | 0.23  | Sonde 11 |          |  |
| 30.6    | 13802.0 | 13758.3 | 233.3   | 236.6 | 225.0 | 197.9 | -0.60 | Sonde 12 |          |  |
| 21.3    | 13812.3 | 13767.7 | 186.8   | 188.9 | 225.6 | 204.9 | 0.29  | Sonde 13 |          |  |
| 12.9    | 13966.5 | 13920.0 | 159.7   | 158.5 | 228.1 | 215.5 | 3.95  | Sonde 14 | fast     |  |
| 9.9     | 14115.1 | 14067.6 | 168.7   | 168.3 | 225.8 | 216.0 | -0.05 | Sonde 15 | Pt 14    |  |
| 7.7     | 14115.6 | 14067.1 | 182.6   | 181.6 | 227.2 | 219.6 | -0.14 | Sonde 16 | Pt 15    |  |
| 12.4    | 14134.8 | 14085.0 | 214.5   | 216.2 | 231.6 | 221.3 | -0.84 | Sonde 17 |          |  |
| 12.1    | 14113.9 | 14063.3 | 231.5   | 232.7 | 226.3 | 215.9 | 0.16  | Sonde 18 | Pt 17    |  |
| 12.7    | 14120.4 | 14069.7 | 242.0   | 244.3 | 227.1 | 218.4 | -0.26 | Sonde 19 | Pt 17    |  |
| 13.0    | 14110.2 | 14059.4 | 242.1   | 244.2 | 227.8 | 218.4 | 0.14  | Sonde 20 | Pt 17    |  |
| 17.8    | 14098.9 | 14047.9 | 267.7   | 271.2 | 225.3 | 214.2 | -0.46 | Sonde 21 | Pt 18    |  |
| 19.2    | 14101.0 | 14050.0 | 267.6   | 271.1 | 227.2 | 213.7 | -0.08 | Sonde 22 | Pt 18    |  |
| 7.7     | 14108.0 | 14057.0 | 296.1   | 297.7 | 227.1 | 223.4 | -0.04 | Sonde 23 | Pt 19    |  |
| 3.2     | 14095.6 | 14045.5 | 323.0   | 323.4 | 229.1 | 227.9 | 0.65  | Sonde 24 | Pt 20    |  |
| 8.5     | 14107.0 | 14057.4 | 335.2   | 336.6 | 229.3 | 231.7 | -0.12 | Sonde 25 | Pt 21    |  |
| 5.4     | 14241.4 | 14192.2 | 0.5     | 0.8   | 224.6 | 229.6 | -0.48 | Sonde 26 | Pt 22    |  |
| 9.9     | 14239.0 | 14191.1 | 29.3    | 27.3  | 229.7 | 237.7 | 0.42  | Sonde 27 | Pt 23    |  |
| 13.6    | 14388.7 | 14341.0 | 54.3    | 51.1  | 230.3 | 238.5 | 0.65  | Sonde 28 | Pt 24    |  |
| 18.6    | 14389.9 | 14342.7 | 82.7    | 77.5  | 229.4 | 232.7 | -0.68 | Sonde 29 | Pt 25    |  |
| 20.0    | 14398.2 | 14351.0 | 62.4    | 58.0  | 226.5 | 230.9 | -0.20 | Sonde 30 | Pt 26    |  |
| 27.4    | 14392.6 | 14346.8 | 343.7   | 350.4 | 227.7 | 238.8 | -0.31 | Sonde 31 | Pt 27    |  |
| 31.3    | 14396.0 | 14350.4 | 311.2   | 319.0 | 226.5 | 223.5 | 0.38  | Sonde 32 | Pt 27    |  |
| 33.6    | 14396.5 | 14351.1 | 310.8   | 319.1 | 226.6 | 220.6 | 0.14  | Sonde 33 | Pt 27    |  |
| 29.0    | 14391.1 | 14346.3 | 269.8   | 275.6 | 225.1 | 202.7 | 0.21  | Sonde 34 | Pt 28    |  |
| 31.8    | 14383.4 | 14337.6 | 251.0   | 256.8 | 226.9 | 205.8 | -0.35 | Sonde 35 | Pt 29    |  |
| 18.3    | 14389.0 | 14343.2 | 265.4   | 269.1 | 227.5 | 216.3 | 0.25  | Sonde 36 | Jason    |  |
| 16.0    | 14375.7 | 14329.9 | 266.6   | 269.2 | 226.4 | 214.8 | 0.33  | Sonde 37 | Pt 30    |  |

Fast Fall

00:02:37 27 00.14'N 72 18.39'W 148.3 -61.6 -71.2 225.8

2nd Try

00:08:01 Sonde 39 Jason #2 (good sonde but bad aircraft data (winds

00:24:14 27 00.19'N 75 09.10'W 148.3 -61.4 -69.1 194.1

#3 released one minute late

00:45:38 27 05.87'N 78 00.07'W 148.1 -62.0 -69.1 265.1

01:32:51 27 41.40'N 82 37.08'W 1014.3 28.0 22.5 50.8

01:42:29 27 41.40'N 82 37.08'W 1014.1 27.8 22.1 119.4

100831n

|                                           |         |         |       |       |       |       |       |          |       |
|-------------------------------------------|---------|---------|-------|-------|-------|-------|-------|----------|-------|
| 13.6                                      | 14371.2 | 14325.5 | 267.1 | 269.4 | 224.0 | 213.9 | -0.58 | Sonde 38 | Pt 30 |
| program failed so Drop Point #31 missed)) |         |         |       |       |       |       |       |          |       |
| 9.5                                       | 14356.7 | 14311.1 | 267.9 | 270.1 | 226.3 | 223.8 | 0.46  | Sonde 40 | Jason |
| 6.6                                       | 14368.1 | 14322.5 | 281.4 | 281.8 | 226.6 | 220.4 | -0.54 | Sonde 41 | Pt 33 |
| 7.9                                       | 518.8   | 518.3   | 41.7  | 40.5  | 62.6  | 54.8  | -0.58 | landing  |       |
| 8.6                                       | 518.8   | 518.3   | 132.8 | 217.6 | 8.6   | 1.7   | 0.04  | block in |       |

# NOAA G-IV Flight Track Drop Locations for EARL (AL072010)

On 2010090100 the storm was centered at 22.8;-68.7



