

1999091641-LPS

E.2 Lead Project Scientist

E.2.1 Preflight

- 1. Participate in general mission briefing.
- 2. Determine specific mission and flight requirements for assigned aircraft.
- 3. Determine from CARCAH or field program director whether aircraft has operational fix responsibility and discuss with AOC flight director/meteorologist and CARCAH unless briefed otherwise by field program director.
- 4. Contact HRD members of crew to:
 - a. Assure availability for mission.
 - b. Arrange ground transportation schedule when deployed.
 - c. Determine equipment status.
- 5. Meet with AOC flight crew at least 90 minutes before takeoff, provide copies of flight requirements, and provide a formal briefing for the flight director, navigator, and pilots.
- 6. Report status of aircraft, systems, necessary on-board supplies and crews to appropriate HRD operations center (MGOC in Miami).

E.2.2 In-Flight

- 1. Confirm from AOC flight director that satellite data link is operative (information).
- 2. Confirm camera mode of operation.
- 3. Confirm data recording rate.
- 4. Complete Form E-2.

E.2.3 Post flight

- 1. Debrief scientific crew.
- 2. Report landing time, aircraft, crew, and mission status along with supplies (tapes, etc.) remaining aboard the aircraft to MGOC.
- 3. Gather completed forms for mission and turn in at the appropriate operations center. [Note: all data removed from the aircraft by HRD personnel should be cleared with the AOC flight director.]
- 4. Obtain a copy of the 10-s flight listing from the AOC flight director. Turn in with completed forms.
- 5. Determine next mission status, if any, and brief crews as necessary.
- 6. Notify MGOC as to where you can be contacted and arrange for any further coordination required.
- 7. Prepare written mission summary using form E-2 p.3 (due to Field Program Director 1 week after the flight).

FLOYD WINDS AT LANDFALL

Lead Project Scientist Check List

Date 16 SEPT 99 Aircraft N42NS Flight ID 99091614

A. —Participants:

HRD		AOC	
Function	Participant	Function	Participant
Lead Project Scientist	<u>Houston/Log RGE</u>	Flight Director	<u>CRYPK</u>
Cloud Physics	<u>CROXFORD</u>	Pilots	<u>TRILLER / FENX / ROCK</u>
Radar	<u>LEIGHTON</u>	Navigator	<u>ZNRWMA</u>
Workstation	<u>LEIGHTON</u>	Systems Engineer	<u>S. MCMILLAN</u>
Photographer/Observer		Data Technician	<u>J. Roles</u>
Dropwindsonde	<u>DOOBIS / CROXFORD</u>	Electronics Technician	<u>WATKINS</u>
AXBT/AXCP/Guest	<u>CROXFORD</u>	Other	<u>SENDE CARLOS MADR</u>

Take-Off: 031654 Location: TPA Intl Landing: 113241 Location: MACOELL

Number of Eye Penetrations: 7

B. —Past and Forecast Storm Locations:

Date/Time	Latitude	Longitude	MSLP	Maximum Wind

C. —Mission Briefing:

D. —Equipment Status (Up ↑, Down ↓, Not Available —, Not Used O)

Equipment	Pre-Flight	In-Flight	Post-Flight	# of DATs or Expendables
Aircraft				
Radar/LF				
Radar/TA (Doppler)				
Cloud Physics				
Data System				
Dropwindsondes				
AXBT/AXCP				
Workstation				
Videography				

REMARKS:

Mission Summary
Storm name
YYMMDDA# Aircraft 4_RF

Scientific Crew (4 RF)

Lead Project Scientist	_____
Radar Scientist	_____
Cloud Physics Scientist	_____
Dropwindsonde Scientist	_____
Boundary-Layer Scientist	_____
Workstation Scientist	_____
Observers	_____

Mission Briefing: (include sketch of proposed flight track or page #)

Mission Synopsis: (include plot of actual flight track)

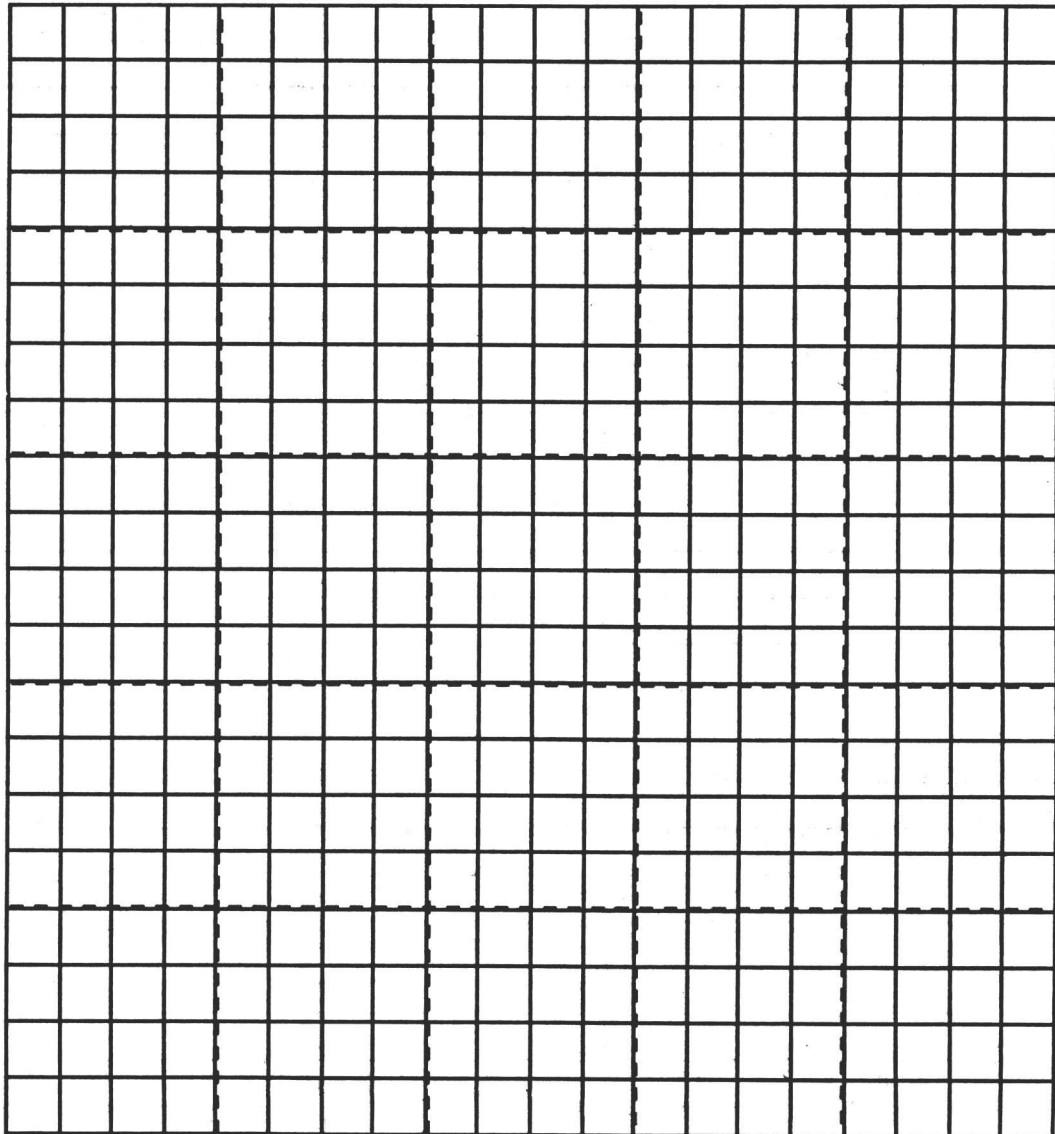
Evaluation: (did the experiment meet the proposed objectives?)

Problems: (list all problems)

Observer's Flight Track Worksheet

Date _____ Flight _____ Observer _____

Latitude (°)



Longitude (°)

WINDS AT LAGO FALL

AP EPOWMA
 2000
 LAT 20°N
 0500
 33°26'
 78°13'

Form E-2
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Lead Project Scientist Event Log

Date 26 SEP Flight 990916H LPS Houston, 1900R

Time	Event	Position	Comments
043351	IP	3212 7930	IP
044109	2 miles NW		41004 34ms1
044230	044°		
045			BT #1
045300	069°		28 miles
045329			BT #1 PARUSED
045857			IPC WINDS 85kt →
050221			PW BYE WIND 200 → PARL
			BT #2
050636			33°26' 78°10'
051430		3350 7740.5	DROP #1 6000 WINDS
051951		3351 7739	DROP #2 " "
11		" "	BT SST = 6000
			SURFACE SEA
052200		34°14' 77°13'	BT #3 6000 26.0°C
0534	KMHX		DROP # 6000 76kt
05	TO JAIL USA		BT #
053838			RAINBAND
053945	LOOKING BEH	34°25.2 77°15.1	DROP 6000 141° 28ms
054850	WINDY VEH BEH	349.5 7738.1	DROP 6000 44km 1 28m
0552	CAPES FAAN	3349 7752	DROP 6000 38ms
0558	5	3342 7806	5 12 miles S of BEH
0600	270°		
0603		CAPES PRAM	CROSS FAAN 356km NW of NW
0607		3355 7820	LOOKING BEH
0610		3342 7841	ENE 300
0612		3339 7846	ENE 6000
0614		3331.7 7855	MVA

48kt 318°
 30ms 305

Thru 05012
 PARL

10034ms
 70kt

← LEFT OF

5 miles offshore

141° 28ms
 28m
 38ms

34
7

AF
5 06457
33 59'
77 58'

0000 956MB

Form E-2
Page 5 of 5

Lead Project Scientist Event Log

Date 16 SEPT Flight 950916HQ LPS

0609
33 41'
78 02
957

Time	Event	Position	Comments
0630		33 58 77 59	5' (WIND) (LANDFALL)
0637		33 28 77 34	FRONT
0633			DEEP WIND
0646		33 17 77 06	HIGH WIND
0658			BT
0700		34 03 76 30	BT
0			CLIMB 2000
072200		34 25 77	TOPICAL BUA 2000
072251		9 77	" "
0728	3 miles west	34 17' 77 48'	WINDY AT WELLS BUA
073953		33 25.8 77 31.3	FRONT BUA
075132		33 15 76 33	RENOVE GOOD
075145		" "	BT #8 BUA
0808		34 37' 76 32'	CLIMB 5000 (GOOD)
081912		34 28' 77 20	TOPICAL BUA GOOD
082114		34 26 77 22	" " "
0823	3 miles W.	34 20' 77 27	ON TOPICAL BUA
083726		33 27 77 31	FRONT 6000
084850		33 19 76 33	BT (6300)
090446		34 37 76 39	CLIMB
0907		34 36 76 59	SONOR GOOD? (NORTH POLAR WIND)
0912		34 36 77 12	SONOR GOOD
0916		34 26 77 09	TWO MECH 1 CENTER
0922		34 10 77 15	WINDY WIND
0923		34 06 77 49	KW 3/11
0930		34 41 77 28	FRONT LEFT IN WIND

WEST
ELEVATION

BUA
GOOD 45MS
WELLS BUA

(GOOD)

NORTH POLAR WIND

LEFT IN WIND

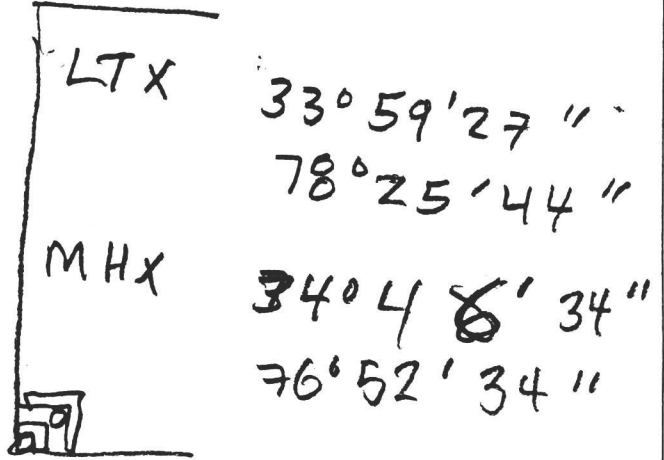
AF 09287 WINDY
34 41' CAMP USBY
77 28 ELEVATED

①
 9 FLOYD LANDFALL 990916 H
 delayed because of oil light engine #2
 031654 Take off TIA

0350 Radar sys ↓
 0358 Radar sys ↑

0358 FM talking SH
 they did run down
 CLKNT to WILMINGTON
 with no problem
 ~60 KTS at 41004

Barry Dominano's most
 bumps N & along coast



020°/15 KTS Center | 43'S LAST
 0343Z 33°03' 78°18' FIX

0422 Bouncing along at 2410m altitude
 0435 HF winds 34 m/s S-FMR
 044109(DROP) 79.12° 32.52°

TEAL
 33°26'
 78°13'

①
 BT₁ 045327 33°07' 79°03' (NO GOOD)

0459 appr SW "eyewall" but zip for dBZ

②
 BT₂ 050220 7843 33.28 (Lockpit saw TEAL)

0505 SC g hunting 050613
 DROP probably NG

③
 051426 / (GOOD) 36/m/s "closest pass" 33°26' 78°10'

④
 05143 / sondes #3 100/84 MBL

BT₃
 BT₄ 052208 34°14' 77°14'

053059 turn at 34°42' 76°45'

50 SHEETS EYE EASE 5 SQUARE
 42-382 100 SHEETS EYE EASE 5 SQUARE
 42-385 200 SHEETS EYE EASE 5 SQUARE
 42-382 100 RECYCLED WHITE 5 SQUARE
 42-389 200 RECYCLED WHITE 5 SQUARE
 MADE IN U.S.A.
 National Brand

990916H

(2)

DRDP #5

053330

34°39' 76°55'

GOOD

(76.92 34.66)

DRDP #6

053953

34°25' 77°19'

GOOD (RAIN BAND)

054315 in 40-45 dBZ HEAVY STRAT RAIN

DRDP #7

054547

34°09' 77°37'

~~NO GOOD~~

LATE WINDS

(Wrightsville Bch)

~~DRDP #8~~

0559

Great tail sweeps

055019

RADAR ↓

055521

RADAR UP

#8

055241

33°49' 77°52'

GOOD

055452 SC center hunting

05516 SC Mark:

33°42' 78°06'

0600 33°47' 77°51' TURN to TRK 270°

0603 interesting TAIL near CAPE FEAR

#9

060670

33.87, 78.25

GOOD

#10

061112

33°42' 78°41'

NO LAUNCH DETECT

#11

061207

33°39' 78°45'

(35 m/s SFMR) GOOD SONDE

061409 weird rings landward side on TAIL,
JOSH or BBD?

#12

061442

33°31' 78°55'

GOOD SONDE

625

42 m/s

33°41'

78°14'

sw
eyewall

~~33.44A~~

50 SHEETS EYE-GLASS 8 SQUARE
100 SHEETS EYE-GLASS 8 SQUARE
200 SHEETS EYE-GLASS 8 SQUARE
42-392 100 RECYCLED WHITE 8 SQUARE
42-393 200 RECYCLED WHITE 8 SQUARE
MADE IN U.S.A.

National Brand

(3) 990916H

0629 Pilots see CAPE FEAR Light

062959 MARK at CAPE " Light

33°51' 77°59' "LANDFALL"

Now we head for FPSN7

063004 33°28' 77°34'

BT₅, drop #13 SST 26.4 GOOD SONDE

064047 33°20' 77°27' 94 KTS FLT LEVEL

DROP #14

064442 33°17' 77°07' GOOD SONDE

DROP #15

065230 BT₆ 33°17' 76°36'

07:00:41 BT₇ 34°2' 76°30' Fail

071007 DROP #16 AT CLKNT
34°62' 76°53'

DOW DROPS

#17 072212 34°25' 77°29' NO LAUNCH DETECT

#18 072252 34°23'8" 77°31'5" ALSO PEAK

(HIT THE MUD) TRAVELED GOOD ONE

072753 Mark Center 3 mi to WEST 8.9 KM

(BASICALLY WRIGHTSVILLE BEACH) EAST winds 1-2 M

(4) 9909164

0739 Turn at 33°27' 77°34' (FPS117)

073953 DROP #19 33°25' 77°31' 60 s
uv

075042 Turn at 33°12' 76°36'

075129 33°15' 76°32' DROP #20 good sonde

075145 BT₈ (BAD) at 10s

~~080813~~ DROP #21 34°37' 76°32' GOOD SONDE

now headed to hit Topsail Beach / Wind max

0814 SOME cells may have developed, FLECKS of 50+

"DOWN SONDE" DROP #22

081907 34°29' 77°18' GOOD SONDE

082114 34°25' 77°27' GOOD SONDE

DROP #23

SC Mark center 3 mi W 082328 34°20' 77°37'

082509 turn to head 180 to hit FPS117

083728 33°27' 77°31' good winds

Drop #24 FPS117 good at last

BT #9 0849 at 33.2 76.6 SST 40's
29° ↓

085014 Radar ↓ 090402 ↑

60 m
mixed
layer

99091611 (5)

090448 Sonde #25 34.62° 76.74° CLKNT

26 090904 34°36' 76°58' 37 m/s GOOD

27 091159 34°35' 77°12' winds at 20s

91628 Mark center 34°27' 77°28' W
(but actual circ-center probably few miles inland)

920 Radar ↓ 922 ↑

092214 Sonde 28

0 92349 Sonde 29 34°05' 77°49'

LAST SONDE

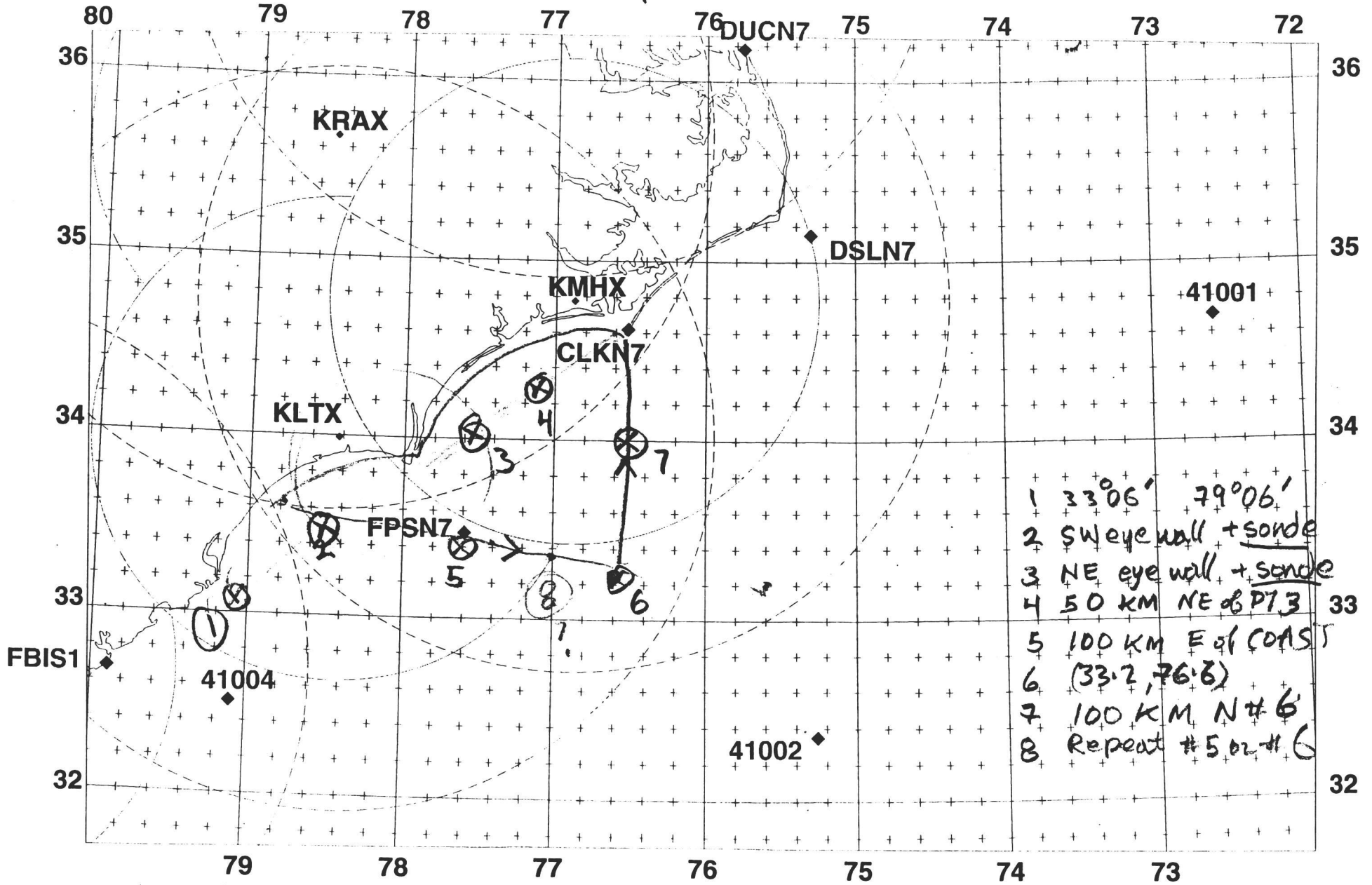
0937 — we headed back to get one last fix
we are over land 34°37' 77°25.8'

093927 34°40' 77°23' MARK 2-3 mi west

↓
34°41' 77°26' #7

1020 32°27' 79°09'
climb out to head back to Tampa

Proposed BT's



- 1 33°06' 79°06'
- 2 SW eye wall + sonde
- 3 NE eye wall + sonde
- 4 50 KM NE of PT3
- 5 100 KM E of COAST
- 6 (33.2, 76.8)
- 7 100 KM N #6
- 8 Repeat #5 or #6

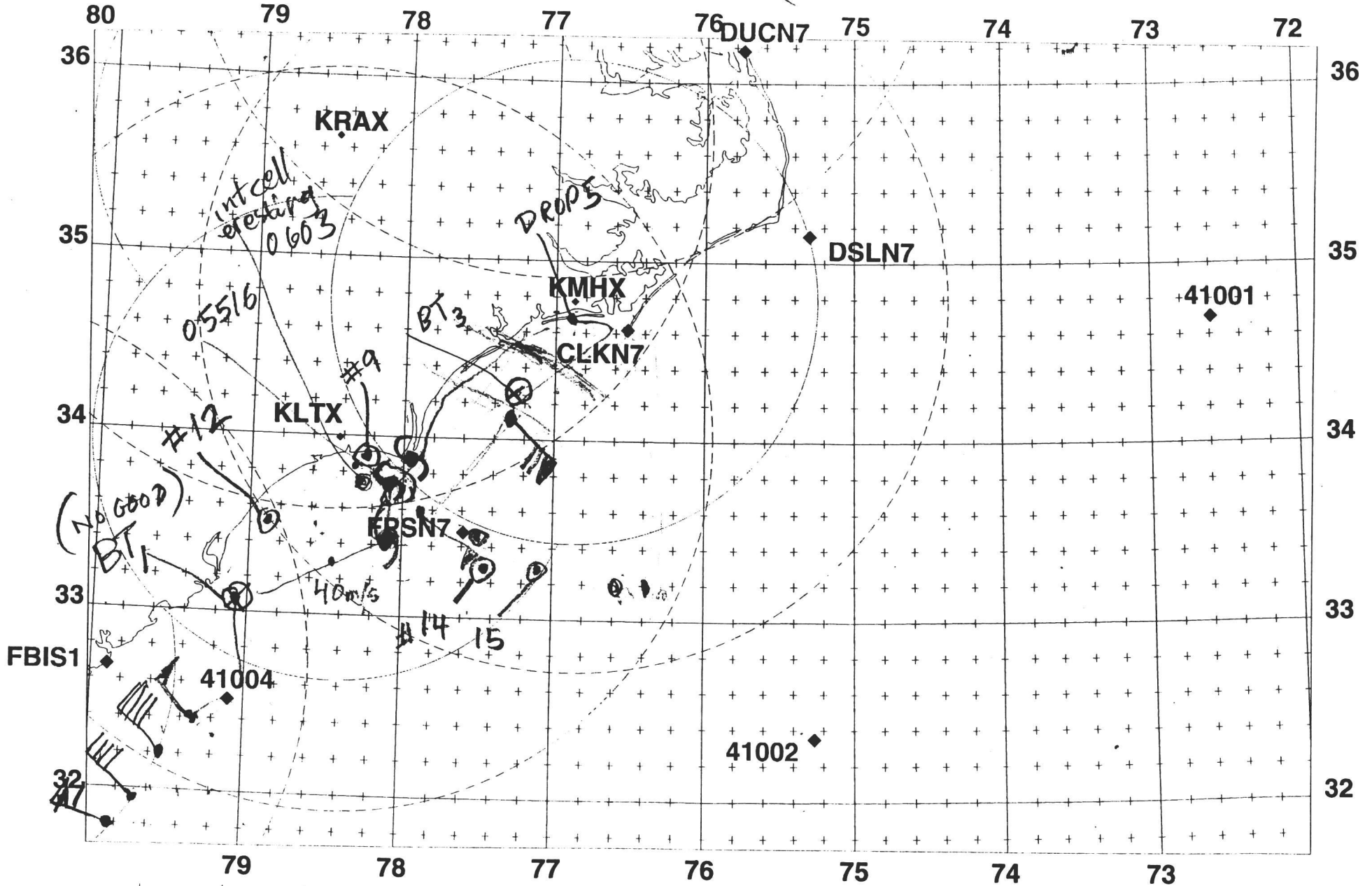


0 50 100 km

Center Lat: 34.00 Lon: -76.00

230 km range rings

150 km Doppler range



0 50 100 km

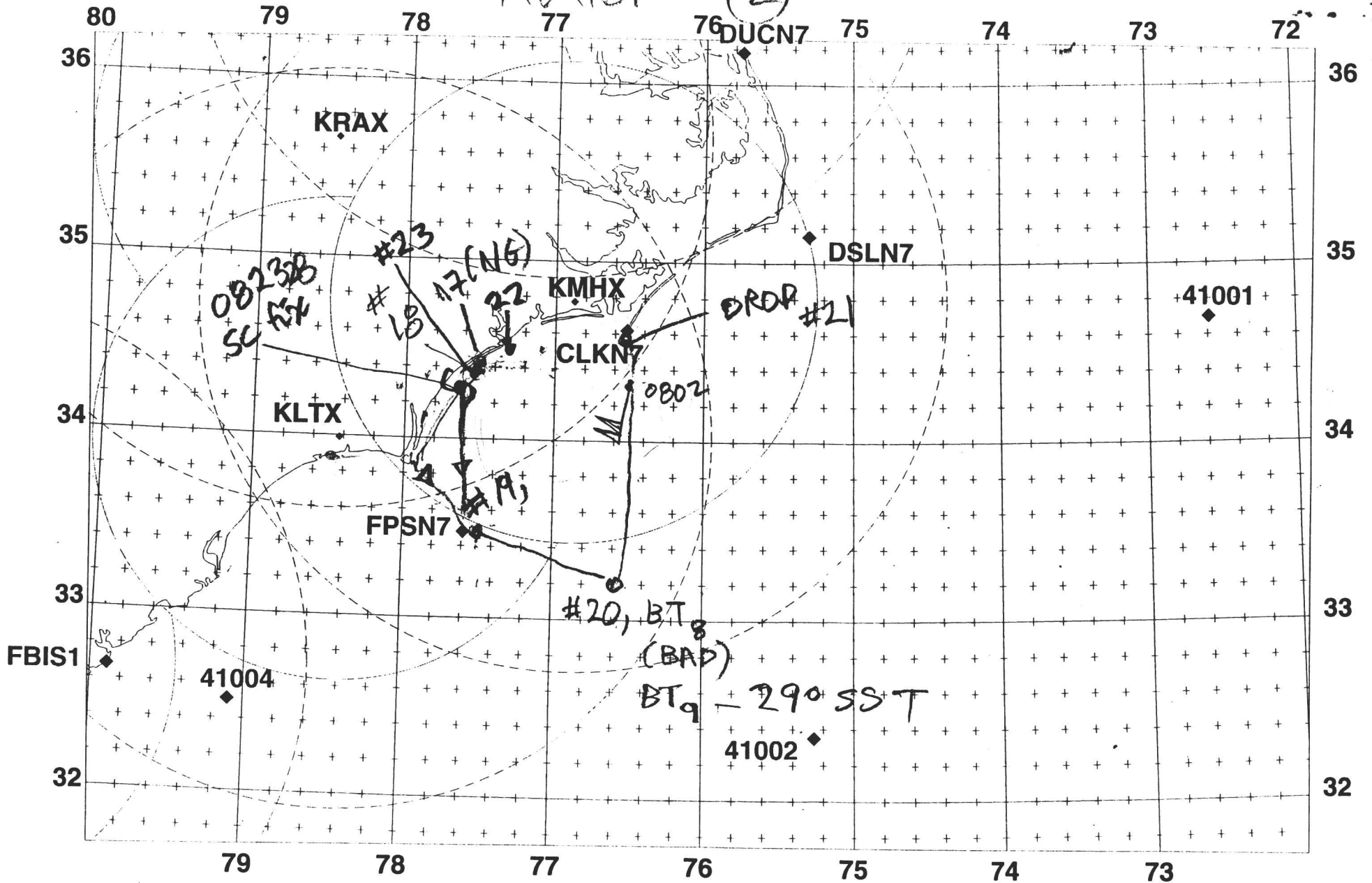
Center Lat: 34.00 Lon: -76.00

○ 230 km range rings ○ 150 km Doppler range

SST #250

990916H

(2)



0 50 100 km

Center Lat: 34.00 Lon: -76.00

230 km range rings

150 km Doppler range

Mission Summary Hurricane Floyd

Winds At Landfall

990916H Aircraft: N42RF

<i>Scientific Crew:</i>		<i>Aircraft Crew:</i>	
<i>Chief Scientists:</i>	Sam Houston, Peter Dodge	<i>Cockpit:</i>	CAPT Dave Tennesen, LCDR Brian Taggart, LCDR Tim O'Mara,
<i>Cloud Physics: Radar/ Dropsonde:</i>	Mark Croxford Peter Dodge	<i>Flight Engineers: Navigator:</i>	Greg Bast, Rock Torrey LT Carl Newman
<i>Workstation: Air-Sea Interaction:</i>	Paul Leighton Mark Croxford	<i>Flight Director: Engineers:</i>	Stan Czyzyk Jim Roles, Sean McMillan, Juan Carlos Prada-Bergnes, Mark Rogers
<i>SFMR, Scatterometer:</i>	Jim Carswell (UMASS)	<i>Observer:</i>	Vince Cappella (USA Today)

Mission Briefing:

Initial planning for a Winds Near Landfall mission into Hurricane Floyd began when Florida's central east coast was considered a likely target for landfall. It later became evident that a large trough approaching from the west would likely cause Floyd to turn northward away from Florida. The Carolinas were threatened by Floyd nearly two weeks after Hurricane Dennis (Dennis turned out to sea after closely approaching the southeast coast; Dennis later made landfall in North Carolina as a tropical storm after it had meandered offshore for several days).

The advanced planning for the Floyd landfall mission was no less difficult than in previous cases. The fact that Dade County was in a hurricane warning and AOML was evacuated made this task even more difficult. Nearly all planing had to be done from NHC and Tampa. The NOAA P3's were put on alert for potential landfall missions to take place on the afternoon of 15 September or the morning of 16 September. It became evident on the morning of 15 September that Floyd would remain offshore until very early on 16 September. Therefore, N43RF was used in an Air-Sea experiment in Floyd offshore from South Carolina near the Gulf Stream. At the end of this experiment, some Winds Near Landfall segments were also flown along the North and South Carolina coastline. This mission complemented closely the tasks of our NOAA 42 flight as Floyd made landfall.

Ground-based teams from Texas Tech, NSSL, and the University of Oklahoma deployed three 10 m meteorological towers, three mobile mesonets, and a single Doppler on Wheels (DOW) to study the wind field of Floyd as it made landfall (Table 1). The mobile mesonet teams were able to gather near surface measurements in Floyd's eye and eyewall. All of these field teams had been located in central Florida when that area was threatened the day before. They made an early exit northward, but ran into problems obtaining fuel for their vehicles, especially in Georgia, which was under a hurricane warning (a team from Clemson University, which was in south Florida, was unable to reach North Carolina in time to set up for Floyd's landfall).

Mission Synopsis:

When it became evident the morning of 15 September that Floyd was accelerating northward and would likely make landfall in the Carolinas early on 16 September, the scheduled take off time for N42RF's mission was moved from 0400 UTC to 0300 UTC. Sam Houston and Mark Croxford drove to Tampa from the TPC to meet the other HRD crew members, Peter Dodge and Paul Leighton. The mission briefing took place at 0100 UTC 16 September at Tampa International airport where N42RF was located. At that time, the pilots expressed concern about operating over land where mesovortex signatures had earlier been reported north of Floyd. A tornado watch box extended along the coast from Charleston to Morehead City, and tornados had been reported on the Outer Banks that afternoon. Therefore, the over land portion of the flight plan was eliminated. The remaining portions of the landfall experiment were briefed, which included an initial "figure 4", a series of coastal patrols and a box pattern. The flight legs had radials in conjunction with the KLTX and KMHX WSR-88D's and the DOW. In addition, GPS dropwindsondes (hereafter referred to as sondes) were launched near university tower sites and NDBC platforms and AXBT deployments were made. The proposed flight track provided to the Flight Director, Stan Czyzyk, is shown in Fig. 1. The flight-level chosen was 8000 ft and the Air Force Reserve WC-130 operating in the area was flying at 10,000 ft.

We took off from Tampa International airport at 0316 UTC and arrived at our IP at 0433 UTC. Enroute, Frank Marks hailed us on the radio from N43RF and provided a useful summary of details about his mission, which had been quite successful. He indicated that Floyd's center was still offshore, so our proposed flight pattern appeared to be on target (see the actual flight track in Fig. 2). We made our first sonde drop near NDBC buoy 41004 at 0441 UTC, where winds were near 34 m s^{-1} at the surface (see Table 2 for a list of sondes dropped). As we arrived from the south of Floyd, the radar reflectivities indicated an ill-defined and "ragged" south eyewall (Fig. 3) even though the infrared satellite image near landfall still looked impressive (Fig. 4). We passed through the flight-level circulation center at 0506 UTC (see Table 2 for center fixes) and could see more vigorous convection in the northern eyewall on radar. We proceeded northeast through this convection on a radial toward the KMRX radar site. In addition to the sonde drops between buoy 41004 and the turn near KMRX, we dropped 4 AXBT's with good data (see Table 4 for AXBT drop locations). After this, we turned to the left at the beach and flew a coastal patrol from near KMRX to Cape Fear. We dropped sondes at 4 locations in the onshore flow along this course, including near the DOW site at Topsail Beach. We made another pass through Floyd's center while it was still a few miles south of Cape Fear at 0556 UTC before circling in the eye and returning on a course that would take us into a coastal patrol from Cape Fear to Myrtle Beach, SC. Three good sondes were dropped in the offshore flow during this portion of the coastal patrol (these were offshore from the TTU tower near Holden Beach, Grand Strand General Airport, and the Myrtle Beach Jetport). By the time we had returned to Floyd's eye at 0630 UTC, it's circulation center was over Bald Head Island at Cape Fear, NC (this was landfall).

We then flew the beginning of the first box east of Floyd over the FPSN7 C-MAN site where we dropped a sonde and then east toward our next turning point near $33.5 \text{ N } 76.5 \text{ W}$ at 0700 UTC (see Fig. 2). We proceeded north from there toward the Cape Lookout (i.e., CLKN7) to drop a sonde at 0710 UTC. Unfortunately, all of the AXBT's we dropped along the east and northbound legs of the box failed. We flew toward the DOW location and dropped a sonde before

passing through the eye, which was 3 miles inland from Wrightsville Beach, NC at 0728 UTC. We then returned to FPSN7 to start the new box (no sonde winds). Our next AXBT drop near our turning point 33.5 N 76.5 W failed again, but we had a good sonde drop here at 0751 UTC. Our next leg to CLKN7 was uneventful and we dropped a sonde here at 0808 UTC. As we approached the DOW site again, the eyewall appeared on radar as a southwest to northeast oriented feature with its cells appearing to be more convectively active than earlier. Prior to the fifth pass through Floyd's eye at 0823 UTC, we dropped two more sondes. The last box began after we left the eye and dropped our last sonde at FPSN7 and CLKN7 during this box. We also launched a successful AXBT during this box. We were also fortunate to have a good AXBT drop this time near our turning point. Our last portion of the box after CLKN7 involved two more sonde drops in the onshore peak winds region and two more south of the eye in the offshore winds region. We made two more penetrations into Floyd and then proceeded home via Buoy 41004. Our landing after a very successful mission was at MacDill AFB at 1136 UTC.

Evaluation:

The mission was very successful and met nearly all of our objectives. We had good luck with Floyd's eye being located offshore for our first two penetrations. This gave us time to complete most of the legs of a modified "figure 4" and a coastal patrol before the circulation center crossed the coastline. The real-time flight-level data adjusted to the surface plus the SFMR data from the previous mission by N43RF were used in the HRD surface wind analysis provided to the forecasters at NHC for 0700 UTC (Fig. 5) The sondes dropped in the storm are plotted in Fig. 6 and listed in Table 3. The boundary layer measurements from the sondes appear to have been good in most cases, especially near the coast and C-MAN stations. It is believed that we will have an excellent data set for analysis using the flight-level winds from N42RF, the Air Force reconnaissance flight, and the sondes. The near surface and surface winds should also be available from sondes, the SFMR, and the scatterometer for documenting Floyd's winds in the offshore and onshore flow near the coast.

Acknowledgments:

Paul Leighton was very helpful in assisting Peter Dodge with drawing up the flight plan to meet the FAA deadline. Mark Croxford provided excellent notes from the mission and was a valuable asset on board. Special thanks to Hugh Willoughby, Peter Black, and Steve Feuer for providing guidance on Floyd's whereabouts and projected track prior to our mission. The AOC crew also very helpful during our mission despite the late hours it required us to be flying and working. We especially appreciate the early start (shortly after 0300 UTC instead of 0400 UTC) take off that allowed us enough time to arrive on station for our mission before Floyd moved inland. Sam Houston was contacted by Steve Delgreco of NCDC and Rainer Dombrowsky of the ASOS Program Office about turning on hi-res ASOS data for states which might be affected: Florida, Georgia, and South Carolina were requested (unfortunately North Carolina was later put under a warning and the hi-res data retrieval may not have happened at all such sites here). Reid Hawkins, SOO at the Wilmington NWSO provided hi-res ASOS data for ILM and CRE.

Problems:

The radar system froze briefly a few times during the flight, but not in mission critical regions. Three of the AXBT's failed in the box pattern east of Floyd, but our last one provided good data. A few sonde failures occurred, but there did not seem to be an unusually large percentage of failures. No known problems with data gathered by existing or special platforms in North and South Carolina were reported at the time of this writing.

Sam Houston and Peter Dodge
9/28/99

Table 1: Locations of University 10 m meteorological tower deployments. A DOW was also located at the Topsail Beach location. Mobile mesonets operated in the Cape Fear area of southeastern North Carolina.

Tower location	Latitude (N) (deg min)	Longitude (W) (deg min)	University
Southport Airport	33 55	78 15	Texas Tech
Wilmington Airport	34 16	77 55	Texas Tech
Topsail Beach.	34 23	77 39	University of Oklahoma tower and DOW

Table 2: Center fixes for Floyd from N42RF and the Air Force (AF) on 16 September (*Landfall occurred over Bald Head Island at Cape Fear). Sea level pressures (slp) were provided in some Air Force eye drops.

Time (UTC)	Latitude (N) (deg min)	Longitude (W) (deg min)	Aircraft
0500	33 26	78 13	AF
0506	33 26	78 10	N42RF
0556	33 47	78 06	N42RF
0609	33 41	78 02	AF (slp = 957 mb)
0630*	33 51	77 59	N42RF
0645	33 59	77 58	AF (slp = 956 mb)
0728	34 12	77 48	N42RF
0823	34 20	77 37	N42RF
0916	34 26	77 29	N42RF
0928	34 28	77 28	AF
0930	34 41	77 26	N42RF

Table 3: Splash locations of sondes launched during the Floyd mission. Here MBL = mean boundary layer wind (fffdd; fff = wind direction in deg and dd = wind speed in kt), LST WND = height of last wind (meters), and SST = sea surface temperature (deg C). Sonde 26 was sent after all the others. Sondes 2, 10, and 29 had no winds (these were not transmitted), but the P, T and RH may be available. Sonde 17 had no launch detect, but these data may be recoverable later, if the sonde id can be determined.

#	sonde id	time (UTC)	Lat. (°N)	Lon (°W)	comments
1	991845148	0441	32.47	79.08	MBL WND 32072 LST WND 011
2	990935168	0502	33.28	78.43	no winds
3	991435107	0514	33.89	77.77	MBL WND 10084 LST WND 011
4	991515138	0514	33.90	77.75	MBL WND 10582 LST WND 013 EYEWALL 045 SST 260
5	991845159	0533	34.70	76.97	MBL WND 11552 LST WND 014
6	991515166	0539	34.46	77.39	MBL WND 11563 RAINBAND
7	990935144	0545	34.19	77.70	MBL WND 09576
8	990935054	0552	33.86	77.90	MBL WND 12581
9	990935114	0606	33.82	78.28	MBL WND 35575
10	990935050	0611	33.70	78.68	no winds
11	991515241	0612	33.59	78.77	MBL WND 33584 LST WND 083
12	990935146	0614	33.47	78.91	MBL WND 33074
13	990935145	0638	33.53	77/53	MBL WND 20566 SST 264
14	990415360	0640	33.40	77.40	MBL WND 22580
15	990415375	0644	33.36	77.10	MBL WND 21073
16	990935048	0710	34.68	76.57	MBL WND 13569
17	missing	0722	34.42	77.48	no launch detect
18	992455395	0722	34.43	77.61	MBL WND 10088 LST WND 108 EYEWALL 045
20	990935112	0751	33.30	76.53	MBL WND 20064
21	990845100	0808	34.68	76.55	MBL WND 14574
22	990935116	0819	34.55	77.34	MBL WND 13093
23	991515161	0821	34.47	77.47	MBL WND 13572 LST WND 011
24	990935135	0837	33.45	77.47	MBL WND 26557
25	991515191	0904	34.69	76.68	MBL WND 15087
26	991515194	0909	34.67	76.99	MBL WND 15077 LST WND 028
27	990935215	0912	34.64	77.22	MBL WND 14568
28	990415352	0922	34.14	77.70	MBL WND 30082
29	991018021	0923	34.10	77.82	fast fall sonde

Figure 1: Proposed flight-track based on the best estimate of Floyd's position at the expected time of N42RF's initial arrival into the hurricane's core. Shown are NDBC and University team's platform locations, along with the WSR-88D sites in North Carolina (range rings indicate radar reflectivity and Doppler data availability).

Figure 2: Actual flight track flown with surface platforms and Hurricane Floyd's storm track during the mission shown.

Figure 3: Composite of real-time lower fuselage radar reflectivities (dBZ) shown for 0445 to 0514 UTC.

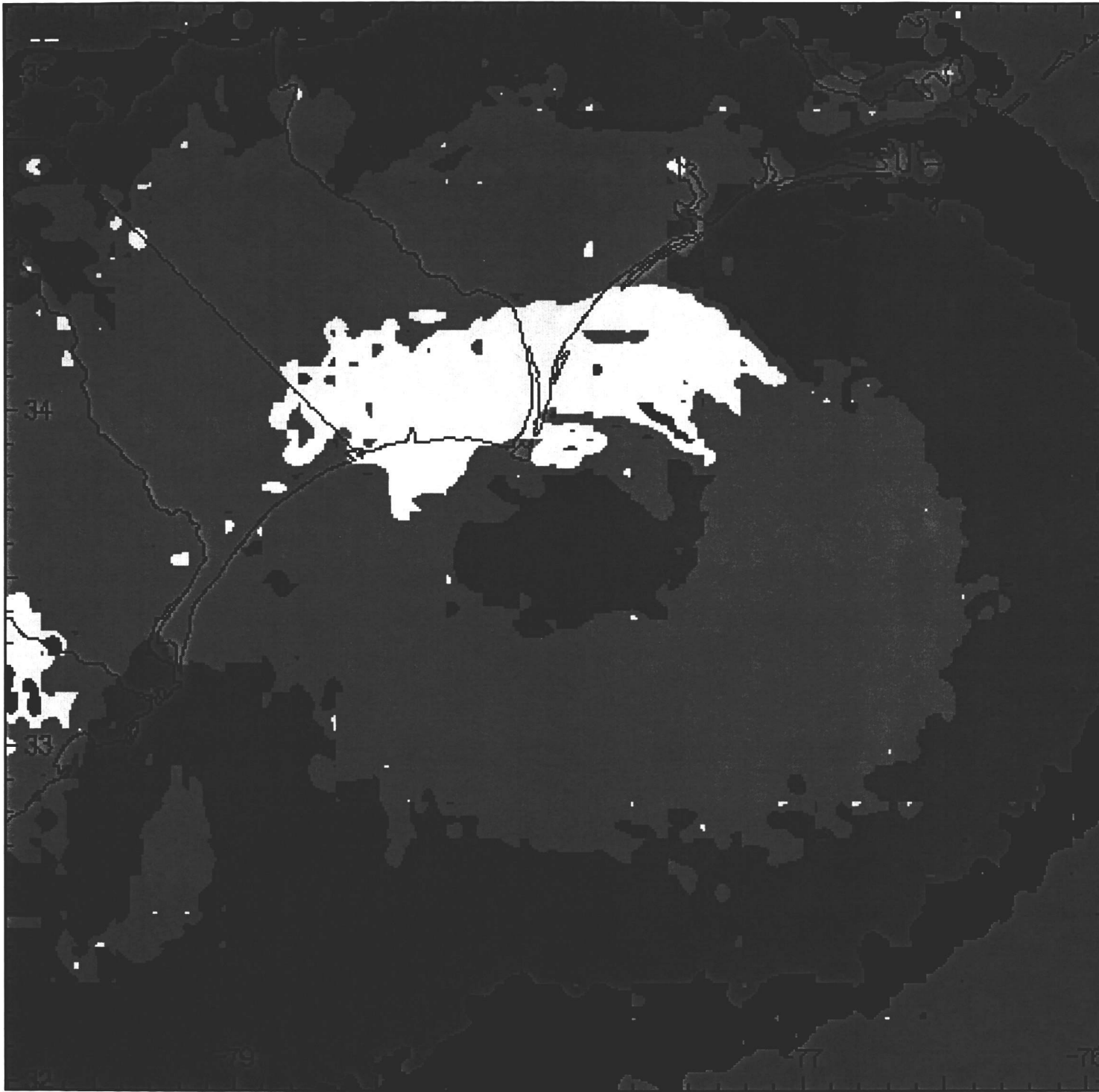
Figure 4: GOES-8 IR satellite image of Floyd soon after landfall.

Figure 5: HRD surface wind analysis provided to the forecasters at for Hurricane Floyd for 0700 UTC 16 September 1999.

Figure 6: Locations of the sondes with good data during the Hurricane Floyd Winds at Landfall mission.

Table 4: Locations of AXBT's launched during the Hurricane Floyd mission and SST (°C).

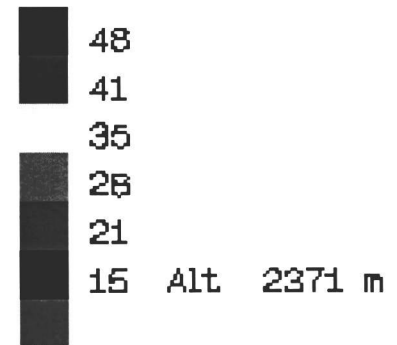
#	time (UTC)	Latitude (N) (deg min)	Longitude (W) (deg min)	comments
1	0453	33 07	79 04	Near 41004, failed
2	0502	33 17	78 26	SW eyewall, good, SST=25.0
3	0514	33 52	77 40	NE eyewall, good, SST=26.0
4	0522	34 14	77 13	50 km NE of 3, good, SST=26.0
5	0638	33 29	77 34	E of Floyd, good, SST=26.4
6	0652	33 17	76 32	failed
7	0700	34 03	76 31	failed
8	0751	33 16	76 32	failed
9	0848	33 17	76 33	SE of Floyd, good, SST=29.0



990916h1

FLOYD

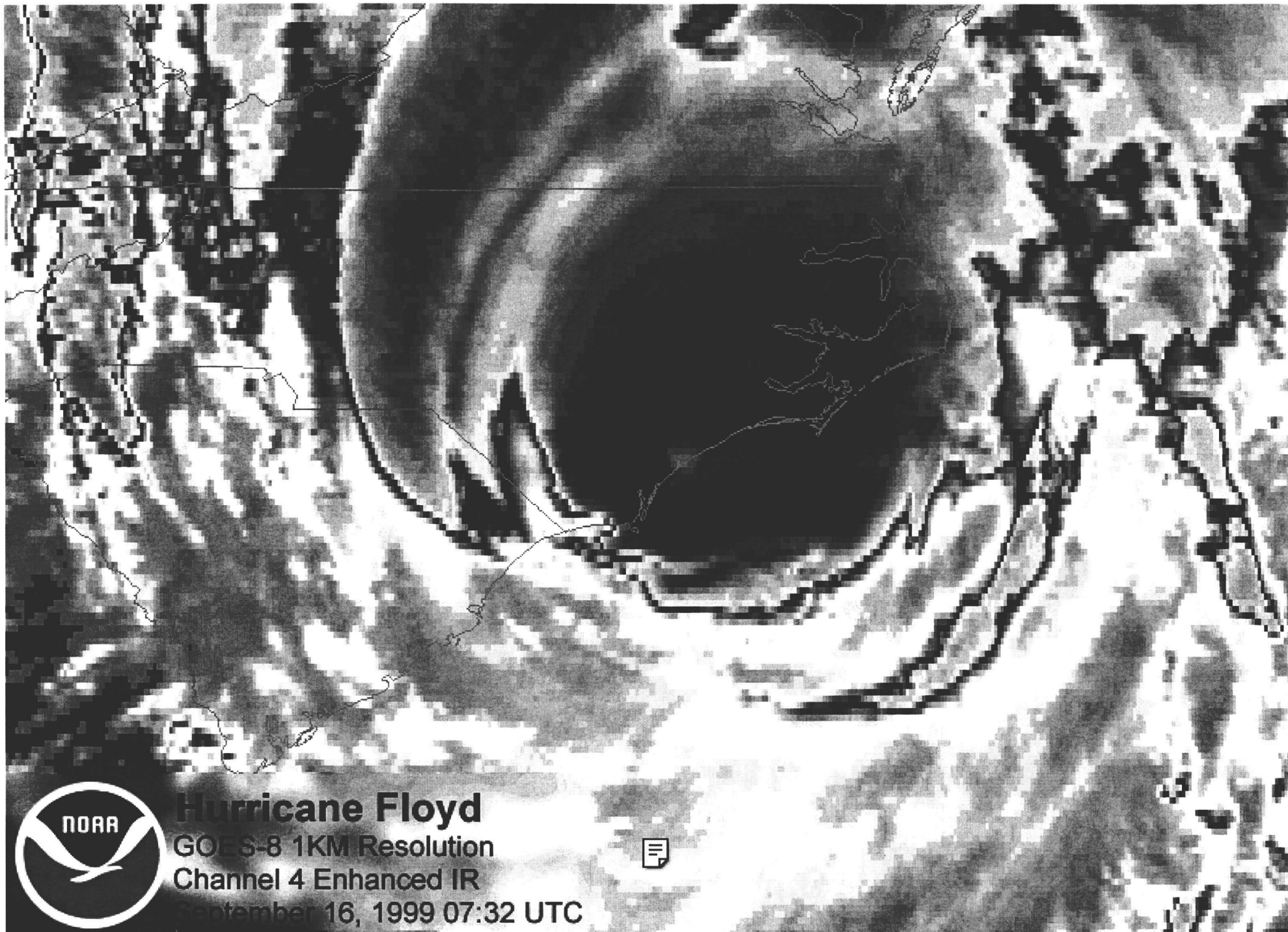
044522 Z to
051448 Z



dBZ Slat 33.59 N
 Slon 77.86 W

360 X 360 km

produced by
HRD / AOC



Hurricane Floyd

GOES-8 1KM Resolution

Channel 4 Enhanced IR

September 16, 1999 07:32 UTC



ATTENTION: HURRICANE SPECIALISTS

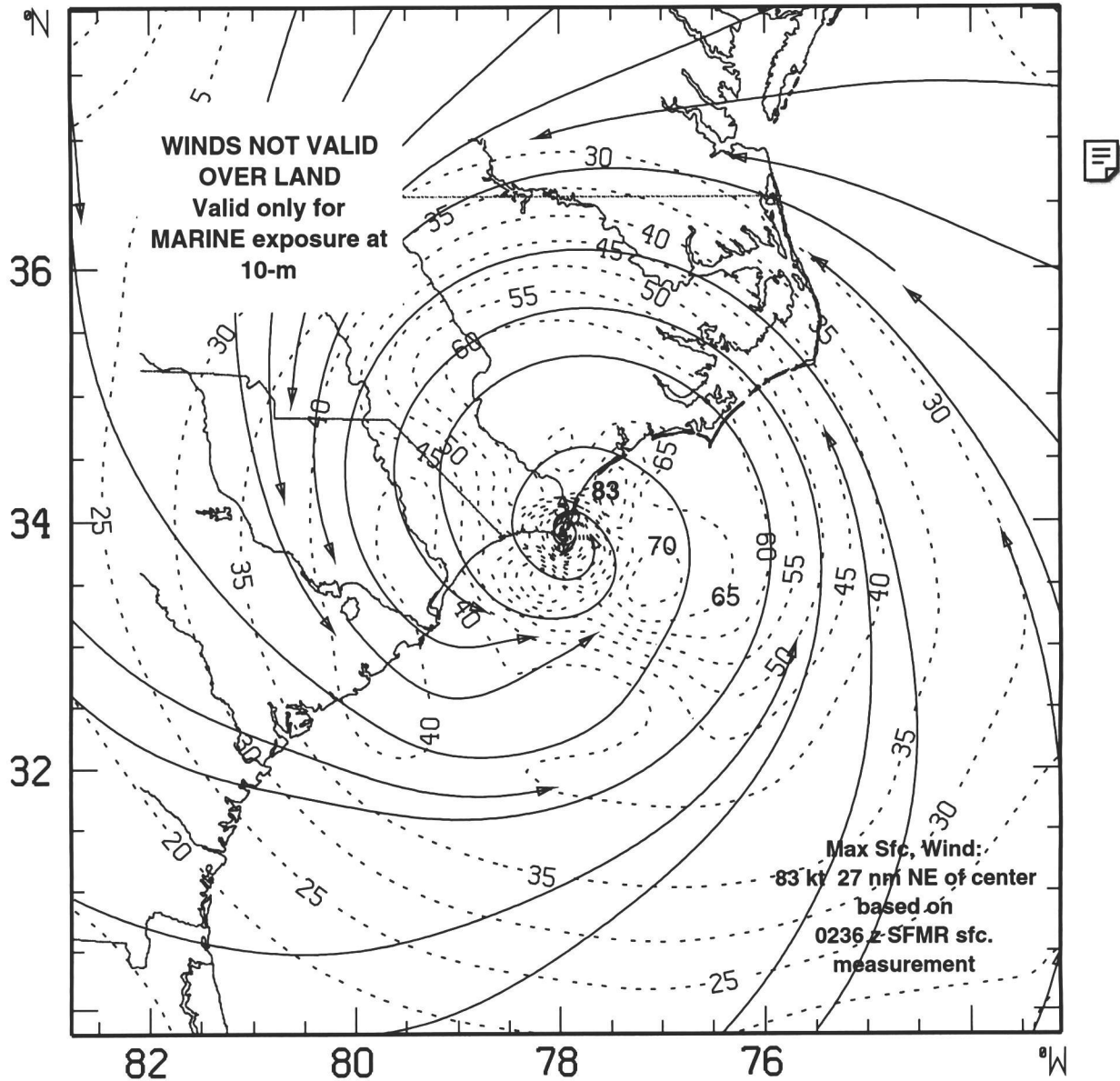
Hurricane Floyd 0700 UTC 16 Sept. 1999

Max. 1-min sustained surface winds (kt) for marine exposure

Analysis based on Selected NOAA 43 SFMR Measurements: 0229 - 0456 z,
NOAA 43 and 42 aircraft 2500 m level winds adj. to sfc. from 0229-0630 z.

Buoy, C-MAN, and ship reports from 0300-0600 z,

0700 z position extrapolated from 0609 z wind center fix using 020° @ 16 kt, mslp = 956 mb.

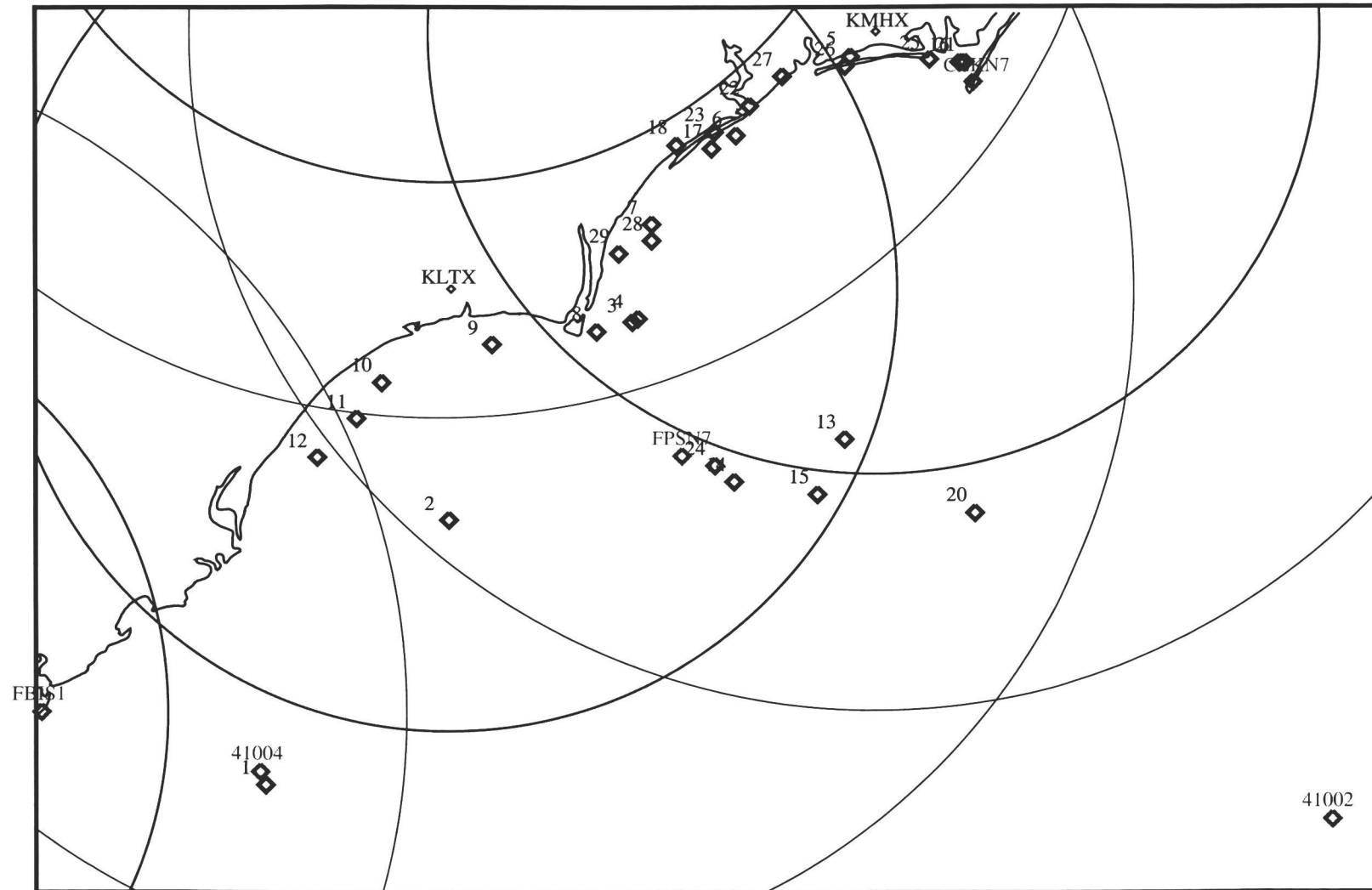


Experimental research product of :

NOAA / AOML / Hurricane Research Division

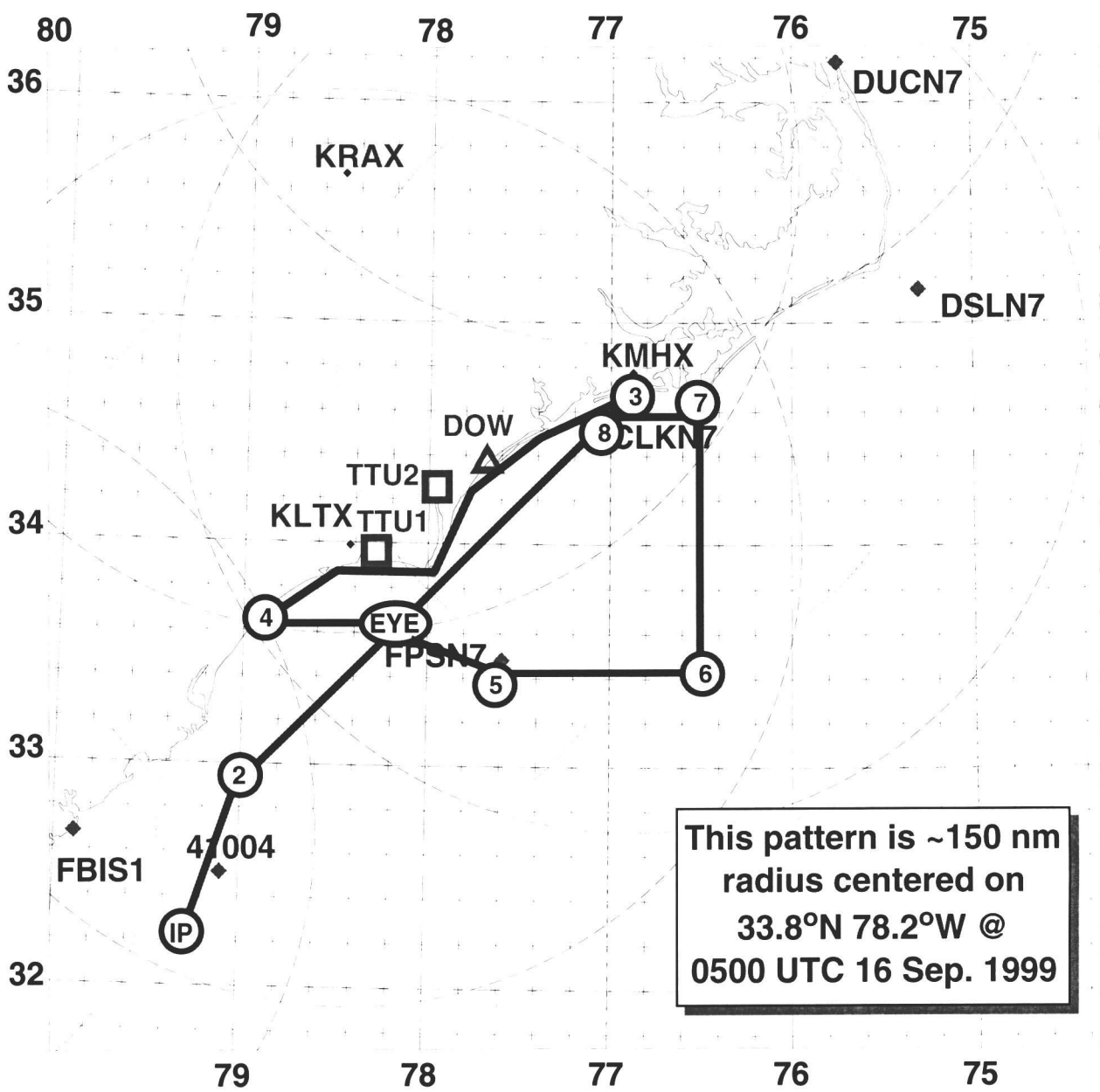


Center Lat: 33.50 Lon: -77.50



0 50 km

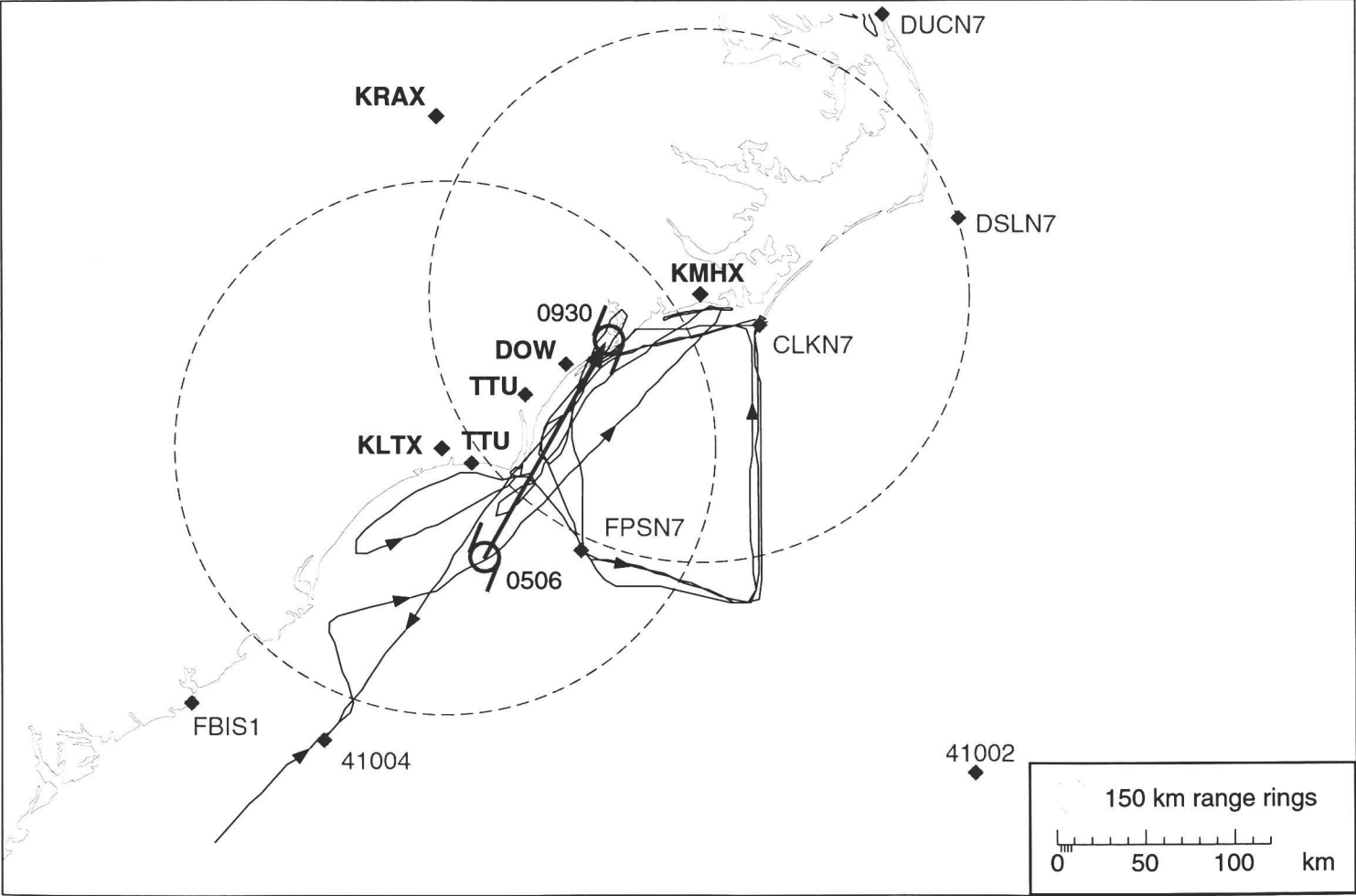
230 km range rings
150 km haze rings

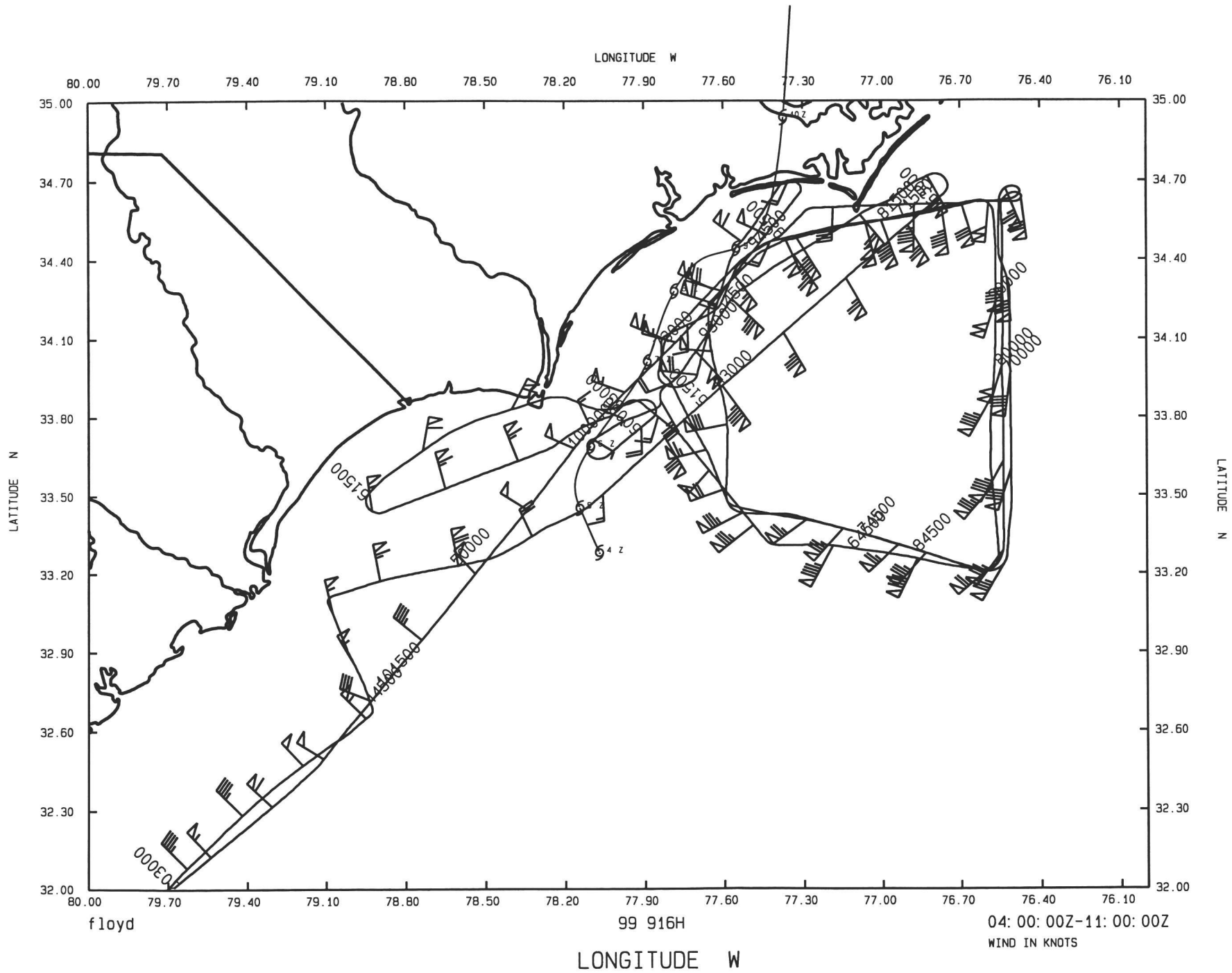


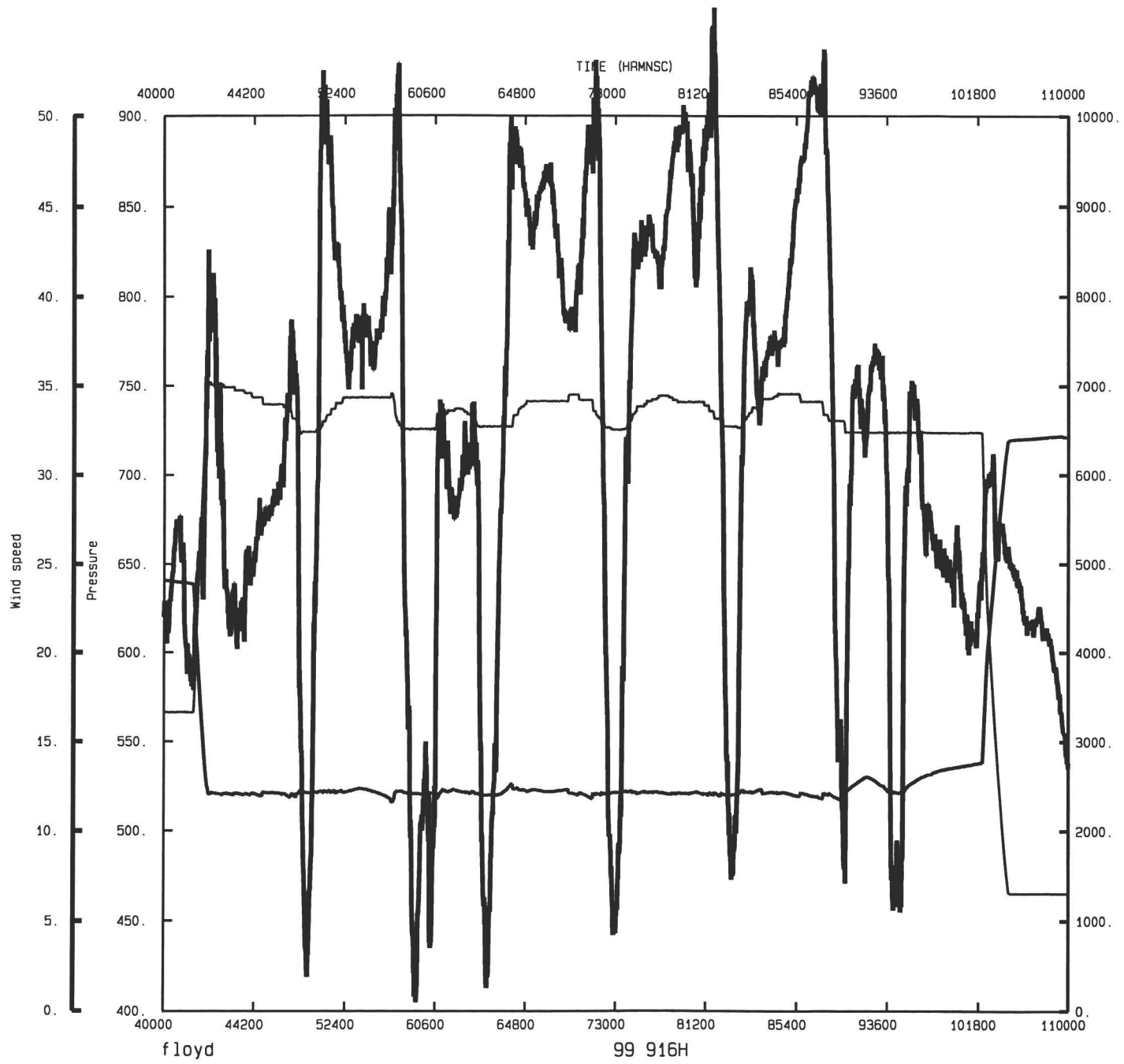
This pattern is ~150 nm radius centered on 33.8°N 78.2°W @ 0500 UTC 16 Sep. 1999

- 230 km range rings
- 150 km Doppler range

NOAA 42 Hurricane Floyd Landfall flight 16 September 1999 0400-1020 UTC







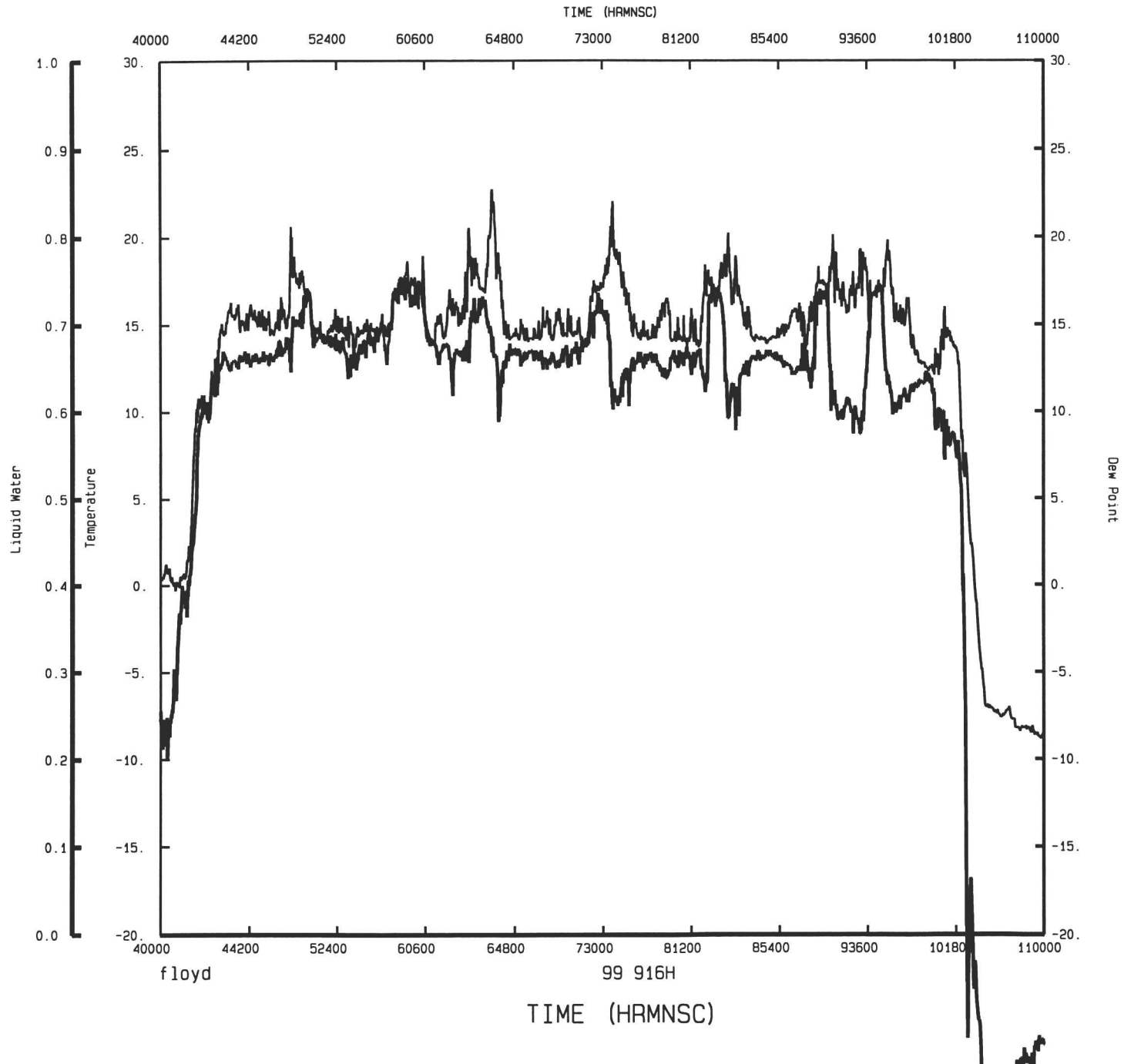
floyd

99 916H

TIME (HRMNSC)



NOAA/HRD



NOAA/HRD