19940820 IL-LPS

E.2 Lead Project Scientist (On-Board)

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 OAO 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 OAO 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 or FGOC at remote recovery location).

E.2.2 In-Flight

✓ 1. Confirm from OAO flight director/meteorologist 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 Postflight

_____ 1. Debrief scientific crew.

_____ 2. Report landing time, aircraft, crew, and mission status along with supplies (tapes, etc.) remaining aboard the aircraft to the appropriate HRD operations center (MGOC or FGOC).

_____ 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 OAO flight director.]

_____ 4. Determine next mission status, if any, and brief crews as necessary.

_____ 5. Notify the appropriate operations center (FGOC or MGOC) as to where you can be contacted and arrange for any further coordination required.

Form E-2
Page 1 of 5

On-Board Lead Project Scientist Check List

Date 20AUG94 Aircraft N43RF Flight ID 940820I

A. Participants

HRD		OAO	
Function	Participant	Function	Participant
Lead Proj. Sci.	WILLOUGHBY	Flight Director	DAMIANO
Cloud Physics	ABERSON	Pilots	MCKIM/KENNEDY
Radar	SAMBURY	Navigator	RATHBURN
~~Doppler~~	BURPEE	Sys. Engr.	LYNCH
~~Photographer~~	GRIFFIN	Data Tech.	
Omegasonde	FRANKLIN	El. Tech.	
AXBT/AXCP		Other	

Take-Off 20/1724 Location SJU Landing 21/0331 Location SJU
10h 07m

B. Past and Forecast Storm Locations

	Date/Time	Latitude	Longitude	MSLP	Max. Wind
FIX	20/1443	23-30	58-21		60 KT
FCST	20/1800	24.5	58.8		

C. Mission Briefing

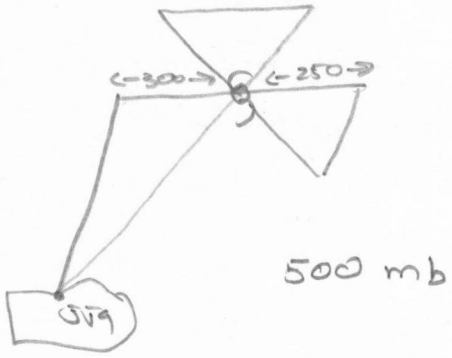
FLY GIANT TREFOIL RTB SJU

D. Equipment Status

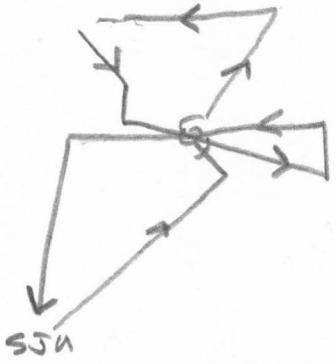
Equipment	Pre-Flight	In-Flight	Post-Flight
Aircraft	↑	↑	↑
Radar	↑	↑	↑
Cloud physics	↑	↑	↑
Data system	↑	↑	↑
Omegasondes	↓	↑	↑
AXBT/AXCP	NO13		
Doppler	↑	↑	↑
~~Photography~~ VIDEO	↑	↑	↑

REMARKS:

E. I. Proposed Flight Pattern (sketch or designate by number)



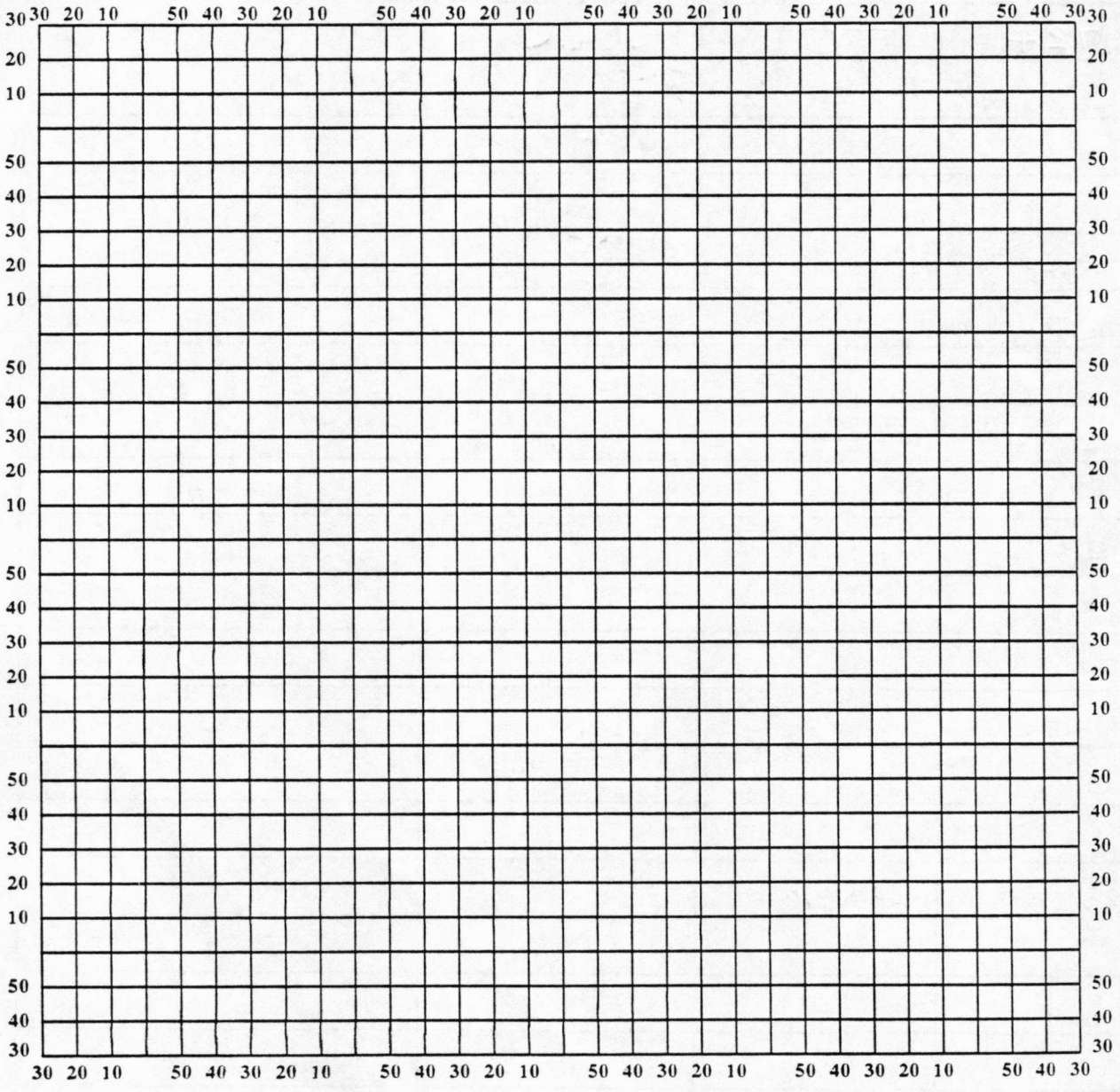
E. II. Actual Flight Pattern



Hurricane Recco Plotting Chart

True at 25° Latitude, in Degrees and Minutes of ϕ and λ.

Date_____ Longitude _____ Observer _____



Note: Label full degrees according to location of flight area.

Form E-2
Page 5 of 5

26.4 60 330/15 1800 24.8 59.7

21-17 62-35) IP

Lead Project Scientist Event Log

Date 20AUG94 Flight 940820I TS CHRIS LPS WILLOUGHBY

Time	Event	Position	Comments
1724	T/O	SJU	FUEL 57,600 LB
1833 (1)	IP DROP 1	21-17 62-34	GOOD
1921	TURN N	23-56 59-13	TURN N TO CROSS CONV LINE ON RADAR
			EST @ 24.8 59.7 TRAK 300
1948	(2)	25-28 60-28	TRACK 030
2041	TURN W DROP 2	29-00 58-00	40K GAS = 8 NIZ GOOD!
2129	TURN SSE DROP 3	26-59 62-38	TRACK 150 → @ GOOD
2224	APPROX @	26-00 66-00	
2317	TURN NORTH	23-54 55-59	
2352	TURN W DROP 4	26-47 56-00	START E → W GOOD LEG
0012		2-	LOTS OF ELECTRICITY
0019	DROP 5	27-10 58-15	BAD IRH, BUT GOOT & WIND
0053	DROP 6	26-54 61-02	STREAMER
0111	DROP 7	26-50 62-32	GOOD!
0133	TURN → SJU	26-51 64-27	
23/0331	LANDING	SJU	

1200

Hurricane Research Division

AOML/NOAA
4301 Rickenbacker Causeway
Miami, FL 33149 USA

TEL: (305) 361-4407, FAX: (305) 361-4402
Internet:
WILLOUGHBY@OCEAN.AOML.ERL.GOV

25 August 1994

To: F. D. Marks

From: H. E. Willoughby

Subject: Flight 940820I (Chris)

Planning: In the morning of 20AUG94 tropical storm Chris was NE of Puerto Rico tracking NW. Over the preceding 24 h the forecasts had indicated an increasing northward component of motion so that we expected Chris to recurve, accelerate, and pass just to the east of a cold–core low centered near 30N 75–70W. The objective of the mission was to study the interaction between Chris and the low. We briefed for a takeoff at noon local time (1600 UT), and planned for a second sortie with takeoff at 2100 local (0100 UT). The intended flight tracks were the "trefoil" pattern of three 250 nmi equilateral triangles equally spaced about Chris' center. The aircraft were to maintain 500 mb PA throughout the flight.

Operations: Departure from San Juan was delayed until 1724 UT to accommodate a VIP passenger. The approach to Chris was from the SW with an expected ETA of 1920 at the center near 25N 59W along a track that we expected to recurve to east of due north. At the IP 21N 62.5W, the aircraft encountered 20 kt wind from the SW, which continued until we reached 24N 59W at 1921. A mass of convection NW of track and banding in the low clouds indicated that we were SE of the center, and we turned toward the NW. The last fix from the USAF reconnaissance confirmed that the center was in that direction. At 1948 we encountered a flight level wind center embedded in poorly organized convection near 25.5N 60.5W.

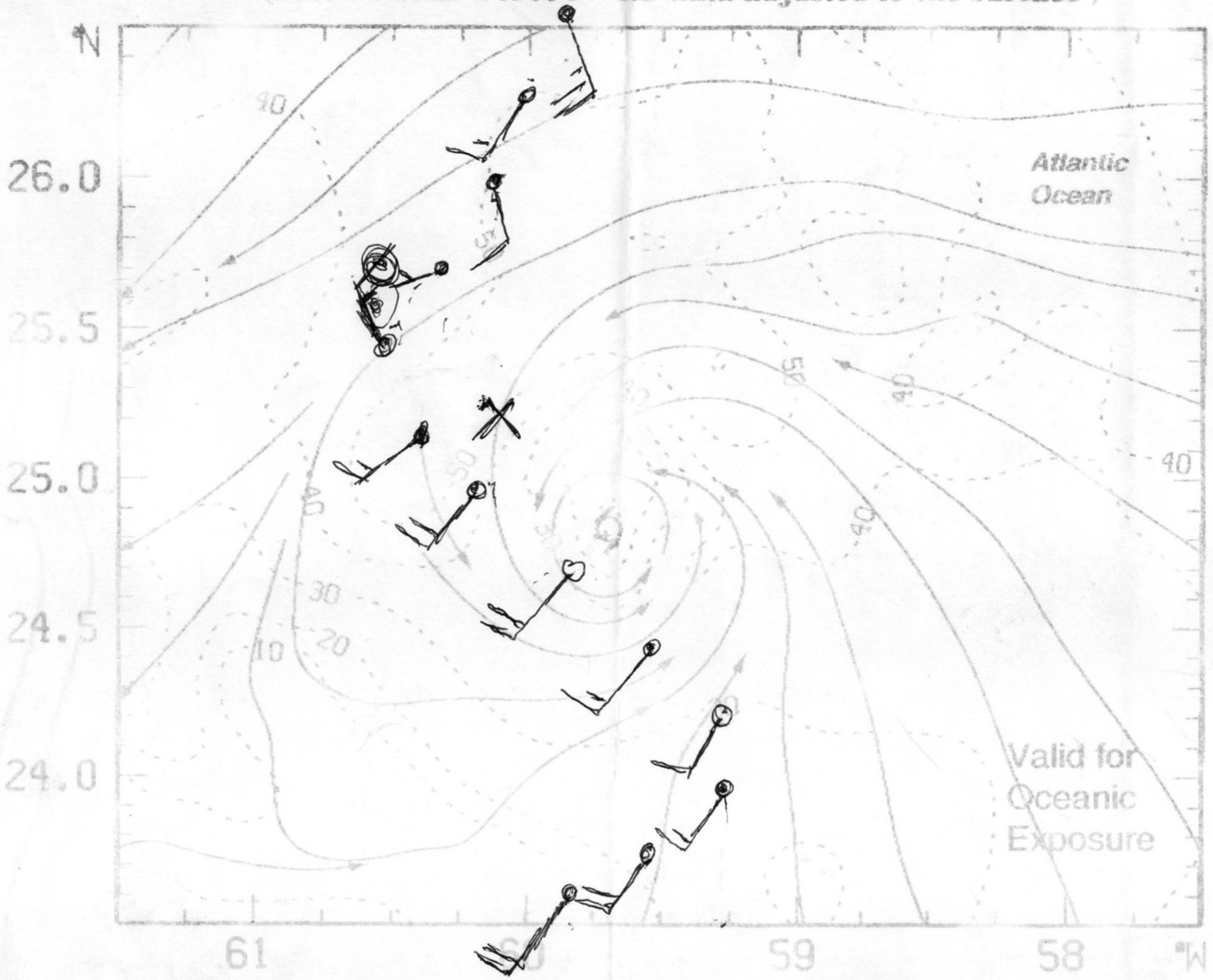
The outbound leg from the center continued the initial SW to NE leg to a point 240 nmi from the center. From there we turned W to a point 240 nmi NW of Chris' extrapolated center. During this part of the flight the meteorological situation seemed confused, difficult to work with, and not at all like the target of the experimental design. These considerations led me to cancel the second sortie. The next leg of the pattern was from NW to SE. At 2224 near 26N 60W, a sudden strengthening of the wind and change of direction from ESE to SW marked crossing shear line that Chris had become. The apparent center lay at the western end of an E–W band of convection. During the outbound leg toward the ESE we flew along to the line of convection, then turned northward to a point 240 nmi E of the extrapolated center. The final E–W leg of the pattern traversed the line of convection in 45 kt southerly winds and apparently passed just south of a circulation center near 27N 59.8W at 0039 on 23AUG. Although the winds were westerly near the center, we encountered no northerly winds W of the center, and eventually the flight–level winds west of the center came from the south at < 10 kt, consistent with the cold low's circulation. We continued the outbound leg along 27N to 64.5W before turning southward to San Juan.

Equipment: The dropsonde equipment worked well, but only because the AOC engineers expended extraordinary efforts and cannibalized 42's gear for parts. We deployed 7 dropsondes in all: at the IP, the NE turn point, the NW turn point, and four along the final E–W leg. All worked except the two on either side of the final center position. The humidity failed east of the center, and the parachute failed to deploy west of it. The radars appeared to work well, but stopped updating three times. They seemed OK after resetting each time. PMS equipment also stopped updating frequently, requiring reset. Aircraft was OK.

Critique: Poor communications and the bad initial guess for Chris' center position made the situation early in the flight seem more difficult than it was. In retrospect, we should have launched the second sortie. It was clear by the time we began the final E–W pass that Chris had been elongated along a N–S axis into a shear zone, possibly with multiple convectively induced centers arrayed along it. The E–W leg was in exactly the right place and, in combination with the low–level USAF data, should document Chris' incorporation into the cold low.

Tropical Storm Chris 1730 UTC 20 August 1994

Analyzed maximum sustained 1-min winds
Streamlines and isotachs (kt) for the period 1224-1751 UTC
(based on Air Force JWRS data adjusted to the surface)



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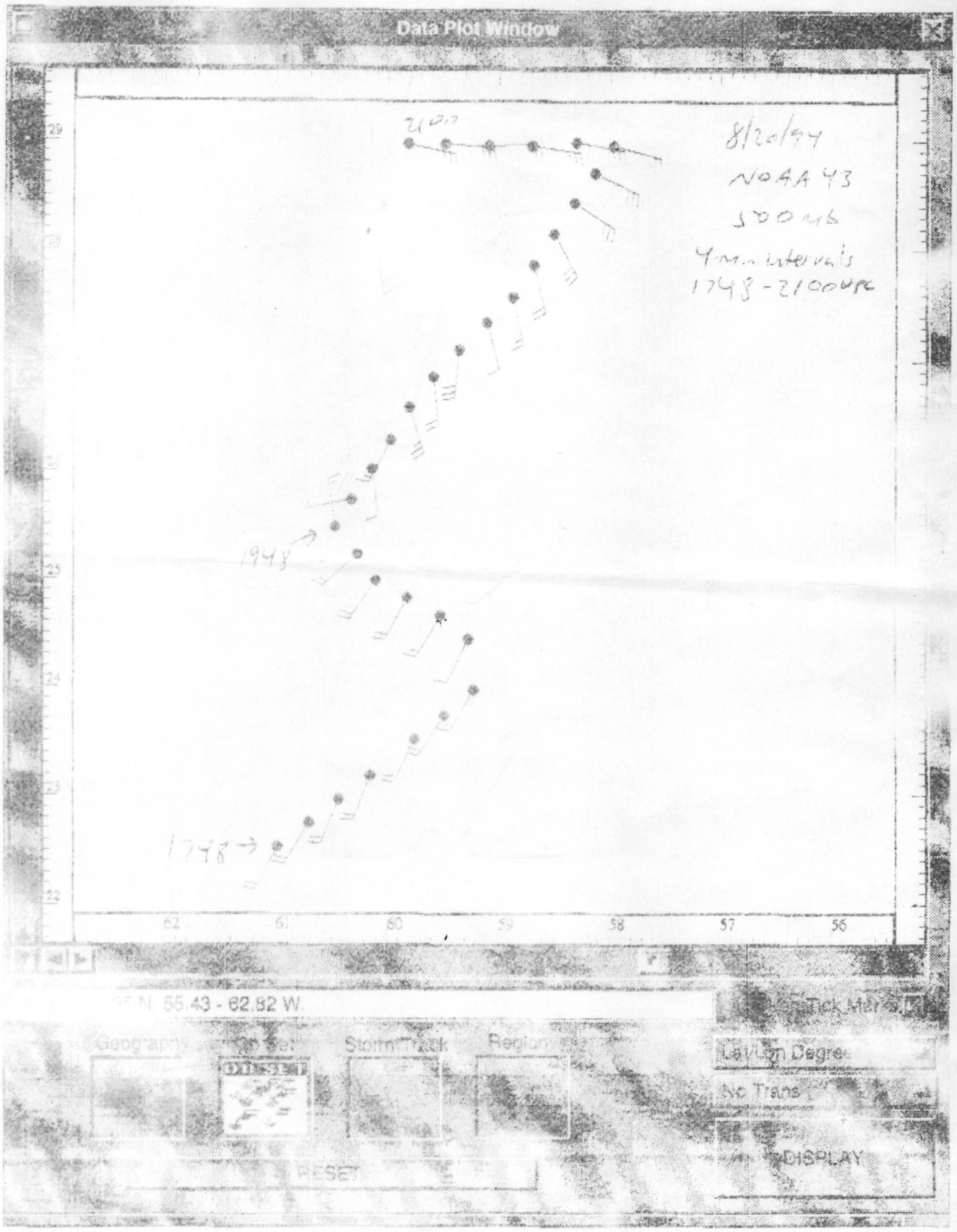
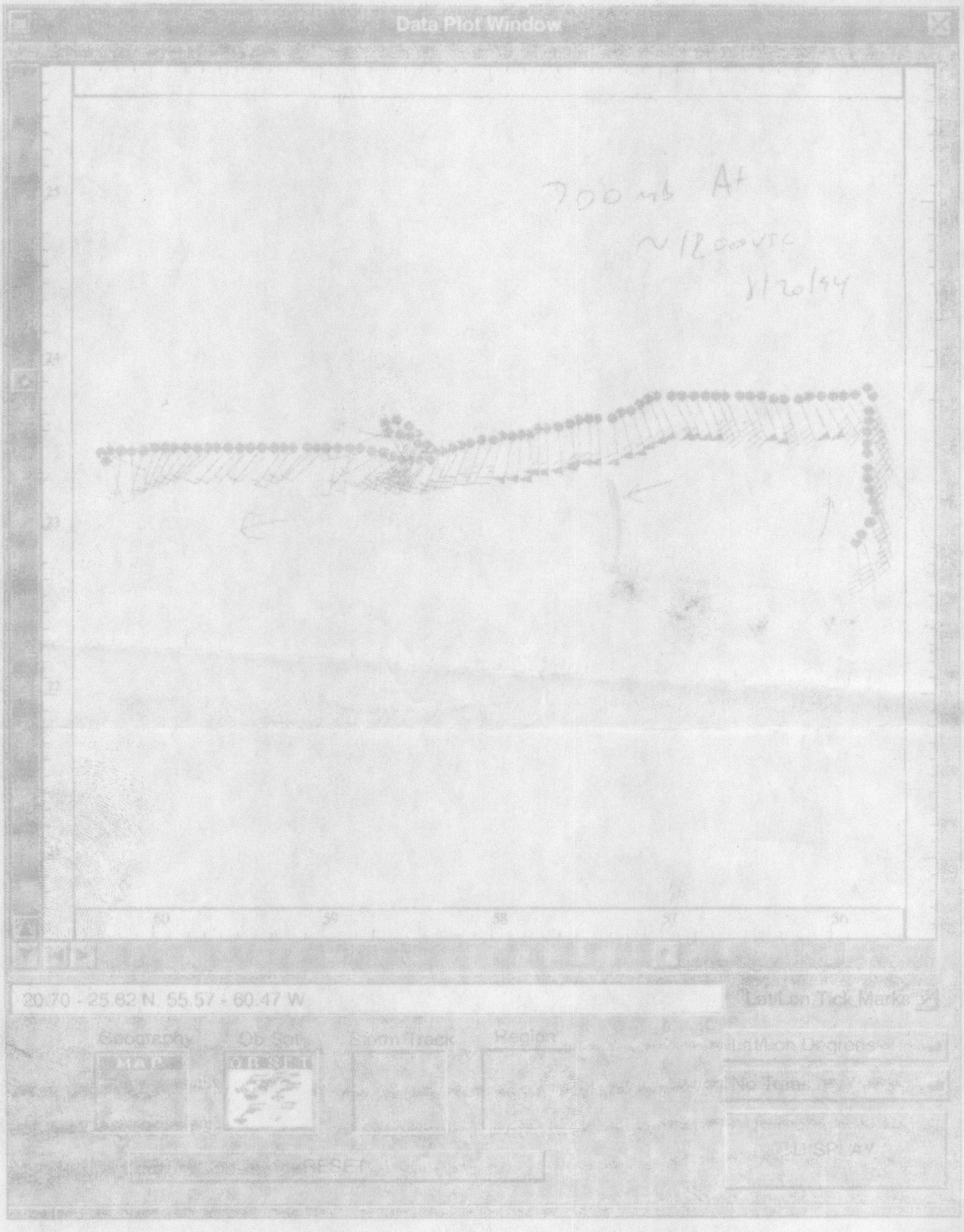
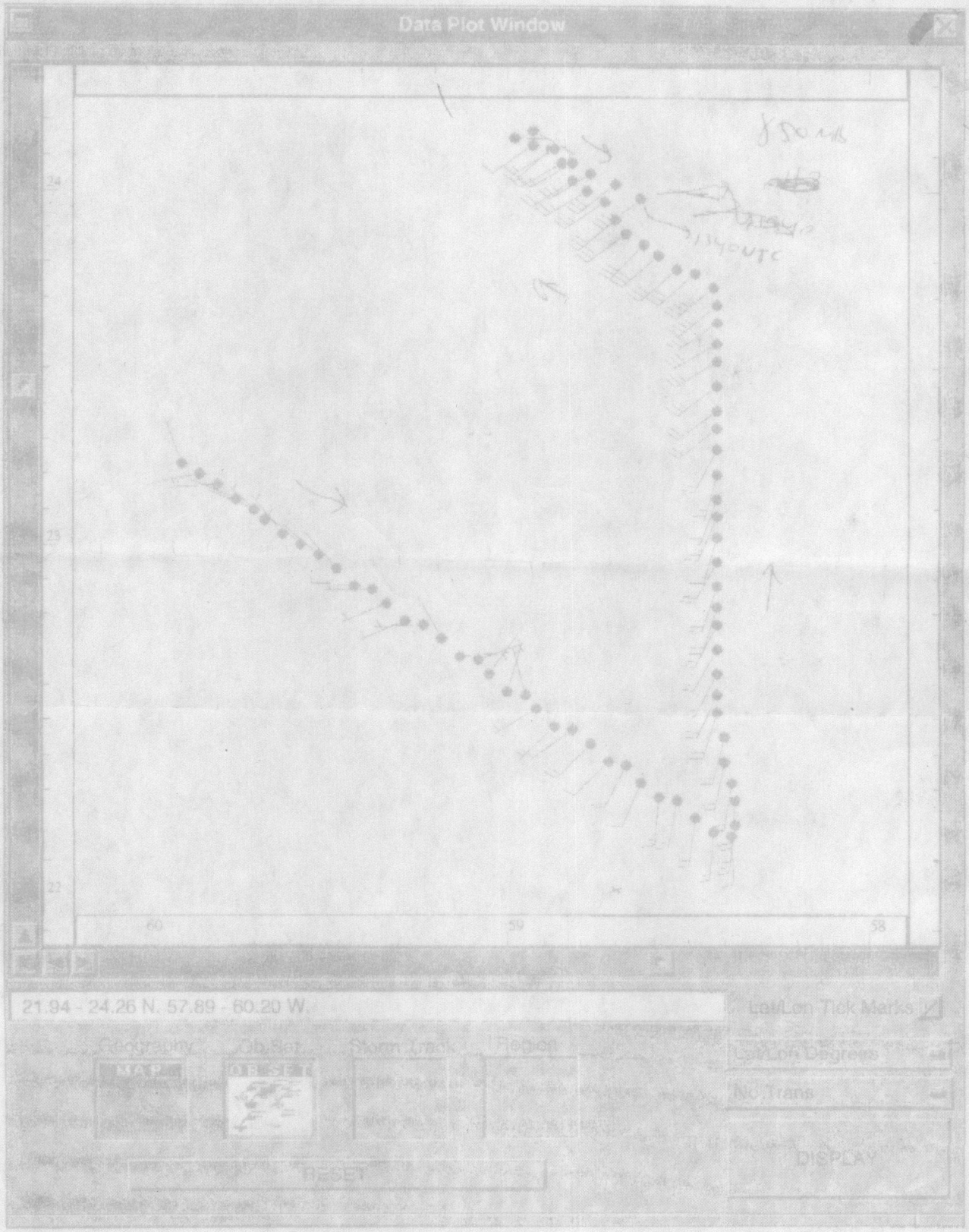

Data Plot Window
8/20/94
NOAA 43
500 mb
4 min intervals
1748 - 2100 UTC
1948
1748
62
61
60
59
58
57
56
N 55.43 - 62.82 W
Geography
Storm Track
Region
Tick Marks
Latitude Degree
No Trans
DISPLAY
RESET


Data Plot Window
66
65
64
63
62
61
60
59
58
57
56
55.11 - 66.89 W
Region
Lat/Lon Degrees
DISPLAY
RESET

data everywhere

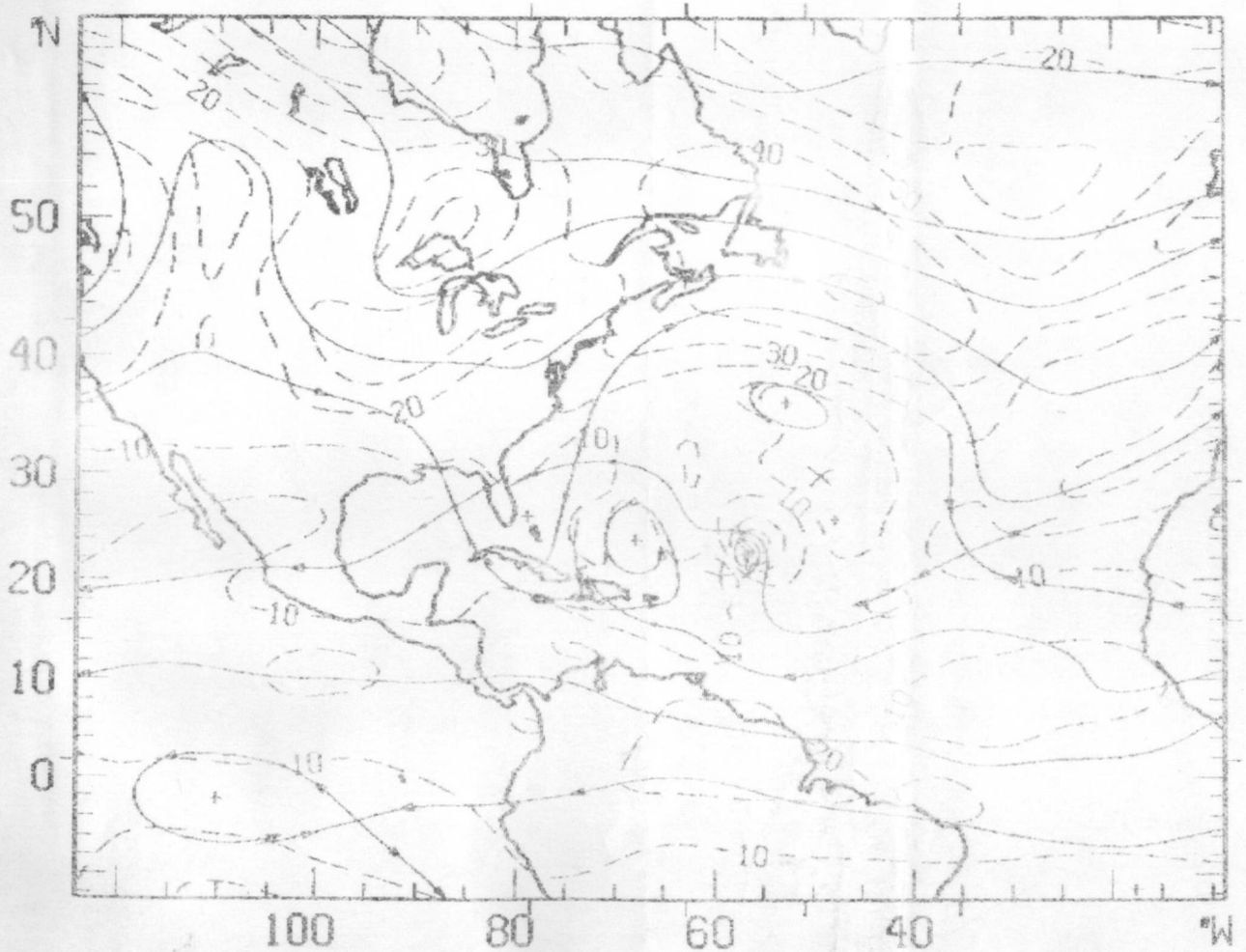


Data every minute
8/20/94



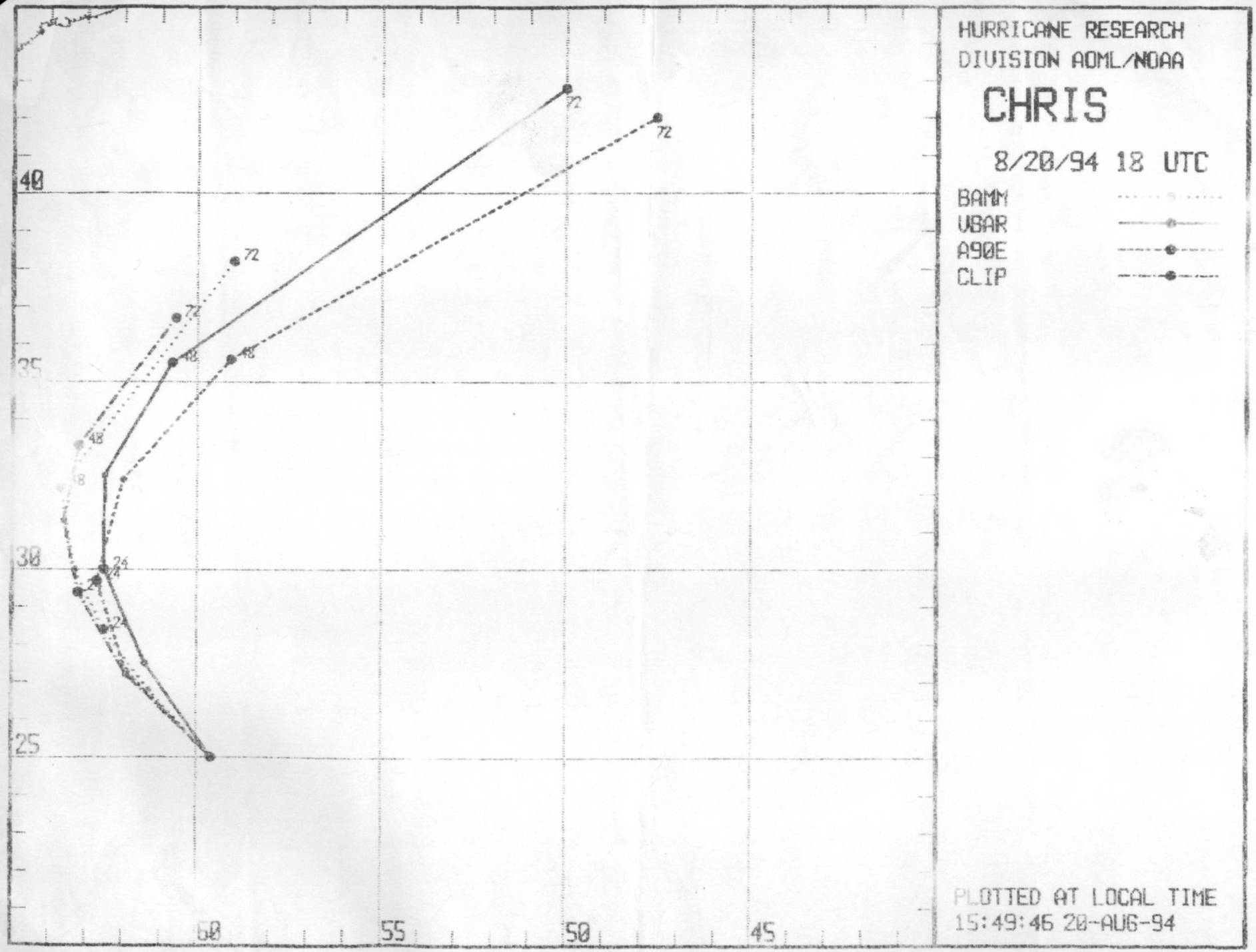
DEEP-LAYER-MEAN ANALYSIS CHRIS
WIND (KTS)
08/20 06 UTC
SC20 CHRM0820 20AUG 94 03 40

LYR MN
MESHES 01-03
M= 1-49, N= 1-39
0= 4



CONT=(10)
(ABERSON.PLOT)PPA.GRD AUG 20 1994 03.44.44

08-20-94 07:42AM FROM AOML HRD ATMOS-OCEAN TO 8302


HURRICANE RESEARCH
DIVISION AOML/NOAA
CHRIS
8/20/94 18 UTC
BAMM
VBAR
A90E
CLIP
PLOTTED AT LOCAL TIME
15:49:46 20-AUG-94
40
35
30
25
60
55
50
45
72
48
24

MAX. SURF.WIND(KTS) HRS. 0-72 (20 AUG. 0Z TO 23 AUG. 0Z) : STORM: CHRIS