

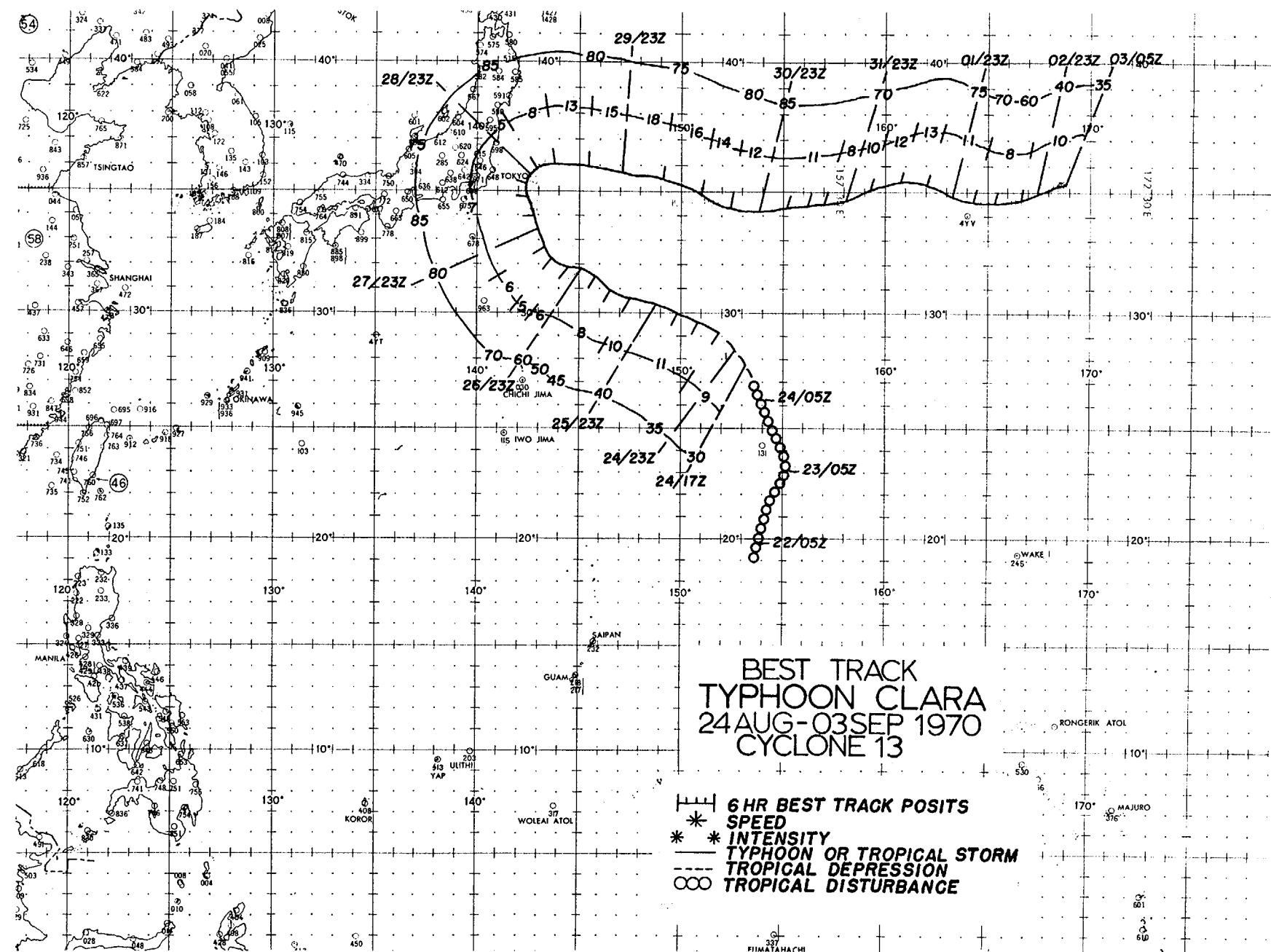
F. TYPHOON CLARA 26 AUG 0500Z-03 SEP 1100Z

1. STATISTICS

- a. Number of Warning Issued - 34
- b. Number of Warnings with Typhoon Intensity - 13
- c. Distance Traveled During Warning Period - 2,449 MI

2. CHARACTERISTICS AS A TYPHOON

- a. Minimum Observed SLP - 965 MBS at 30/2100Z
- b. Minimum Observed 700 MB Height - 2789 M at 30/2100Z
- c. Maximum Surface Wind - 85 KTS (From Best Track)
- d. Maximum Radius of Surface Circulation - 420 MI



3. TYPHOON CLARA NARRATIVE

The fourth typhoon of August appeared on the scene in its early stages as Billie was churning the waters of the Philippine Sea east of Okinawa. Clara developed to typhoon force at an unusually high latitude of 32°N. This was the 5th storm on record to reach typhoon intensity north of the 30th parallel since 1945.

The pre-Clara system was first noted by the ITOS-1 satellite on the 21st south of Marcus Island. The disturbance was related to an upper tropospheric circulation which had separated from the Mid-Pacific trough. The system drifted in a generally northward direction for the next two days and gradually attained a warm core.

On passage of Marcus on the 24th, the island's sounding indicated warming greater than one degree at all levels from 850 to 300 mb. After passage of Marcus a weak surface circulation developed.

The depression, not more than a degree and a half in diameter, reacted to a blocking ridge line to its north by commencing a more westerly track at 9-11 knots.

During the period of the 25th to the 26th the Clara circulation passed under a 200 mb shear line which acted as a hostile environment for further development as mass outflow from the system was retarded. Thus Clara barely attained minimum tropical storm strength during this portion of her track.

Later on the 26th, the system moved from beneath the shear line aloft, slowly strengthened and reached typhoon force the following day although its circulation remained small. Clara shifted to a northeast course 300 miles southeast of Tokyo late on the 27th and came under surveillance of the radar atop Mount Fuji (See Figure 5-11).

The typhoon missed connections with a short wave in the westerlies passing to the north. It instead took a sharp turn to the east on the 29th 120 mi abeam of Tokyo (Figure 5-12) as flow to the rear of the trough forced the storm on an abrupt change of course. For the next five days, Clara was effectively cut off from the westerlies and maintained her typhoon intensity along a 1,200 mile sinusoidal path towards Ocean Station Victor.

Late on the 2nd, Clara began to turn to the northeast and weaken along the periphery of the westward extension of the subtropical high system centered near the Hawaiian Islands. As increasing vertical shear was encountered and drier and

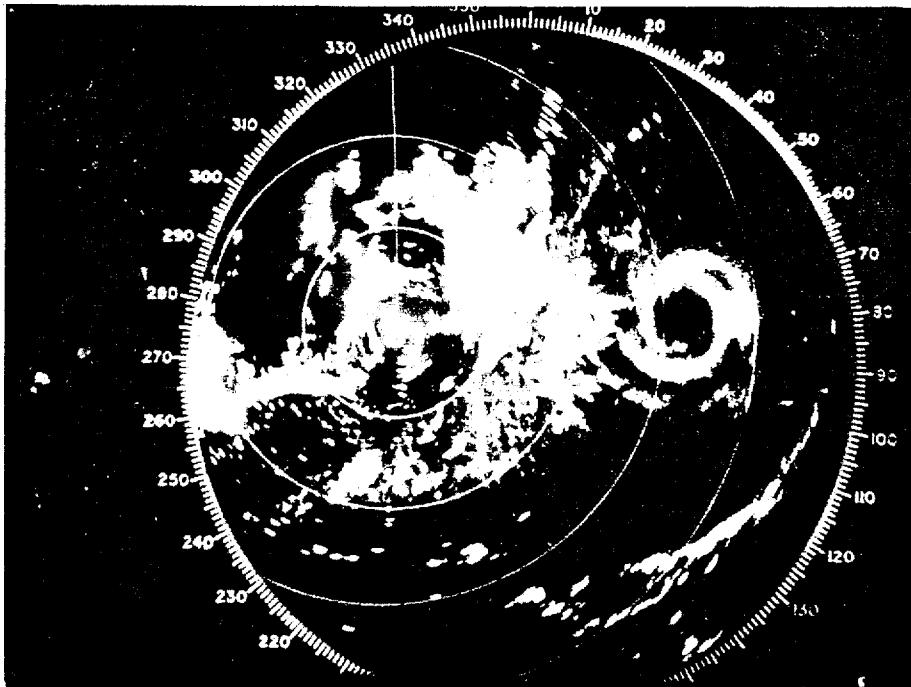


FIGURE 5-11 RADAR SCOPE PHOTOGRAPH OF TYPHOON CLARA AS VIEWED BY MT. FUJI MITSUBISHI RADAR (10.4 CM) ON 29 AUGUST AT 0417 GMT (COURTESY JAPAN METEOROLOGICAL AGENCY, TOKYO DISTRICT OBSERVATORY). RANGE MARKS ARE AT 100 KM INTERVALS. MUCH OF THE ECHO RETURN OUTSIDE THE WALL CLOUD AREA IS DUE TO GROUND CLUTTER AND SEA RETURN.

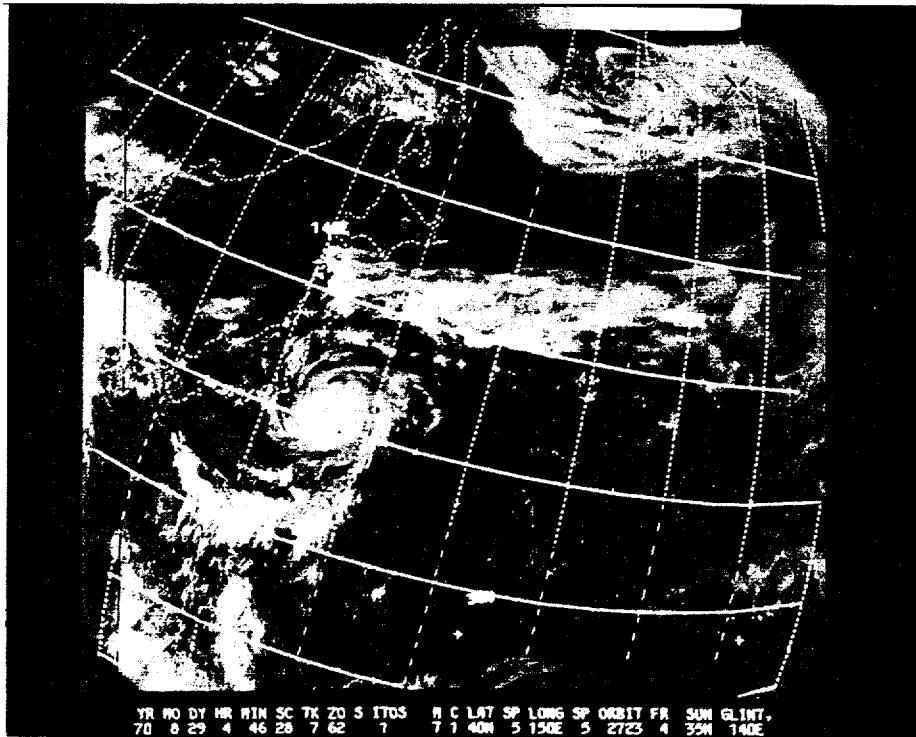


FIGURE 5-12 TYPHOON CLARA AS SEEN BY ITOS-1 ON 29 AUGUST DUE EAST OF TOKYO.

cooler air entrained into the circulation the storm gradually weakened until it was absorbed by a frontal system on the 4th.

During her eastward trek across the West Pacific, Clara affected numerous vessels in the shipping lanes. The Swedish vessel Sonette along with the Netherlands vessel Precent estimated winds of 80 knots on their close encounters with the storm respectively on the 30th of August and the 1st of September.

An interesting sidenote was that Hurricane Dot in the Central Pacific¹ formed on the 1st of September and was recurving close to the International Date Line on the 2nd and 3rd. Reconnaissance planes that were fixing Clara from Wake Island were called upon to position Dot before landing at Midway Island. An unusual accomplishment thus took place on the 3rd of September as reconnaissance aircraft fixed both a typhoon and a hurricane on the same mission.

¹Dot was the forecast responsibility of the Central Pacific Hurricane Center, Honolulu.

-IX NO.	TIME	POSIT	EYE FIXES CYCLONE				13	O-S	MIN	FLT	LVL	EYE	ORIEN- TATION	EYE DIA	CHARACTER	
			UN T- MET O- -ACCY	FLT LVL	LVL WND	SFC >NO		S:P								
1	230449Z	23.0N 155.5E	SLTLS	STG C	01A --	CAT -										
2	240350Z	25.0N 154.5E	SLTLS	STG C	01A --	CAT -										
3	250447Z	29.0N 152.0E	SLTLS	STG X	01A 02	CAT 2										
4	260543Z	30.5N 148.0E	SLTLS	STG X	01A 02	CAT 2										
5	262100Z	31.0N 145.0E	54--05--	700MB	055	050	945	2908	12/07	CIRC	---	22	CLSD	12-15NM THK		
6	270300Z	31.0N 144.0E	54--05--	700MB	055	070	976	2893	14/07	CIRC	---	15	OPEN	NE QUAD		
7	271449Z	31.0N 144.0E	SLTLS	STG C	01A --	CAT -										
8	270950Z	31.0N 144.5E	VW--20--		--	--	--		--/--							
9	271000Z	32.0N 142.0E	LND RUR		--	--	--		--/--							
10	271052Z	32.0N 143.0E	VW--10--		--	--	--		--/--				CLSD	9-27NM THK		
11	271140Z	32.0N 143.0E	VW--05--		045	--	--		--/--	CIRC	---	09	CLSD			
12	271500Z	32.0N 143.0E	LND RUR		--	--	--		--/--							
13	271700Z	32.0N 143.0E	LND RUR		--	--	--		--/--							
14	271800Z	32.0N 143.0E	LND RUR		--	--	--		--/--							
15	271900Z	33.0N 143.0E	LND RUR		--	--	--		--/--							
16	272100Z	33.0N 143.2E	54--05--	700MB	055	080	971	2850	15/08	CIRC	---	10	SNM	THK, OPEN SE-S		
17	272300Z	33.0N 143.2E	LND RUR		--	--	--		--/--							
18	280041Z	33.0N 143.0E	54--05--	700MB	055	085	96.9	2853	14/07	CIRC	---	19	OPEN	SE-S-W		
19	280300Z	33.0N 142.9E	54--05--	700MB	057	085	96.8	2865	17/07	CIRC	---	20	OPEN	SE-SW		
20	280500Z	33.0N 142.8E	LND RUR		--	--	--		--/--							
21	280545Z	33.0N 142.5E	SLTLS	STG C	01A --	CAT -										
22	280600Z	34.0N 142.0E	LND RUR		--	--	--		--/--							
23	280700Z	34.0N 142.0E	LND RUR		--	--	--		--/--							
24	280830Z	34.0N 142.5E	VW--05--		--	--	--		--/--	CIRC	---	35	OPEN	S		
25	280900Z	34.3N 142.7E	LND RUR		--	--	--		--/--							
26	281100Z	34.5N 142.5E	LND RUR		--	--	--		--/--							
27	281200Z	34.8N 142.5E	LND RUR		--	--	--		--/--							
28	281401Z	34.9N 142.5E	VW--10--	700MB	055	--	978	2975	16/09	CIRC	---	25	OPEN	S QUAD		
29	281500Z	35.0N 142.5E	LND RUR		--	--	--		--/--							
30	281600Z	35.1N 142.2E	LND RUR		--	--	--		--/--							
31	281700Z	35.3N 142.0E	LND RUR		--	--	--		--/--							
32	281800Z	35.3N 142.1E	LND RUR		--	--	--		--/--							
33	282000Z	35.5N 142.2E	LND RUR		--	--	--		--/--							
34	282100Z	35.5N 142.2E	54--05--	700MB	075	075	973	2862	15/08	CTRC	---	35	CLSD			
35	282100Z	35.7N 142.2E	LND RUR		--	--	--		--/--							
36	282100Z	35.5N 142.3E	LND RUR		--	--	--		--/--							
37	282200Z	35.6N 142.4E	LND RUR		--	--	--		--/--							
38	282300Z	35.6N 142.4E	LND RUR		--	--	--		--/--							
39	280000Z	35.6N 142.5E	LND RUR		--	--	--		--/--							
40	280100Z	35.6N 142.6E	LND RUR		--	--	--		--/--							
41	280200Z	35.6N 142.8E	LND RUR		--	--	--		--/--							
42	280300Z	35.9N 142.7E	54--05--	700MB	065	120	975	2841	17/14	CTRC	---	20	OPEN	SSW		
43	280446Z	35.8N 142.5E	SLTLS	STG X	01A 01	CAT 3										
44	280500Z	36.1N 143.0E	LND RUR		--	--	--		--/--							
45	280600Z	35.8N 143.2E	LND RUR		--	--	--		--/--							
46	280804Z	36.1N 143.4E	VW--05--		--	100	977	--	--/28	CTRC	---	28	OPEN	W		
47	281200Z	35.0N 144.0E	LND RUR		--	--	--		--/--							
48	291400Z	35.1N 144.3E	VW--08--		--	100	945	2990	--/--	CTRC	---	20	OPEN	W		

TYPHOON CLARA

Fix No.	TIME	POS(1)	EYE F/XES CYCLONE 13										CHARACTER WALL CLOUD
			UN-I- MET-DU -ACLY	FLT LVL	LVL WND	SFC RHO	MIN SLP	MIN 700MB	FLT LVL FR/TU	EYF FORM	ORIEN- TATION	EYE DIA	
43	292115Z	36.0N 146.7E	54--05---	700MB	0/2	050	975	2883	15/14	ELIP	NW-SE	25X18	CLSD
50	300000Z	35.0N 147.5E	54--05---	700MB	0/3	080	974	2868	16/12	ELIP	NW-SE	12X--	CLSD, APRS BRKG UP
51	300215Z	35.0N 148.3E	54--08---	700MB	0/0	000	959	2832	16/11	ELIP	NW-SE	28X22	OPEN NW, BRKG UP
52	300543Z	34.5N 150.5E	SLTS	STG X	DIA 03	CAT 3							-----
53	300926Z	35.0N 151.2E	VW--02---	3080M	068	--	943	2929	17/12	ELIP	NW-SE	38X28	OPEN W
54	301405Z	34.0N 151.9E	VW--10---	3000M	065	--	973	2911	16/10	CTRC	----	30	OPEN NE-SW, BRKG UP NE
55	302100Z	34.0N 153.4E	54--05---	700MB	000	085	945	2789	13/08	CTRC	----	30	CLSD
56	310200Z	34.2N 154.7E	54--05---	700MB	000	090	940	2800	18/07	CTRC	----	30	CLSD, ILL DEF S QUAD
57	310444Z	34.5N 155.0E	SLTS	STG X	DIA 04	CAT 2							-----
58	310915Z	34.5N 156.1E	VW--05---	3000M	0/0	060	973	2853	13/18	CTRC	----	28	CLSD, 15NM THK N SEMICIR
59	311130Z	34.7N 156.6E	VW--11---	3000M	045	--	--	--	--/--	CIRC	----	28	CLSD
60	010300Z	35.0N 158.0E	54--30---	700MB	000	100	975	2893	17/10	CTRC	----	15	NOT WELL DEF, OPEN S
61	010405Z	35.0N 158.5E	SLTS	STG X	DIA 05	CAT 2							-----
62	011004Z	35.0N 160.3E	VW--120---	--	--	--	--	--	--/--	----			-----
63	011114Z	35.4N 160.9E	VW--105---	700MB	005	--	979	2963	16/12	CIRC	----	15	CLSD
64	011230Z	35.5N 161.3E	VW--120---	--	--	--	--	--	--/--	----			-----
65	012056Z	35.1N 163.1E	54--15---	700MB	052	085	943	2935	18/10	CTRC	----	30	OPEN SSW-NNE
66	020300Z	34.8N 163.7E	54--20---	700MB	000	090	979	2941	17/12	CTRC	----	15	OPEN NE
67	020440Z	34.0N 165.0E	SLTS	SIG X	DIA 07	CAT 2							-----
68	021230Z	34.7N 165.1E	VW--115---	--	--	--	--	--	--/--	----			W/C S SEMICIR, 6NM THK
69	021250Z	34.0N 165.4E	VW--105---	--	045	991	--	24/24	--				-----
70	022015Z	34.4N 166.4E	54--15---	700MB	039	040	992	3021	15/-	----			NEG W/C
71	030340Z	34.0N 168.0E	SLTS	SIG C	DIA --	CAT -							-----
72	030400Z	35.2N 168.4E	54--10---	700MB	035	030	943	3030	11/09	----			NEG W/C
73	040242Z	34.0N 169.0E	SLTS	SIG C	DIA --	CAT -							-----

TYPHOON CLARA

TROPICAL CYCLONE 13 -- 8/24/1700Z TO 9/3/0500Z
POSITION AND FORECAST VERIFICATION DATA

WARN NO.	DTG	WARNING POSIT		BEST TRACK		24 HR LAT	FCST LONG	24 HR DEG DIST	ERROR	48 HR LAT	FCST LONG	48 HR DEG DIST	ERROR	72 HR LAT	FCST LONG	72 HR DEG DIST
		LAT	LONG	LAT	LONG											
01	26/0500Z	30.5N	147.5E	30.6N	147.5E	31.7N	142.1E	264-0108	-----	-----	-----	-----	-----	-----	-----	-----
02	26/1100Z	30.8N	146.3E	31.0N	146.6E	32.0N	140.6E	266-0162	-----	-----	-----	-----	-----	-----	-----	-----
03	26/1700Z	31.0N	145.3E	31.5N	145.9E	32.1N	140.3E	258-0156	-----	-----	-----	-----	-----	-----	-----	-----
04	26/2300Z	32.0N	145.1E	31.9N	145.0E	34.1N	141.6E	298-0072	36.8N	139.6E	296-0144	42.7N	144.6E	345-0432	-----	-----
05	27/0500Z	32.0N	144.3E	31.9N	144.3E	33.8N	138.4E	266-0216	-----	-----	-----	-----	-----	-----	-----	-----
06	27/1100Z	32.0N	143.9E	32.2N	143.8E	33.8N	138.5E	255-0198	-----	-----	-----	-----	-----	-----	-----	-----
07	27/1700Z	32.8N	143.5E	32.7N	143.4E	35.7N	142.0E	338-0030	39.7N	142.4E	327-0252	-----	-----	-----	-----	-----
08	27/2300Z	33.1N	143.1E	33.5N	143.0E	35.8N	141.9E	284-0024	40.0N	145.0E	340-0270	-----	-----	-----	-----	-----
09	28/0500Z	34.0N	142.8E	34.1N	142.7E	36.2N	141.8E	284-0048	-----	-----	-----	-----	-----	-----	-----	-----
10	28/1100Z	34.6N	142.4E	34.7N	142.4E	37.4N	141.8E	306-0120	-----	-----	-----	-----	-----	-----	-----	-----
11	28/1700Z	35.3N	142.3E	35.2N	142.3E	38.1N	142.8E	314-0168	-----	-----	-----	-----	-----	-----	-----	-----
12	28/2300Z	35.8N	142.2E	35.7N	142.4E	38.5N	143.1E	312-0246	-----	-----	-----	-----	-----	-----	-----	-----
13	29/0500Z	36.0N	142.9E	36.0N	142.8E	37.6N	146.6E	314-0174	-----	-----	-----	-----	-----	-----	-----	-----
14	29/1100Z	36.3N	143.8E	36.2N	143.8E	37.4N	147.9E	313-0216	-----	-----	-----	-----	-----	-----	-----	-----
15	29/1700Z	36.3N	144.8E	36.1N	145.4E	36.7N	149.1E	310-0210	37.0N	155.0E	324-0174	-----	-----	-----	-----	-----
16	29/2300Z	35.8N	147.2E	35.7N	147.0E	35.4N	156.1E	060-0126	-----	-----	-----	-----	-----	-----	-----	-----
17	30/0500Z	35.6N	149.4E	35.5N	149.2E	39.4N	157.9E	024-0330	-----	-----	-----	-----	-----	-----	-----	-----
18	30/1100Z	35.6N	151.8E	34.9N	151.1E	36.9N	159.7E	049-0222	-----	-----	-----	-----	-----	-----	-----	-----
19	30/1700Z	34.6N	152.8E	34.4N	152.4E	36.0N	158.4E	036-0102	-----	-----	-----	-----	-----	-----	-----	-----
20	30/2300Z	34.3N	153.9E	34.3N	153.8E	35.7N	159.7E	058-0096	-----	-----	-----	-----	-----	-----	-----	-----
21	31/0500Z	34.2N	155.2E	34.3N	155.1E	34.7N	160.8E	112-0078	-----	-----	-----	-----	-----	-----	-----	-----
22	31/1100Z	36.2N	156.5E	34.4N	156.2E	36.2N	162.3E	059-0090	-----	-----	-----	-----	-----	-----	-----	-----
23	31/1700Z	34.8N	157.9E	34.6N	157.1E	36.7N	163.7E	043-0114	-----	-----	-----	-----	-----	-----	-----	-----
24	31/2300Z	34.9N	157.8E	34.8N	158.0E	35.6N	159.5E	282-0186	37.2N	161.7E	295-0300	-----	-----	-----	-----	-----
25	01/0500Z	35.0N	158.1E	35.2N	159.3E	35.9N	159.9E	288-0222	37.6N	162.2E	293-0352	-----	-----	-----	-----	-----
26	01/1100Z	35.4N	160.7E	35.4N	160.7E	38.6N	165.8E	000-0234	-----	-----	-----	-----	-----	-----	-----	-----
27	01/1700Z	35.9N	161.9E	35.3N	162.0E	39.6N	167.0E	006-0288	-----	-----	-----	-----	-----	-----	-----	-----
28	01/2300Z	35.1N	163.8E	34.9N	163.3E	35.8N	170.5E	072-0150	38.3N	178.2E	-----	-----	-----	-----	-----	-----
29	02/0500Z	34.8N	164.0E	34.7N	164.3E	34.4N	167.8E	222-0075	35.6N	173.4E	-----	-----	-----	-----	-----	-----
30	02/1100Z	34.5N	165.2E	34.7N	165.8E	34.7N	169.6E	-----	36.4N	175.4E	-----	-----	-----	-----	-----	-----
31	02/1700Z	34.8N	166.3E	34.8N	166.3E	36.2N	171.1E	-----	-----	-----	-----	-----	-----	-----	-----	-----
32	02/2300Z	35.0N	167.3E	35.0N	167.5E	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
33	03/0500Z	35.3N	168.5E	35.4N	168.8E	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
34	03/1100Z	35.4N	169.8E	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

AVERAGE 24 HOUR ERROP - 0153 MI.

AVERAGE 48 HOUR ERROR - 0249 MI.

AVERAGE 72 HOUR ERROR - 0432 MI.