M. TYPHOON CHARLOTTE (09-19 OCTOBER 1959)

As early as 4 October, surface map analyses indicated a diffuse area of low pressure extending along the Intertropical Convergence Zone from the general vicinity of the Palau Islands eastward. By 8 October, this low pressure area had deepened and contracted to the extent that surface map analyses indicated the possibility of a cyclone just to the southeast of the islands of Yap and Koror. Accordingly, a reconnaissance aircraft investigated the area late on the 8th and verified the existence of a closed circulation. This circulation was still quite weak but warranted further reconnaissance surveillance. Throughout the 9th, reconnaissance aircraft continued to track this cyclone. Finally on the 10th, as a result of an early morning penetration, Tropical Storm CHARLOTTE was named and the first warning was issued at 100600Z.

Throughout the 9th and 10th, CHARLOTTE moved northwestward at speeds varying from 6 to 9 knots. Steady intensification took place so that at 101800Z she was upgraded to a typhoon. On the 11th and 12th, CHARLOTTE intensified further and continued to move to the northwest at an average speed of 9 knots. On the 13th, as CHARLOTTE approached the western extremity of the semi-permanent Pacific High, recurvature and deceleration commenced. Also on the 13th, at 0800Z, CHARLOTTE appears to have reached her peak intensity. At this time a reconnaissance aircraft penetration reported a sea level pressure of 905 millibars and maximum surface winds of 145 knots. On the 14th CHARLOTTE reached the apex of her recurvature. She slowed to a speed

of 3-4 knots and began a movement toward the north-northeast. At approximately 161200Z, CHARLOTTE passed within 40 miles of the southern tip of Okinawa. At this time she was moving northeastward at a speed of about 9 knots. As a result of this comparatively slow speed, Okinawa experienced sustained winds of 45-55 knots for approximately 14 hours on the 16th. A peak gust of 105 knots was recorded by the Ryukyuan Weather Bureau, and 24 inches of rain caused considerable flooding. On the 18th, CHARLOTTE finally came under the influence of strong westerlies aloft and rapidly accelerated toward the northeast. An influx of colder air lying to the north and northwest caused steady weakening. At 190000Z, she was downgraded to a tropical storm and the final tropical warning was issued. Very shortly thereafter, CHARLOTTE was imbedded in the Polar Front as an extra-tropical low.

It is interesting to note the reconnaissance aircraft fixes on the 18th. At this time CHARLOTTE was rapidly proceeding northeastward off the southeastern tip of Honshu. These fixes would seem to indicate that CHARLOTTE's track was further north than that delineated by the best track. However, careful analysis of the reports from Hachijo Jima indicated that the primary center had passed close to this station. Apparently a secondary upper air center had developed on the 18th as CHARLOTTE became diffuse and cold air advection caused rapid weakening. It was this secondary center which was fixed at 181415Z and 182000Z by reconnaissance aircraft. Throughout her lifetime, CHARLOTTE's track conformed quite closely to the flow as indicated by the high level charts. The 200 millibar chart was

particularly helpful as a forecasting tool, and the 200 millibar level was undoubtedly the best steering level aloft. Thirty-six warnings were issued covering a period of 10 days.

For damage caused by Typhoon CHARLOTTE see section VI, "Destructive Effects of Typhoons."

RECONNAISSANCE AIRCRAFT FIXES - TYPHOON CHARLOTTE

FIX NO.	TIME	LAT.	LONG.	*UNIT METHOD & ACCY	MIN SLP MBS	MAX SFC WND	MIN 700MB HGT	MAX FLT LVL WND	700MB TEMP (°C)	700MB DEWPT (°C)	EYE CHARACTERISTICS
1	090215Z	10.4N	137.3E	54-P-10	--	35	10120	35	09	09	EYE ILL DEFINED
2	090700Z	10.9N	136.6E	54-P-5	1006	40	10080	35	09	09	EYE FILLED WITH CLDS
3	092100Z	12.0N	135.0E	54-P-5	994	30	10130	30	11	08	EYE ILL DEFINED
4	100800Z	13.4N	133.9E	54-P-2	998	50	10100	35	13	07	CIRC DIA 30 MI
5	102000Z	13.4N	132.4E	54-R-15	--	--	--	--	--	--	WALL CLDS DIA 20 MI
6	102140Z	13.8N	132.7E	54-P-5	989	90	9910	--	16	05	TURBC SVR W QUAD
7	110140Z	14.3N	131.7E	54-P-5	989	100	9890	--	17	07	CIRC DIA 25 MI
8	110800Z	14.7N	131.0E	54-P-5	980	70	9630	70	18	12	CIRC DIA 15 MI
9	111400Z	14.8N	130.3E	54-R-10	--	--	--	--	--	--	———
10	112000Z	15.4N	128.6E	54-T-40	--	--	--	60	--	--	TURBC LGT N&W QUADS
11	112200Z	15.5N	129.2E	54-P-15	972	80	9420	--	17	12	CIRC DIA 40 MI
12	120030Z	15.8N	129.0E	54-P-15	975	175	9480	--	16	13	WALL CLDS ALL QUADS
13	121422Z	16.9N	126.9E	12-R-10	--	--	--	--	--	--	WELL DEFINED EYE
14	122000Z	17.3N	126.2E	54-R-15	--	--	--	--	--	--	CIRC DIA 10 MI
15	122200Z	17.5N	126.0E	54-P-5	932	150	8180	--	17	15	WALL CLDS ALL QUADS
16	130200Z	17.9N	125.9E	54-P-5	916	125	7730	--	17	16	CIRC DIA 08 MI
17	130433Z	18.0N	125.7E	VW-R-5	--	--	--	--	--	--	CLOSED EYE 08 MI DIA
18	130800Z	18.3N	125.4E	54-P-5	905	145	7320	180	20	15	PERFECT EYE FORMATION
19	131605Z	18.7N	125.2E	54-R-5	--	--	--	--	--	--	DOUBLE WALL CLDS
20	132200Z	19.3N	124.9E	54-P-3	914	100	7630	110	17	15	WALL CLDS ALL QUADS
21	132316Z	19.5N	125.1E	12-R-5	--	--	--	--	--	--	WELL DEFINED CIRC EYE

RECONNAISSANCE AIRCRAFT FIXES - TYPHOON CHARLOTTE (CONT'D)

FIX NO.	TIME	LAT.	LONG.	*UNIT METHOD & ACCY	MIN SLP MBS	MAX SFC WND	MIN 700MB HGT	MAX FLT LVL WND	700MB TEMP (°C)	700MB DEWPT (°C)	EYE CHARACTERISTICS
22	140200Z	19.7N	124.8E	54-P-5	914	125	7620	- -	18	15	CIRC DIA 05 MI
23	140800Z	20.4N	124.6E	54-P-5	916	175	7640	- -	17	15	WALL CLDS ALL QUADS
24	141045Z	20.6N	124.4E	12-R-10	- -	- -	- -	- -	- -	- -	EYE DIA 09 MI
25	141400Z	21.1N	124.3E	54-R-10	- -	- -	- -	- -	- -	- -	CIRC DIA 12 MI
26	142200Z	21.5N	124.3E	54-P-2	932	150	8130	70	18	18	CIRC DIA 07 MI
27	150200Z	21.8N	124.4E	54-P-5	937	- -	8110	- -	17	13	EYE BREAKING UP
28	150357Z	22.1N	124.6E	12-R—	- -	- -	- -	- -	- -	- -	
29	150800Z	22.5N	124.7E	54-P-5	940	95	8280	70	17	15	EYE ELLIPTICAL
30	151359Z	23.2N	125.3E	12-R-5	- -	- -	- -	- -	- -	- -	DOUBLE WALL CLDS
31	151830Z	23.9N	125.7E	* *	- -	- -	- -	- -	- -	- -	
32	152200Z	24.3N	125.8E	54-P-5	956	85	8730	90	16	13	CIRC DIA 60 MI
33	160150Z	24.7N	126.6E	54-P—	955	- -	- -	- -	- -	- -	TWO CELLS
34	160522Z	25.0N	127.1E	54-P—	952	- -	9010	90	10	10	EYE OBLONG
35	161100Z	25.6N	128.0E	12-R-10	- -	- -	- -	- -	- -	- -	WALL CLD STRONG NE
36	161412Z	25.7N	128.3E	54-R-20	- -	- -	- -	- -	- -	- -	EYE ELLIP DIA INDEF
37	162000Z	26.3N	129.0E	54-R-25	- -	- -	- -	- -	- -	- -	EYE NOT WELL DEFINED
38	162115Z	26.2N	128.9E	54-P-10	962	60	9070	- -	17	14	EYE ILL DEFINED
39	170200Z	26.8N	129.4E	54-P-5	970	90	9220	70	16	16	CIRC DIA 60 MI
40	170800Z	27.2N	130.3E	54-P-3	965	75	9190	80	15	15	WALL CLDS ALL QUADS
41	171100Z	27.3N	130.8E	12-R-5	- -	- -	- -	- -	- -	- -	EYE ELLIPTICAL
42	171430Z	27.8N	131.3E	54-R-2	- -	- -	- -	- -	- -	- -	WALL CLDS ALL QUADS

RECONNAISSANCE AIRCRAFT FIXES - TYPHOON CHARLOTTE (CONT'D)

FIX NO.	TIME	LAT.	LONG.	*UNIT METHOD & ACCY	MIN SLP MBS	MAX SFC WND	MIN 700MB HGT	MAX FLT LVL WND	700MB TEMP (°C)	700MB DEWPT (°C)	EYE CHARACTERISTICS
43	172000Z	28.1N	131.5E	54-P-5	974	- -	9500	70	22	16	CIRC DIA 45 MI
44	172318Z	28.4N	133.1E	12-P-5	- -	- -	- -	- -	- -	- -	EYE POORLY DEFINED
45	180200Z	29.0N	132.9E	54-P-2	970	60	9570	60	16	10	WALL CLDS N, E&S QUADS
46	180800Z	30.2N	134.1E	54-P-2	970	90	9590	67	19	08	TURBC SVR N QUAD
47	181415Z	32.1N	136.5E	54-R-1	- -	- -	- -	75	- -	- -	EYE ELLIPTICAL
48	182000Z	34.8N	139.5E	54-R-15	- -	- -	- -	- -	- -	- -	CIRC, WALL CLDS TO N

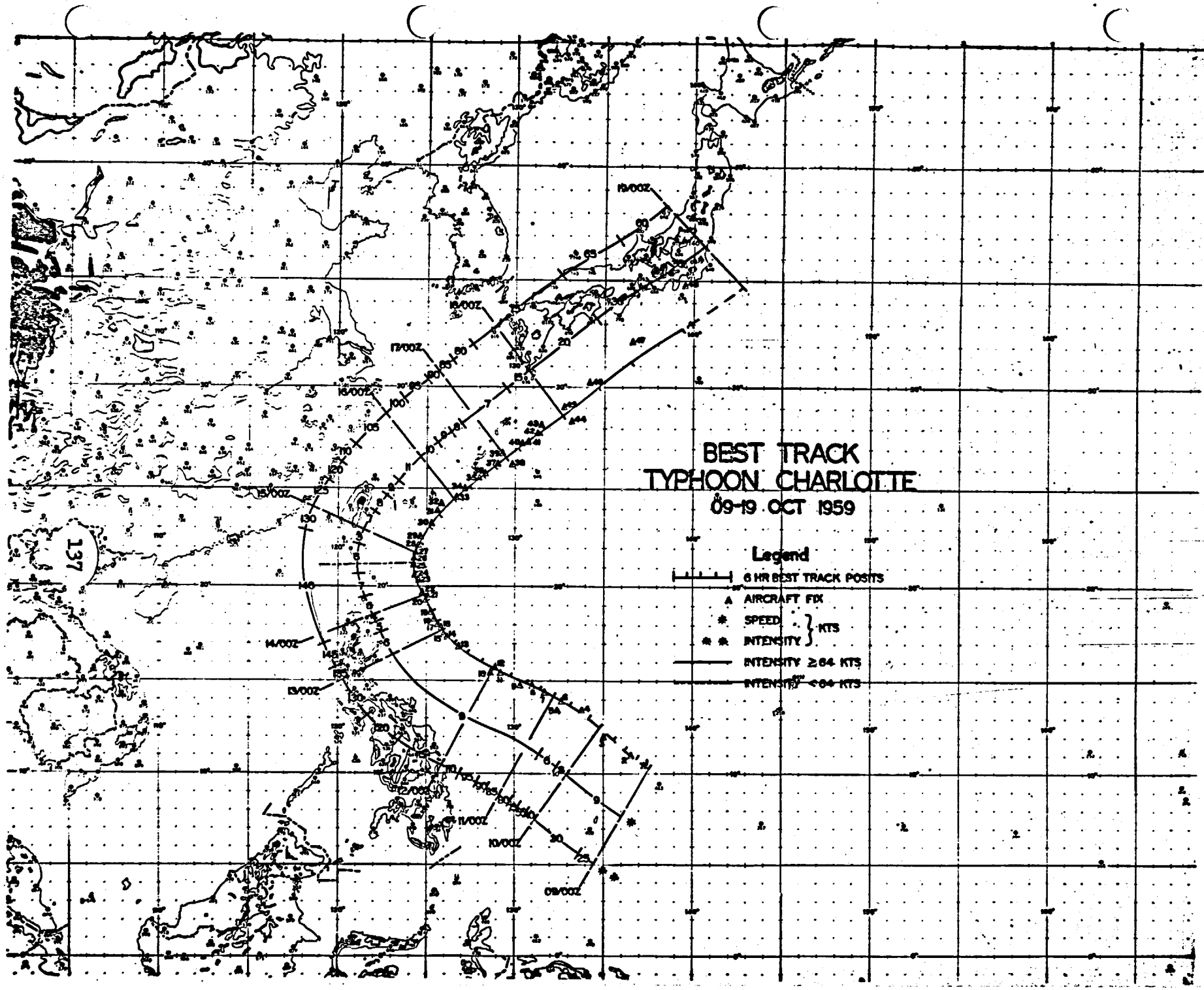
TYPHOON CHARLOTTE 09 - 19 OCT. 1959
POSITION AND FORECAST VERIFICATION DATA

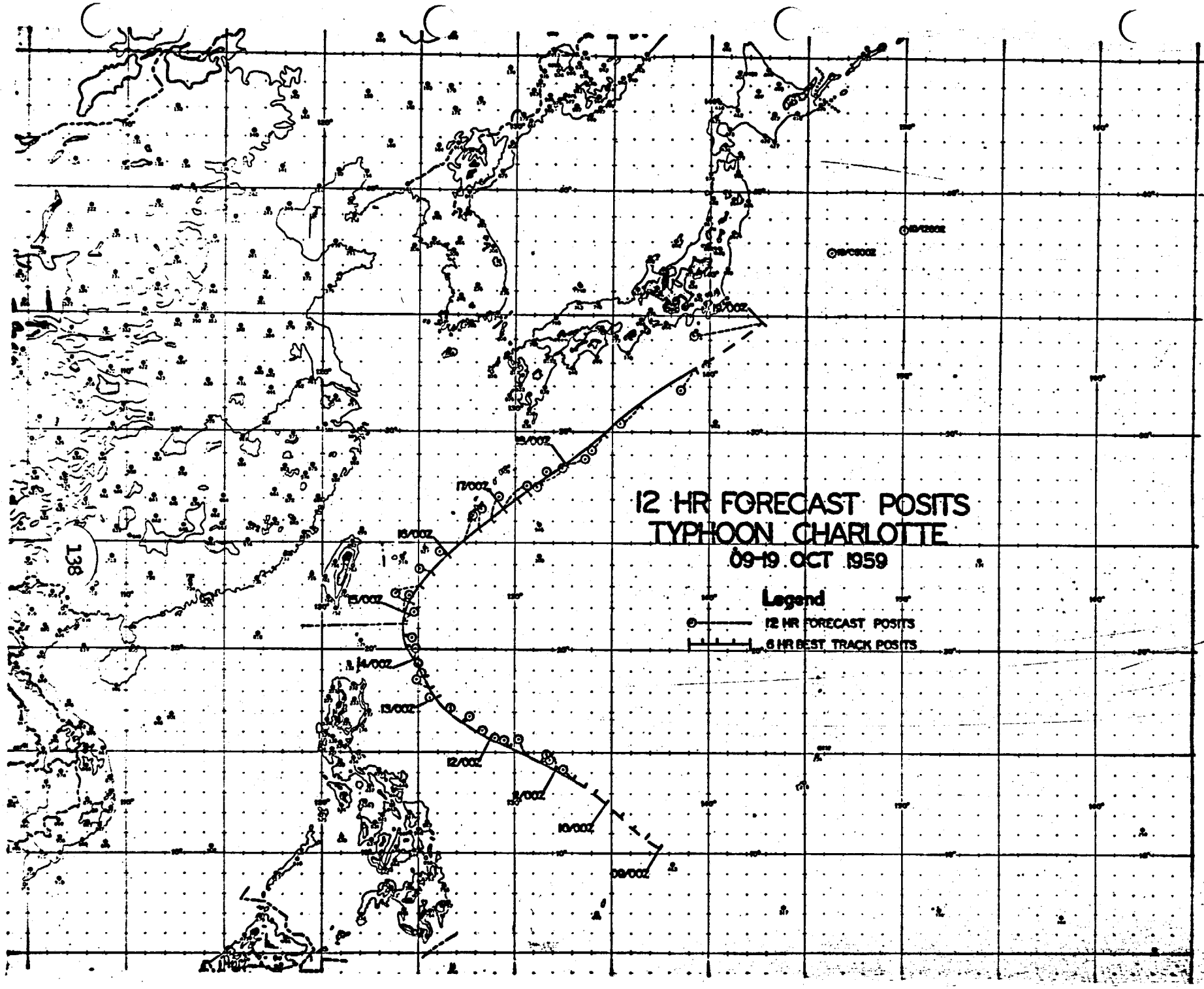
DTG	STORM POSITION LAT.	LONG.	12 HR ERROR DEG.	DISTANCE	24 HR ERROR DEG.	DISTANCE
090000Z	10.2N	137.6E	- - - -		- - - -	
090600Z	10.8N	136.9E	- - - -		- - - -	
091200Z	11.4N	136.2E	- - - -		- - - -	
091800Z	11.9N	135.5E	- - - -		- - - -	
100000Z	12.5N	134.8E	- - - -		- - - -	
100600Z	15.0N	134.1E	- - - -		- - - -	
101200Z	15.4N	133.6E	- - - -		- - - -	
101800Z	13.7N	133.1E	310	46	- - - -	
110000Z	14.2N	132.2E	325	57	- - - -	
110600Z	14.5N	131.4E	260	30	333	66
111200Z	14.9N	130.6E	334	48	338	85
111800Z	15.2N	129.8E	326	25	076	62
120000Z	15.6N	128.9E	043	07	343	82
120600Z	16.0N	128.1E	062	20	326	36
121200Z	16.5N	127.3E	051	29	255	20
121800Z	17.0N	126.6E	056	19	096	28
130000Z	17.7N	125.9E	270	18	050	07
130600Z	18.2N	125.6E	291	44	270	20
131200Z	18.7N	125.3E	325	14	269	65
131800Z	19.2N	125.0E	324	22	290	105
140000Z	19.5N	124.9E	003	36	339	58
140600Z	20.1N	124.6E	119	18	353	45
141200Z	20.7N	124.3E	135	20	043	80
141800Z	21.3N	124.3E	045	40	125	37
150000Z	21.7N	124.4E	009	53	052	36
150600Z	22.3N	124.7E	300	51	051	116
151200Z	23.0N	125.1E	259	75	003	90
151800Z	23.7N	125.7E	284	37	282	90
160000Z	24.5N	126.5E	284	23	283	148
160600Z	25.1N	127.4E	020	68	281	53
161200Z	25.6N	128.2E	016	55	351	46
161800Z	26.2N	128.8E	015	60	063	185
170000Z	26.5N	129.5E	048	85	056	167
170600Z	27.0N	130.1E	059	67	051	172
171200Z	27.4N	130.7E	047	70	062	240
171800Z	27.8N	131.4E	060	68	068	222

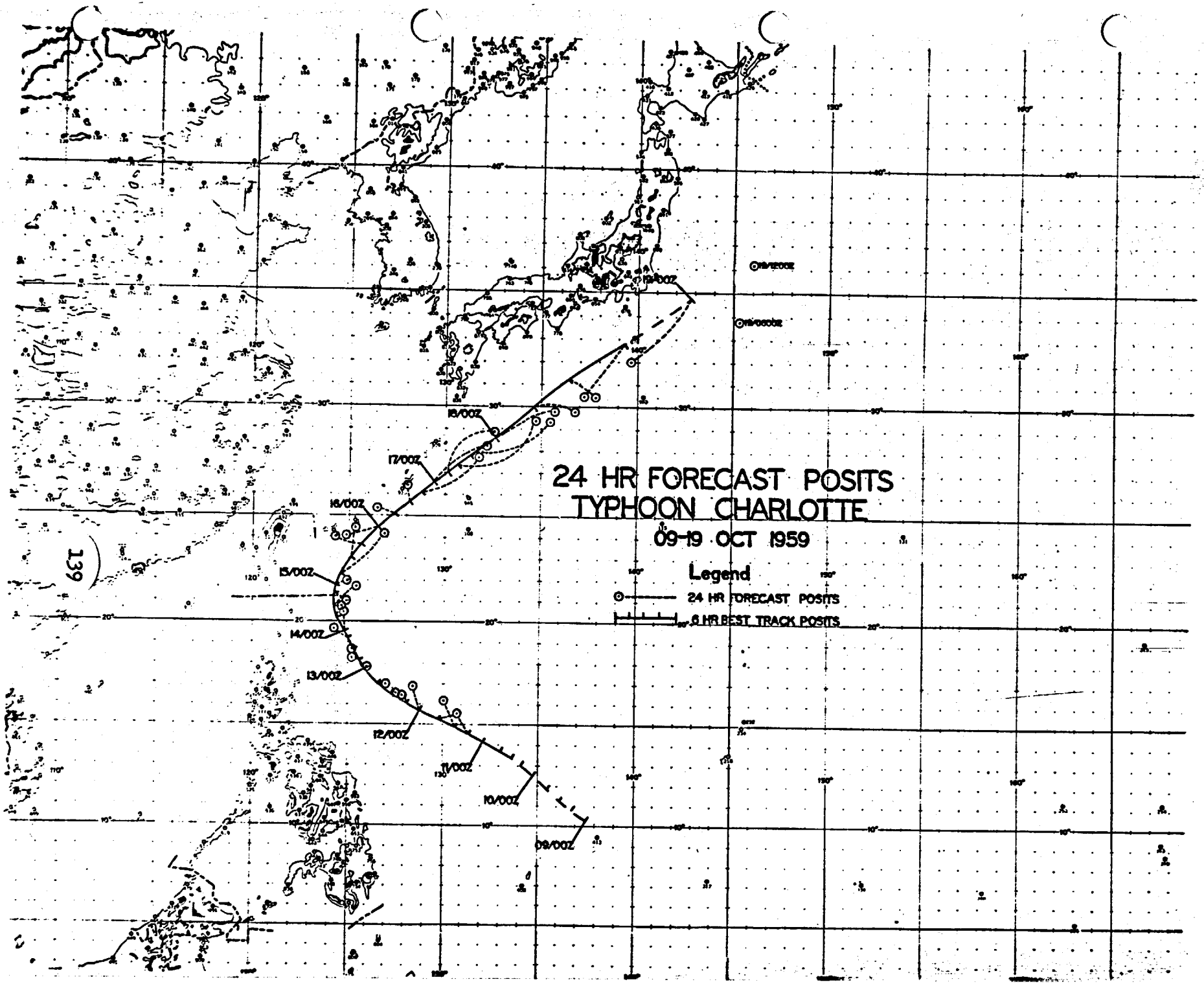
TYPHOON CHARLOTTE 09 - 19 OCT 1959
POSITION AND FORECAST VERIFICATION DATA (CONT'D)

DTG	STORM POSITION LAT.	LONG.	12 HR ERROR DEG.	DISTANCE	24 HR ERROR DEG.	DISTANCE
180000Z	28.7N	132.7E	086	46	069	172
180600Z	30.0N	134.6E	213	54	095	116
181200Z	31.2N	136.4E	227	76	124	93
181800Z	32.8N	139.3E	213	72	215	181
190000Z	34.8N	142.8E	258	180	224	232

AVERAGE 12 HOUR FORECAST ERROR 48.0 NM
AVERAGE 24 HOUR FORECAST ERROR 98.6 NM


BEST TRACK
TYPHOON CHARLOTTE
09-19 OCT 1959
Legend
6 HR BEST TRACK POSITS
AIRCRAFT FIX
SPEED
INTENSITY
KTS
INTENSITY ≥64 KTS
INTENSITY <64 KTS
09/00Z
10/00Z
11/00Z
12/00Z
13/00Z
14/00Z
15/00Z
16/00Z
17/00Z
18/00Z
19/00Z


12 HR FORECAST POSITS
TYPHOON CHARLOTTE
09-19 OCT 1959
Legend
12 HR FORECAST POSITS
6 HR BEST TRACK POSITS
09/00Z
10/00Z
12/00Z
13/00Z
14/00Z
15/00Z
16/00Z
17/00Z
18/00Z
19/00Z
19/06Z
19/12Z
138


24 HR FORECAST POSITS
TYPHOON CHARLOTTE
09-19 OCT 1959
Legend
24 HR FORECAST POSITS
6 HR BEST TRACK POSITS
09/00Z
10/00Z
11/00Z
12/00Z
13/00Z
14/00Z
15/00Z
16/00Z
17/00Z
18/00Z
19/00Z
19/06Z
19/12Z