

ANNEX

A

SUMMARY OF TROPICAL CYCLONES

IN THE

EASTERN NORTH PACIFIC OCEAN
(180 DEGREES TO NORTH AMERICAN COAST)

FOR

1966

Fleet Weather Central Alameda and Fleet Weather Central Pearl Harbor issued a record total of 342 tropical warnings on 7 hurricanes, 6 tropical storms and 6 tropical depressions in the Eastern North Pacific during 1966.

The following five year summary covering the Fleet Weather Central Alameda/Fleet Weather Central Pearl Harbor areas is presented for comparison:

SUMMARY OF EASTERN PACIFIC TROPICAL CYCLONE DATA

	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>
TOTAL NUMBER OF WARNINGS*	122	80	60	244	342
CALENDAR DAYS OF WARNINGS*	35	26	21	73	70
TROPICAL DEPRESSIONS*				2	6
TROPICAL STORMS	6	5	4	9	6
HURRICANES	2	4	2	1	7
TOTAL TROPICAL CYCLONES*	8	9	6	12	19

*Tropical Depression information not available 1962-1964.

A record number of hurricanes (7) traversed FLEWEACEN Alameda's area of responsibility during 1966. Again aiding in the location and tracking of these storms was the APT satellite readout as is evidenced below.

	<u>SATELLITE FIX</u>	<u>RECON FIX</u>
ADELE	4	0
BLANCA	6	3
CONNIE	7	0
DOLORES	11	3
EILEEN	6	2
FRANCESCA	12	2
HELGA	5	0

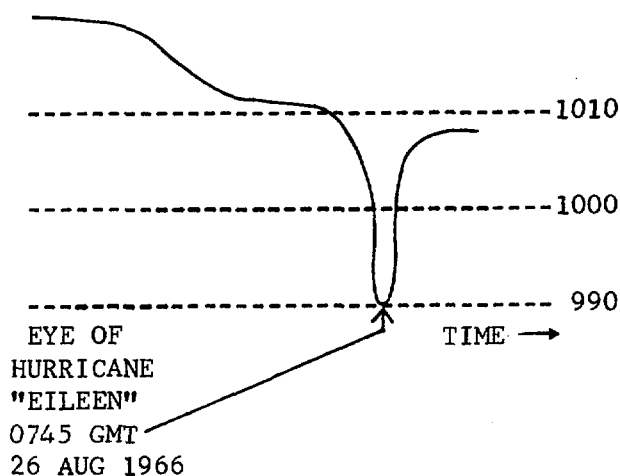
Extensive property damage and loss of life was caused by Tropical Storm KIRSTEN and Hurricanes ADELE and HELGA as they crossed land into lower Mexico and Baja California. There were no "super" hurricanes reported, however, CONNIE generated winds in excess of 85 knots. ADELE had the distinction of being the shortest lived hurricane (about 3 days) while FRANCESCA was active for almost eleven days.

An interesting letter was received from the ROBERT D. CONRAD, an oceanographic research vessel operated by Columbia University, which passed through the eye of hurricane EILEEN on 26 August 1966. A portion of their letter is duplicated below.

"In less than two hours before entering the eye, northerly winds increased from 40 knots to 60-70 knots, with gusts to 80 (measured), but these high winds of hurricane intensity were sustained for only about 15 minutes before and after the eye passed. (The ship and storm were heading in nearly opposite directions making the relative speed of advance throughout the passage about 20 knots.) Torrential rain with zero visibility was encountered only about one-half hour on either side of the center. Seas were close to 25-30 feet at their maximum height in the leading edge, and with the passage of the eye, they decreased down to only about a few feet in four hours.

Excellent radar presentation depicted the eye to be elliptical in shape, about 12 miles by 8 miles in diameter. During our 25 minutes inside the eye, we noted atop the confused seas numerous luminescent jelly fish which had not been seen previously (or subsequently) on this 10 month cruise of the Pacific.

I've enclosed a tracing of the barograph trace."



The mean forecast error listed below was computed by two methods.
a) standard mean vector forecast error and b) closest distance error from best track. Positions used in these determinations were based on very limited surface data modified by "Recon" and Satellite as listed below.

1966 FORECAST VECTOR ERRORS*

HURRICANE	12 HOUR MEAN ERROR (MI)	24 HOUR MEAN ERROR (MI)	48 HOUR MEAN ERROR (MI)
ADELE	81	181	---
BLANCA	115	204	463
CONNIE (Alameda)	45	76	177
CONNIE (Pearl Harbor)	57	101	217
DOLORES	86	162	278
EILEEN	40	72	128
FRANCESCA	75	175	329
HELGA	51	109	327

1966 FORECAST ERRORS*
(IN TERMS OF CLOSEST DISTANCE TO BEST TRACK)

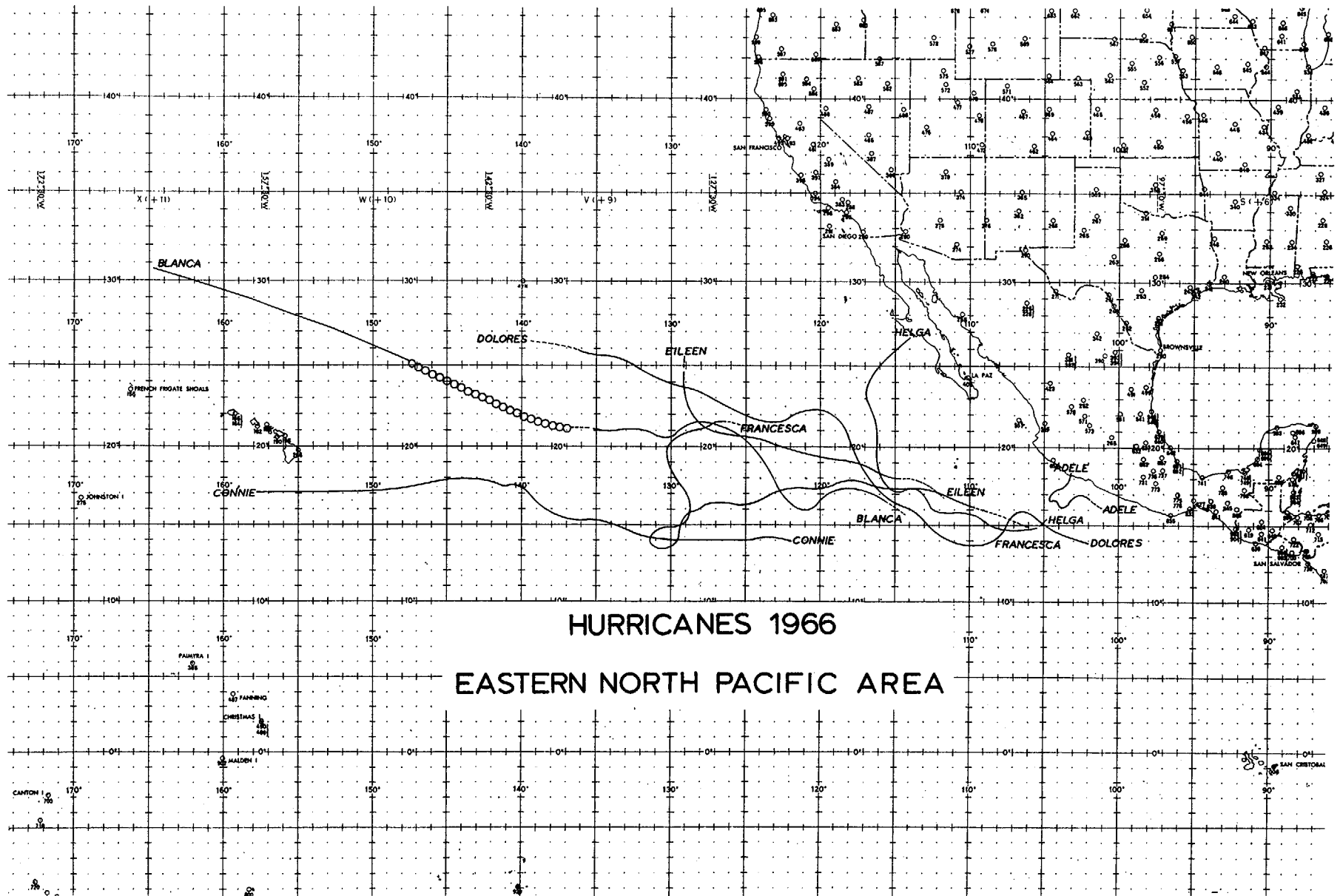
HURRICANE	12 HOUR MEAN ERROR (MI)	24 HOUR MEAN ERROR (MI)	48 HOUR MEAN ERROR (MI)
ADELE	53	168	**
BLANCA	111	204	397
CONNIE (Alameda)	39	71	163
CONNIE (Pearl Harbor)	37	63	128
DOLORES	79	157	276
EILEEN	34	66	109
FRANCESCA	78	157	317
HELGA	62	91	277

*Includes forecast errors during tropical storm intensity as well as hurricane.
**No 48 hour forecast made during "depression" stage.

TROPICAL CYCLONES FOR THE 1966 SEASON

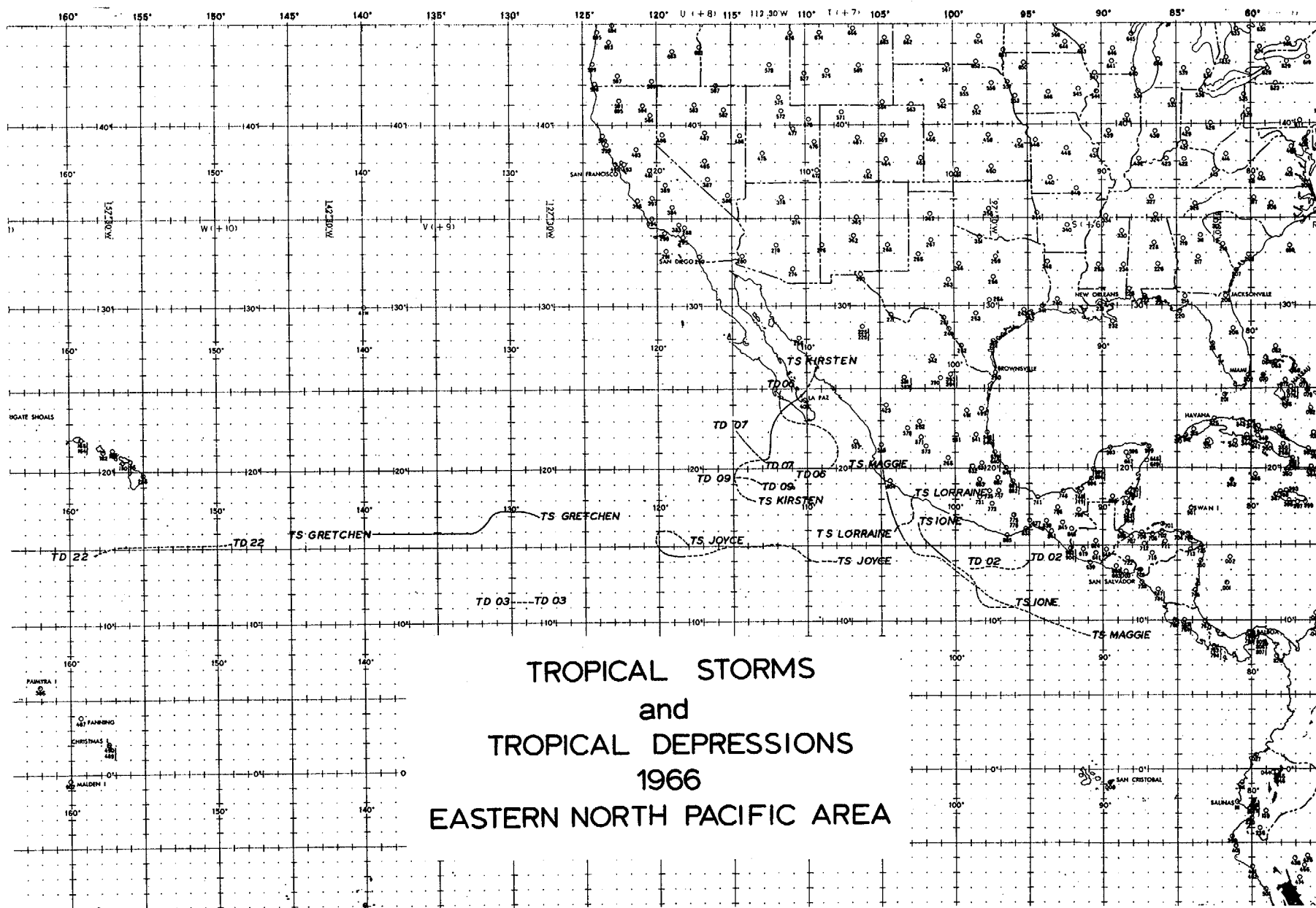
<u>CYCLONE</u>	<u>PERIOD</u>
01. Hurricane ADELE	21 JUN - 24 JUN
02. Tropical Depression	28 JUN - 30 JUN
03. Tropical Depression	11 JUL - 11 JUL
04. Hurricane BLANCA	02 AUG - 12 AUG
05. Hurricane CONNIE	07 AUG - 17 AUG
06. Tropical Depression	11 AUG - 13 AUG
07. Tropical Depression	15 AUG - 16 AUG
08. Hurricane DOLORES	16 AUG - 26 AUG
09. Tropical Depression	17 AUG - 17 AUG
10. Hurricane EILEEN	23 AUG - 29 AUG
11. Hurricane FRANCESCA	05 SEP - 16 SEP
12. Tropical Storm GRETCHEN	08 SEP - 11 SEP
13. Hurricane HELGA	09 SEP - 15 SEP
14. Tropical Storm IONE	11 SEP - 13 SEP
15. Tropical Storm JOYCE	14 SEP - 20 SEP
16. Tropical Storm KIRSTEN	25 SEP - 29 SEP
17. Tropical Storm LORRAINE	04 OCT - 05 OCT
18. Tropical Storm MAGGIE	16 OCT - 19 OCT
22. Tropical Depression*	10 SEP - 12 SEP

*See Chapter V for statistics



HURRICANES 1966

EASTERN NORTH PACIFIC AREA



TROPICAL STORMS
and
TROPICAL DEPRESSIONS
1966
EASTERN NORTH PACIFIC AREA

TROPICAL STORMS 1966
POSITIONS DATA

TROPICAL STORM GRETCHEN
08 SEP-12 SEP

DTG	LAT	LONG	DTG	LAT	LONG
080000Z	17.0N	128.0W	100600Z	16.0N	137.4W
080600Z	17.3N	128.8W	101200Z	16.0N	138.6W
081200Z	17.4N	130.0W	101800Z	16.0N	139.5W
081800Z	17.3N	131.2W	110000Z	16.0N	139.5W
090000Z	16.5N	131.8W	110600Z	16.0N	139.5W
090600Z	16.0N	132.5W	111200Z	16.0N	139.5W
091200Z	16.0N	133.5W	111800Z	16.0N	139.5W
091800Z	16.0N	135.0W	112115Z	16.0N	139.5W
100000Z	16.0N	136.2W			

TROPICAL STORM IONE
11 SEP-13 SEP

DTG	LAT	LONG	DTG	LAT	LONG
110000Z	11.0N	096.0W	121800Z	14.0N	100.5W
110600Z	11.0N	097.0W	130000Z	14.5N	101.1W
111200Z	11.0N	098.0W	130600Z	15.0N	101.7W
111800Z	11.6N	098.5W	131200Z	15.5N	102.2W
120000Z	12.5N	098.7W	131800Z	16.5N	102.5W
120600Z	13.1N	099.2W			
121200Z	13.6N	099.8W			

TROPICAL STORM JOYCE
14 SEP-20 SEP

DTG	LAT	LONG	DTG	LAT	LONG
141800Z	14.0N	108.0W	180000Z	14.5N	117.7W
150000Z	14.0N	108.0W	180600Z	14.4N	118.2W
150600Z	14.1N	108.4W	181200Z	14.4N	118.8W
151200Z	14.0N	108.9W	181800Z	14.5N	119.4W
151800Z	14.0N	109.5W	190000Z	14.7N	119.7W
160000Z	14.2N	110.0W	190600Z	15.0N	120.0W
160600Z	14.8N	110.8W	191200Z	15.4N	120.2W
161200Z	15.2N	112.0W	191800Z	15.9N	120.1W
161800Z	15.0N	113.5W	200000Z	16.1N	119.7W
170000Z	15.0N	114.9W	200600Z	16.0N	119.0W
170600Z	15.0N	115.5W	201200Z	15.7N	118.6W
171200Z	14.8N	116.1W	201800Z	15.2N	118.1W
171800Z	14.6N	116.8W			

TROPICAL STORM KIRSTEN
25 SEP-29 SEP

DTG	LAT	LONG	DTG	LAT	LONG
252100Z	18.0N	114.5W	271200Z	20.5N	113.1W
260000Z	18.5N	114.7W	271800Z	20.8N	112.6W
260600Z	19.0N	114.8W	280000Z	21.5N	112.5W
261200Z	19.5N	114.9W	280600Z	22.8N	112.3W
261800Z	20.2N	114.6W	281200Z	24.0N	111.3W
270000Z	20.5N	114.1W	281800Z	25.0N	110.0W
270600Z	20.5N	113.5W	290000Z	26.3N	109.3W

TROPICAL STORM LORRAINE
04 OCT-05 OCT

DTG	LAT	LONG	DTG	LAT	LONG
040000Z	16.0N	104.0W	041800Z	17.2N	102.8W
040600Z	16.5N	103.6W	050000Z	17.8N	103.0W
041200Z	16.5N	103.0W	050600Z	18.3N	102.8W

TROPICAL STORM MAGGIE
16 OCT-19 OCT

DTG	LAT	LONG	DTG	LAT	LONG
160300Z	09.0N	091.0W	171800Z	13.6N	100.1W
160600Z	09.3N	091.8W	180000Z	14.2N	101.1W
161200Z	10.0N	093.4W	180600Z	14.4N	102.5W
161800Z	10.6N	094.9W	181200Z	15.7N	103.6W
170000Z	11.2N	096.6W	181800Z	17.3N	104.3W
170600Z	11.8N	098.0W	190000Z	18.6N	104.7W
171200Z	12.7N	099.0W	190600Z	20.0N	104.8W

TROPICAL DEPRESSIONS 1966
POSITION DATA

TROPICAL DEPRESSION 02
28 JUN-30 JUN

DTG	LAT	LONG	DTG	LAT	LONG
281200Z	14.0N	095.0W	291800Z	13.6N	097.0W
281800Z	13.6N	095.3W	300000Z	13.7N	097.6W
290000Z	13.5N	095.8W	300600Z	13.5N	098.2W
290600Z	13.5N	096.3W	301200Z	13.5N	098.7W
291200Z	13.5N	096.7W	301800Z	13.6N	099.1W

TROPICAL DEPRESSION 03
11 JUL

DTG	LAT	LONG	DTG	LAT	LONG
110000Z	11.5N	128.5W	111200Z	11.5N	129.5W
110600Z	11.5N	129.0W	111800Z	115.N	130.0W

TROPICAL DEPRESSION 06
11 AUG-13 AUG

DTG	LAT	LONG	DTG	LAT	LONG
111800Z	20.0N	108.5W	130000Z	22.9N	110.2W
120000Z	20.5N	108.0W	130600Z	23.1N	111.2W
120600Z	21.4N	107.9W	131200Z	24.0N	111.8W
121200Z	22.3N	108.5W	131800Z	25.0N	111.7W
121800Z	22.7N	109.4W			

TROPICAL DEPRESSION 07
15 AUG-16 AUG

DTG	LAT	LONG	DTG	LAT	LONG
151800Z	20.5N	113.0W	160600Z	21.6N	114.1W
160000Z	21.0N	113.5W	161200Z	22.3N	114.8W

TROPICAL DEPRESSION 09
17 AUG

DTG	LAT	LONG	DTG	LAT	LONG
170000Z	19.0N	113.0W	171200Z	19.5N	114.2W
170600Z	19.3N	113.5W	17.800Z	19.5N	115.0W

HURRICANE ADELE - 211800Z TO 241200Z JUNE

I. DATA

A. Statistics

1. Number of warnings issued - 21
2. Number of warnings with hurricane intensity - 6
3. Total distance traveled during tropical warning period - 372 mi

B. Characteristics

1. Minimum observed SLP - 982 mbs at 240300Z
2. Minimum observed 700mb height - 3090 m. at 240000Z
3. Maximum surface wind - 64 kts
4. Maximum radius of surface circulation - 580 mi

II. DEVELOPMENT

A. Initial impetus - ITCZ

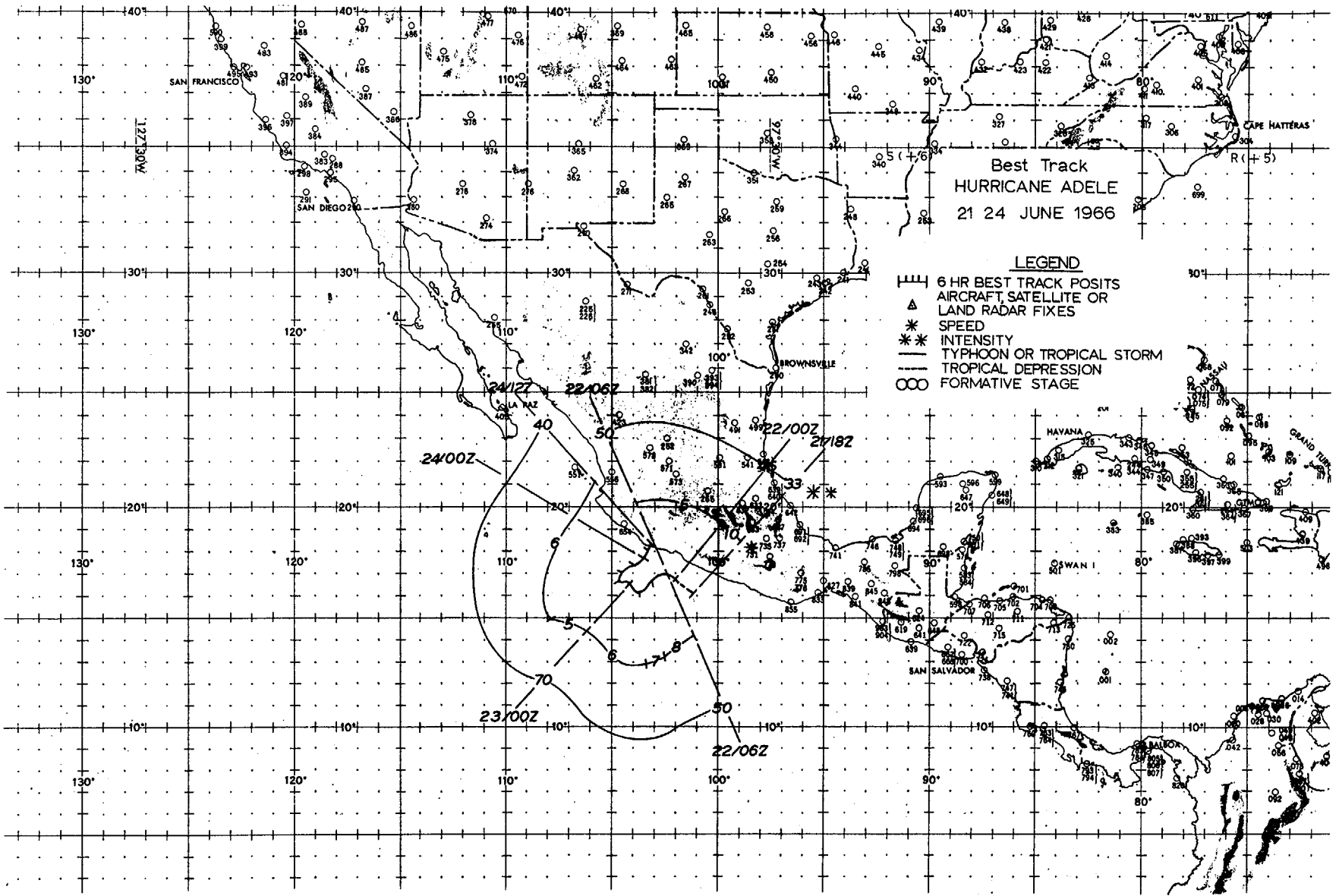
B. Initial surface vortex

1. 211800Z
2. Surface pressure less than 1008 mbs

C. Time storm reached hurricane intensity - 230000Z

III. FINAL DISPOSITION

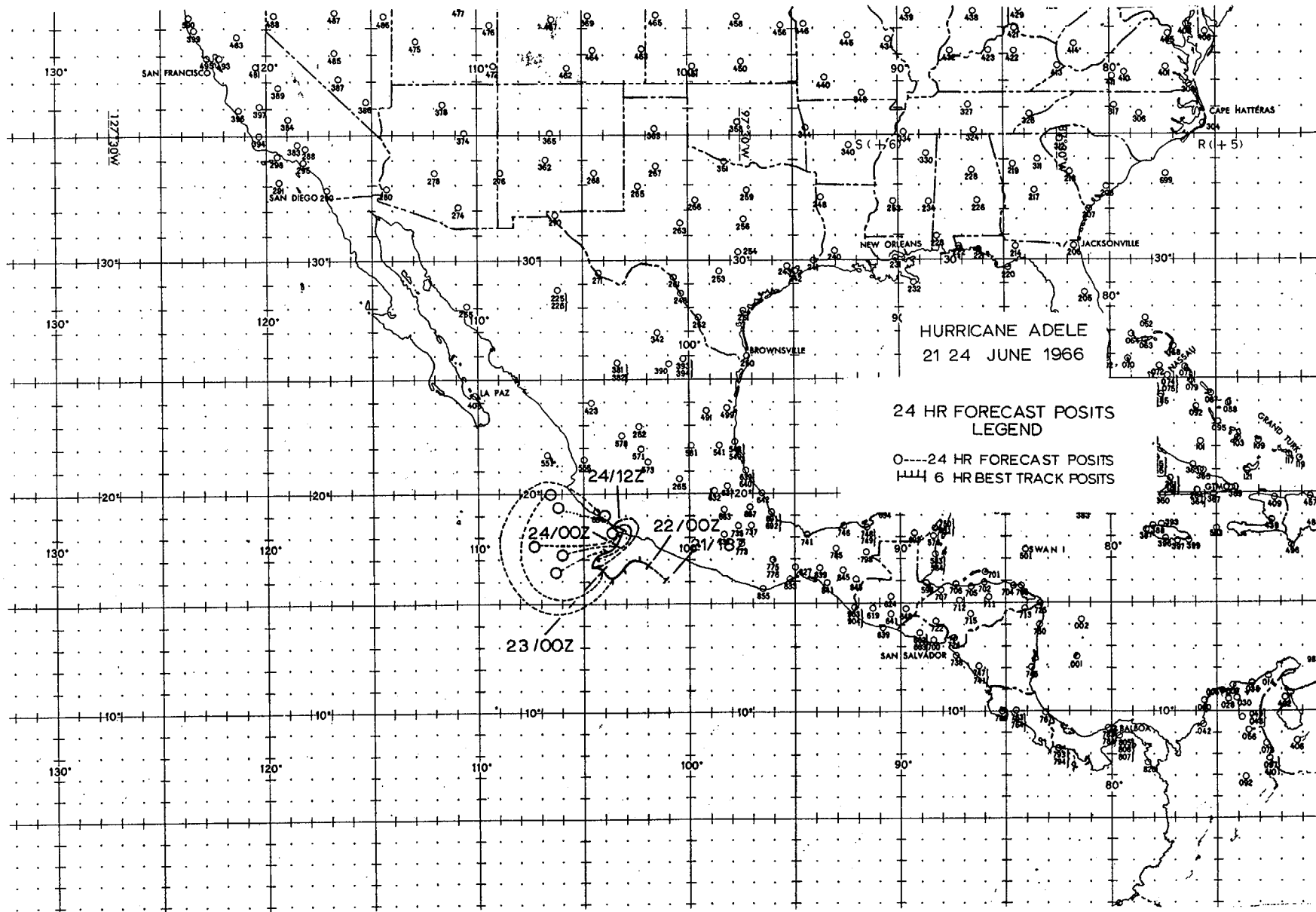
A. Dissipated over land



HURRICANE ADELE 21 JUN-24 JUN 1966
 POSITION AND FORECAST VERIFICATION DATA

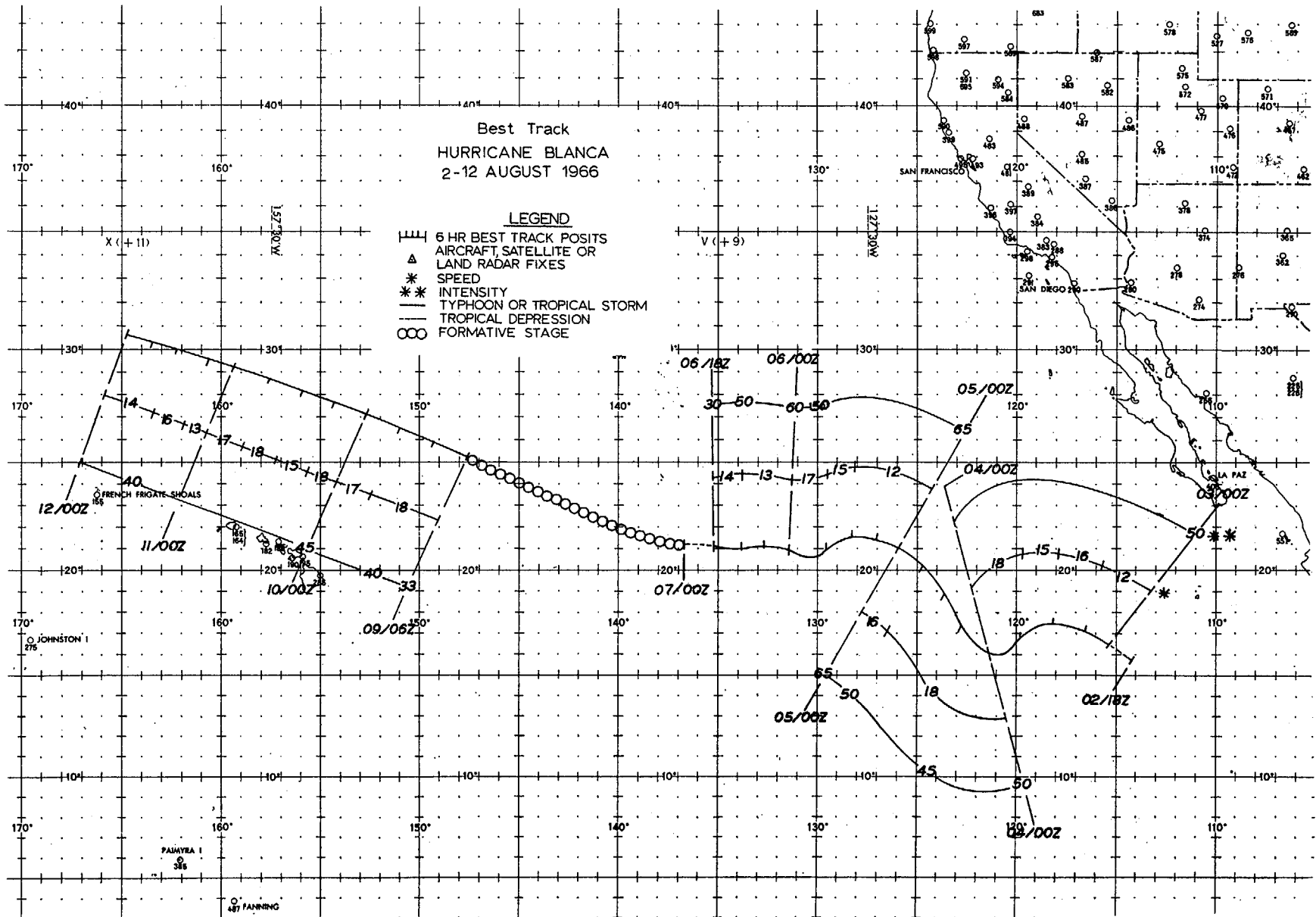
DTG	STORM POSITION		24 HOUR ERROR		48 HOUR ERROR	
	LAT.	LONG.	DEG.	DISTANCE	DEG.	DISTANCE
211800Z	16.1N	101.2W	-----	-----	-----	-----
220000Z	16.8N	102.0W	-----	-----	-----	-----
220600Z	17.0N	102.5W	-----	-----	-----	-----
221200Z	16.6N	102.5W	-----	-----	-----	-----
221800Z	16.0N	103.9W	343-177	-----	-----	-----
230000Z	16.4N	104.1W	326-261	-----	-----	-----
230600Z	16.5N	104.6W	028-099	-----	-----	-----
231200Z	16.9N	104.5W	041-085	-----	-----	-----
231800Z	17.2N	104.0W	255-141	-----	-----	-----
240000Z	17.6N	103.5W	263-148	-----	-----	-----
240600Z	18.0N	103.3W	266-248	-----	-----	-----
241200Z	18.5N	103.2W	291-189	-----	-----	-----

AVERAGE 24 HOUR ERROR 181 MI



HURRICANE BLANCA - 021800Z TO 120000Z AUG

- I. DATA
 - A. Statistics
 - 1. Number of warnings issued - 30
 - 2. Number of warnings with hurricane intensity - 3
 - 3. Total distance traveled during tropical warning period - 2574 mi
 - B. Characteristics
 - 1. Minimum observed SLP - 990mbs at 031600Z
 - 2. Minimum observed 700mb height - 3170m. at 030000Z
 - 3. Maximum surface wind - 70 kts
 - 4. Maximum radius of surface circulation - 250 mi
- II. DEVELOPMENT
 - A. Initial impetus - ITCZ
 - B. Initial surface vortex
 - 1. 020000Z
 - 2. Surface pressure less than 1006mb
 - C. Time storm reached hurricane intensity - 050000Z
- III. FINAL DISPOSITION
 - A. Dissipated over water

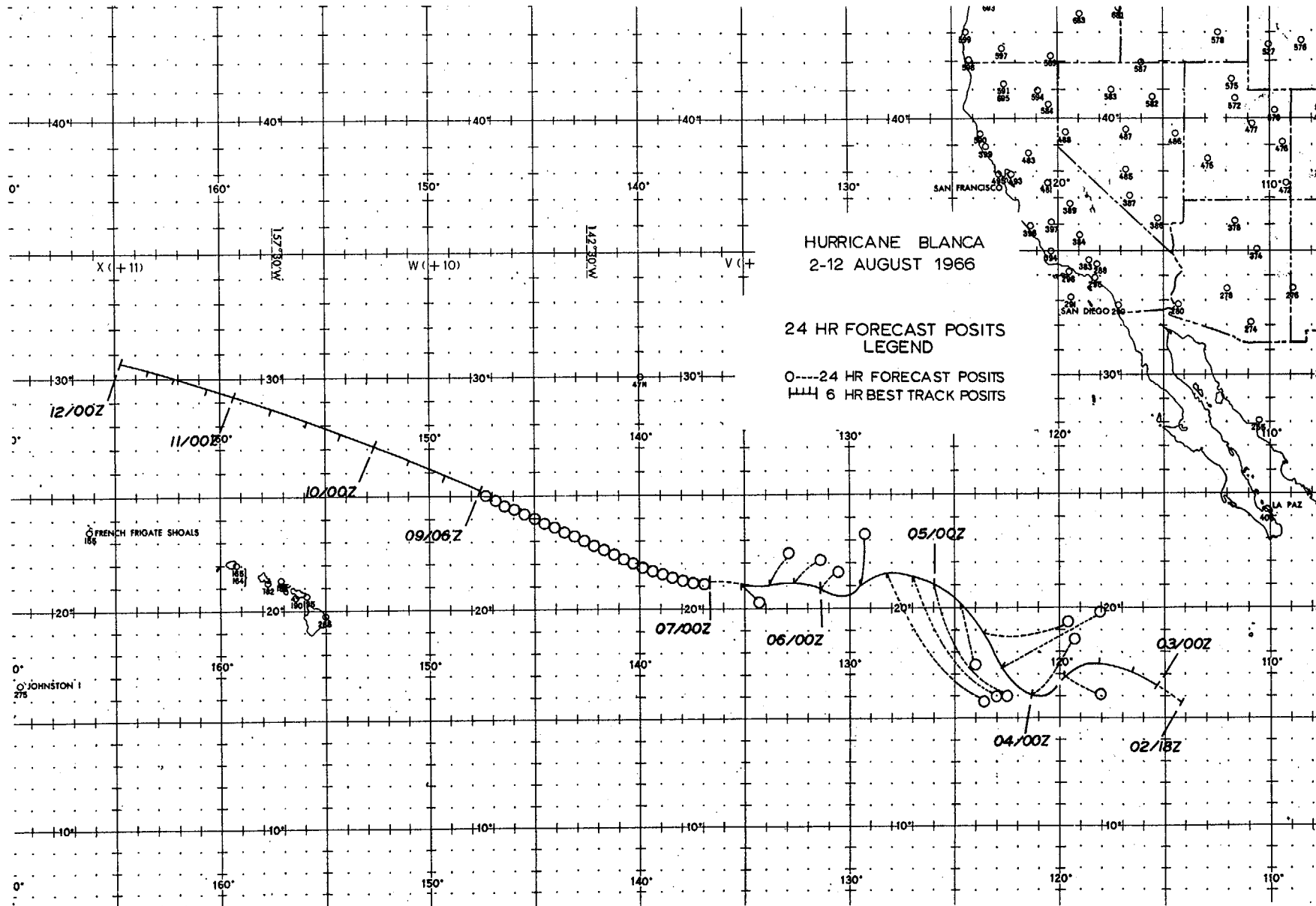


HURRICANE BLANCA 02 AUG-12 AUG 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR	48 HOUR ERROR
	LAT.	LONG.	DEG. DISTANCE	DEG. DISTANCE
021800Z	15.9N	114.0W	-----	-----
030000Z	16.3N	115.2W	-----	-----
030600Z	17.0N	116.8W	-----	-----
031200Z	17.6N	118.2W	-----	-----
031800Z	16.7N	119.8W	106-112	-----
040000Z	16.1N	121.3W	040-178	-----
040600Z	17.4N	122.5W	045-314	-----
041200Z	18.8N	123.6W	069-267	-----
041800Z	20.2N	124.7W	163-172	-----
050000Z	21.0N	126.0W	144-366	104-240
050600Z	21.3N	127.2W	141-405	083-688
051200Z	21.5N	128.4W	140-464	083-420
051800Z	20.8N	129.7W	014-156	150-229
060000Z	21.0N	131.5W	056-085	127-518
060600Z	21.0N	132.7W	049-103	126-570
061200Z	21.0N	133.9W	032-105	125-616
061800Z	21.2N	135.3W	123-078	024-198
070000Z	21.2N	136.8W	105-055	032-094
090600Z	25.3N	147.6W	-----	-----
091200Z	25.9N	149.3W	-----	-----
091800Z	26.6N	151.0W	-----	-----
100000Z	27.3N	152.7W	-----	-----
100600Z	27.7N	154.3W	-----	-----
101200Z	28.3N	155.9W	-----	-----
101800Z	28.8N	157.7W	-----	-----
110000Z	29.4N	159.4W	-----	-----
110600Z	29.7N	160.7W	-----	-----
111200Z	30.0N	162.1W	-----	-----
111800Z	30.4N	163.5W	-----	-----
120000Z	30.7N	164.9W	-----	-----

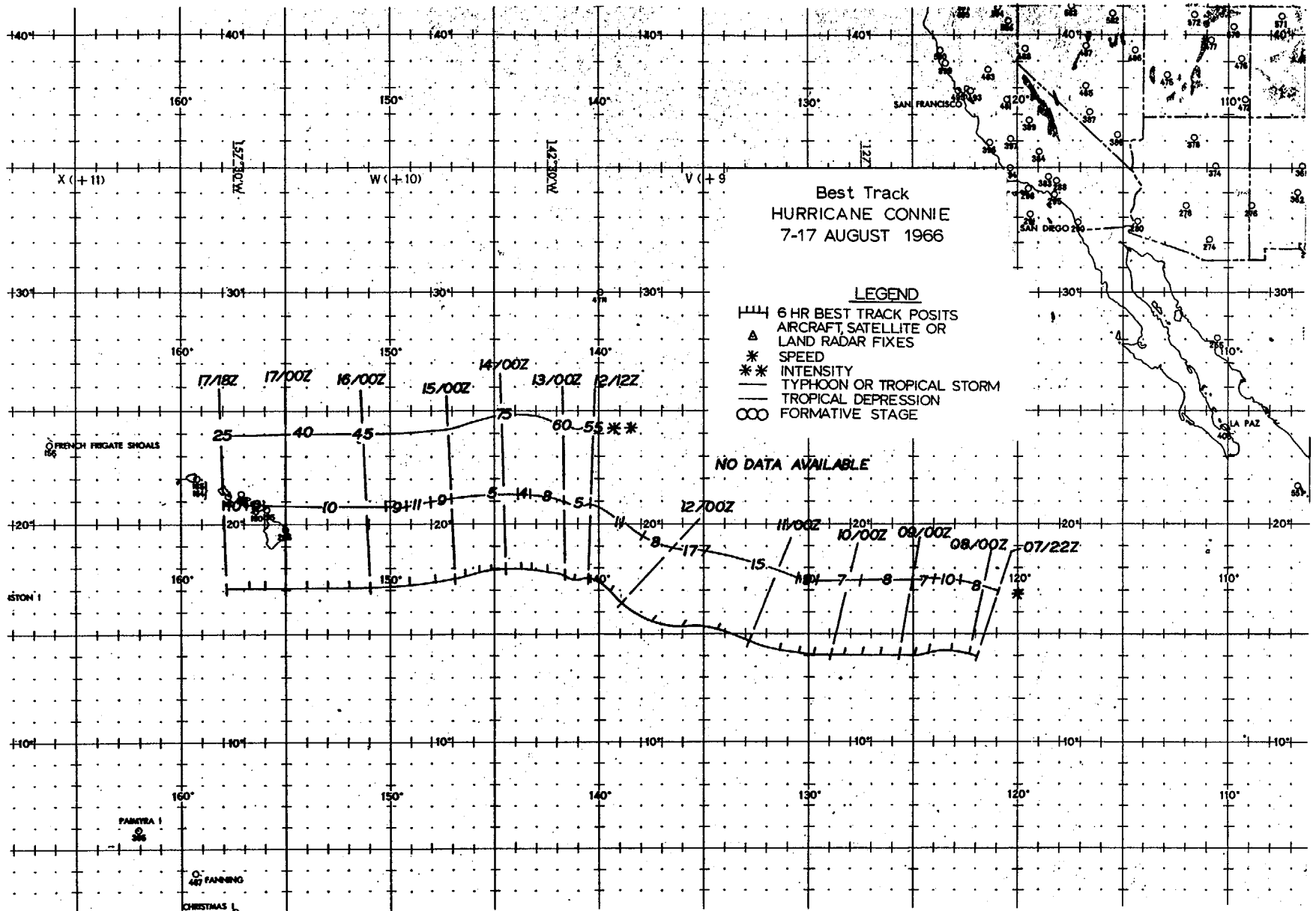
AVERAGE 24 HOUR ERROR 204 MI
 AVERAGE 48 HOUR ERROR 463 MI

240



HURRICANE CONNIE - 072200Z TO 171800Z AUG

- I. DATA
 - A. Statistics
 - 1. Number of warnings issued - 41
 - 2. Number of warnings with hurricane intensity - 8
 - 3. Total distance traveled during tropical warning period - 1948 mi
 - B. Characteristics as a hurricane
 - 1. Minimum observed SLP - 1004mbs 140000Z through 151200Z
 - 2. Minimum observed 700mb height - 2996m. at 150000Z
 - 3. Maximum surface wind - 86 kts
 - 4. Maximum radius of surface circulation - 330 mi
- II. DEVELOPMENT
 - A. Initial impetus - ITCZ
 - B. Initial surface vortex
 - 1. 140000Z
 - 2. Surface pressure 1004mb
 - C. Time storm reached hurricane intensity - 140000Z
- III. FINAL DISPOSITION
 - A. Dissipated over water



HURRICANE CONNIE 07 AUG-17 AUG 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR		48 HOUR ERROR	
	LAT.	LONG.	DEG.	DISTANCE	DEG.	DISTANCE
072200Z	14.0N	122.0W	-----		-----	
080000Z	14.1N	122.3W	-----		-----	
080600Z	14.2N	123.2W	-----		-----	
081200Z	14.1N	124.2W	-----		-----	
081800Z	14.0N	125.0W	-----		-----	
090000Z	14.0N	125.8W	-----		-----	
090600Z	14.0N	126.6W	-----		-----	
091200Z	14.0N	127.4W	-----		-----	
091800Z	14.0N	128.2W	-----		-----	
100000Z	14.0N	129.0W	-----		-----	
100600Z	14.0N	129.8W	-----		-----	
101200Z	14.1N	130.5W	-----		-----	
101800Z	14.3N	131.4W	-----		-----	
110000Z	14.8N	132.9W	-----		-----	
110600Z	15.2N	134.4W	-----		-----	
111200Z	15.4N	136.0W	-----		-----	
111800Z	15.6N	137.5W	-----		-----	
120000Z	16.2N	139.0W	-----		-----	
120600Z	17.0N	139.5W	-----		-----	
121200Z	17.5N	140.5W	-----		-----	
121800Z	17.5N	141.2W	-----		-----	
130000Z	17.8N	141.7W	-----		-----	
130600Z	17.9N	142.5W	-----		-----	
131200Z	18.0N	143.1W	305-118		-----	
131800Z	18.0N	143.7W	285-185		-----	
140000Z	18.0N	144.5W	317-135		-----	
140600Z	18.0N	145.1W	318-165		-----	
141200Z	17.8N	145.7W	323-190		313-230	
141800Z	17.7N	146.4W	320-225		290-330	
150000Z	17.5N	146.9W	316-045		321-270	
150600Z	17.4N	147.9W	025-048		326-285	
151200Z	17.3N	149.1W	050-075		330-315	
151800Z	17.2N	150.0W	057-095		332-335	

HURRICANE CONNIE 07 AUG-17 AUG 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR	48 HOUR ERROR
	LAT.	LONG.	DEG. DISTANCE	DEG. DISTANCE
160000Z	17.2N	151.0W	077-090	101-070
160600Z	17.1N	152.0W	080-105	060-125
161200Z	17.1N	153.0W	080-120	064-150
161800Z	17.1N	154.0W	077-120	068-165
170000Z	17.1N	155.0W	307-025	079-165
170600Z	17.1N	156.0W	302-032	082-185
171200Z	17.1N	156.8W	325-045	084-150
171800Z	17.1N	157.8W	000-000	080-148

AVERAGE 24 HOUR ERROR FWC ALAMEDA 76 MI
 FWC PEARL HARBOR 101 MI
 AVERAGE 48 HOUR ERROR FWC ALAMEDA 177 MI
 FWC PEARL HARBOR 217 MI

HURRICANE DOLORES - 161800Z TO 260000Z AUGUST

I. DATA

A. Statistics

1. Number of warnings issued - 38
2. Number of warnings with hurricane intensity - 4
3. Total distance traveled during tropical warning period - 2580 mi

B. Characteristics

1. Minimum observed SLP - 981 mbs at 210600Z
2. Minimum observed 700mb height - 3140m. at 191200Z
3. Maximum surface wind - 75 kts
4. Maximum radius of surface circulation - 650 mi

II. DEVELOPMENT

A. Initial impetus - ITCZ

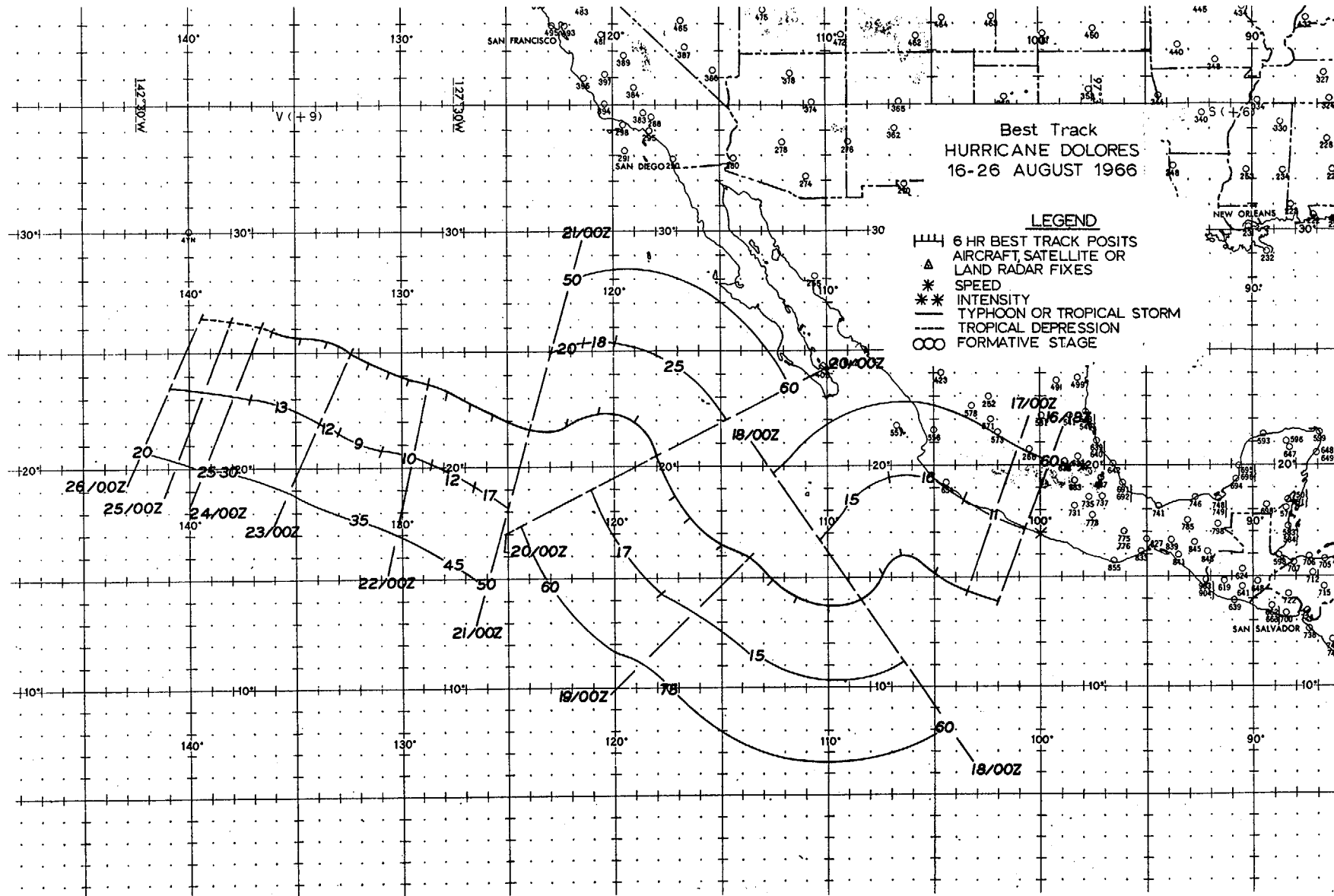
B. Initial surface vortex

1. 160000Z
2. Surface pressure less than 1008 mbs

C. Time storm reached hurricane intensity - 181800Z

III. FINAL DISPOSITION

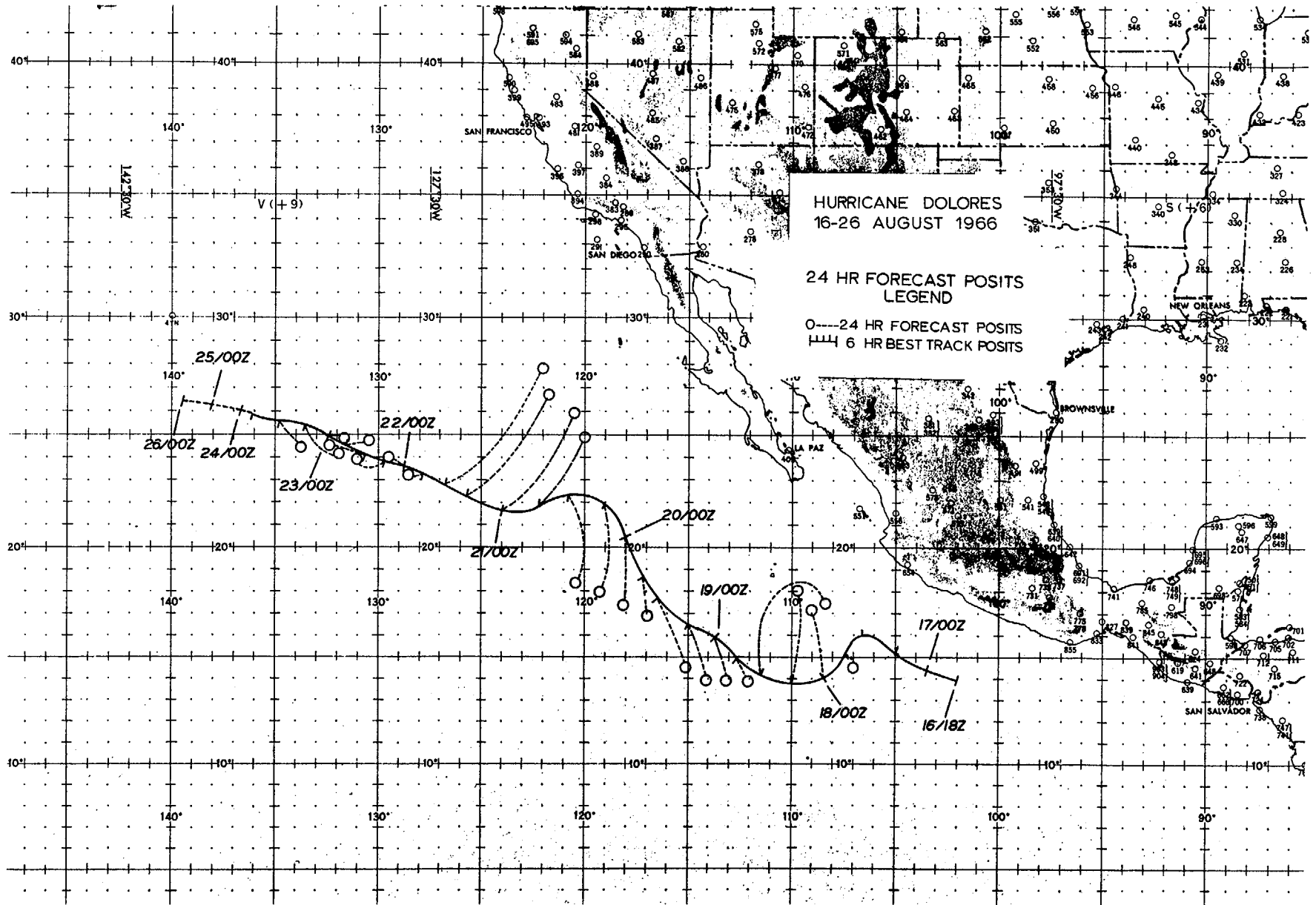
A. Dissipated over water



HURRICANE DOLORES 16 AUG-26 AUG 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR		48 HOUR ERROR	
	LAT.	LONG.	DEG.	DISTANCE	DEG.	DISTANCE
161800Z	14.0N	102.0W	-----		-----	
170000Z	14.5N	103.5W	-----		-----	
170600Z	15.2N	105.0W	-----		-----	
171200Z	16.0N	106.6W	-----		-----	
171800Z	15.1N	107.4W	138-030		-----	
180000Z	13.9N	108.3W	348-202		-----	
180600Z	13.8N	109.9W	342-255		-----	
181200Z	14.3N	111.3W	043-250		-----	
181800Z	15.1N	112.4W	163-068		073-116	
190000Z	15.9N	113.6W	162-118		008-249	
190600Z	16.5N	115.0W	162-159		023-245	
191200Z	17.7N	116.3W	158-193		078-366	
191800Z	18.9N	117.1W	173-112		149-247	
200000Z	20.4N	118.0W	182-172		165-313	
200600Z	21.9N	118.9W	186-235		171-396	
201200Z	22.3N	120.7W	175-235		164-384	
201800Z	21.6N	122.2W	033-245		150-267	
210000Z	21.8N	124.2W	045-335		134-225	
210600Z	22.4N	125.7W	044-354		133-185	
211200Z	22.8N	126.8W	044-418		145-205	
211800Z	23.4N	127.8W	270-038		043-530	
220000Z	23.6N	128.8W	282-055		040-585	
220600Z	23.8N	129.8W	279-074		033-516	
221200Z	24.2N	130.6W	287-107		032-568	
221800Z	24.5N	131.3W	075-047		288-096	
230000Z	25.0N	132.4W	103-058		287-162	
230600Z	25.4N	133.6W	125-126		287-658	
231200Z	25.6N	134.7W	138-090		048-037	
231800Z	26.0N	136.0W	102-062		075-050	
240000Z	26.1N	136.6W	275-092		132-125	
250000Z	26.3N	138.1W	264-066		156-074	
260000Z	26.4N	139.5W	097-192		067-030	

AVERAGE 24 HOUR ERROR 162 MI
 AVERAGE 48 HOUR ERROR 278 MI



HURRICANE EILEEN - 230000Z TO 290600Z AUGUST

I. DATA

A. Statistics

1. Number of warnings issued - 26
2. Number of warnings with hurricane intensity - 5
3. Total distance traveled during tropical warning period - 1290 mi

B. Characteristics

1. Minimum observed SLP - 990 mbs at 260745Z
2. Minimum observed 700mb height - 3150 m. at 270000Z
3. Maximum surface wind - 70 kts
4. Maximum radius of surface circulation - 420 mi

II. DEVELOPMENT

A. Initial impetus - ITCZ

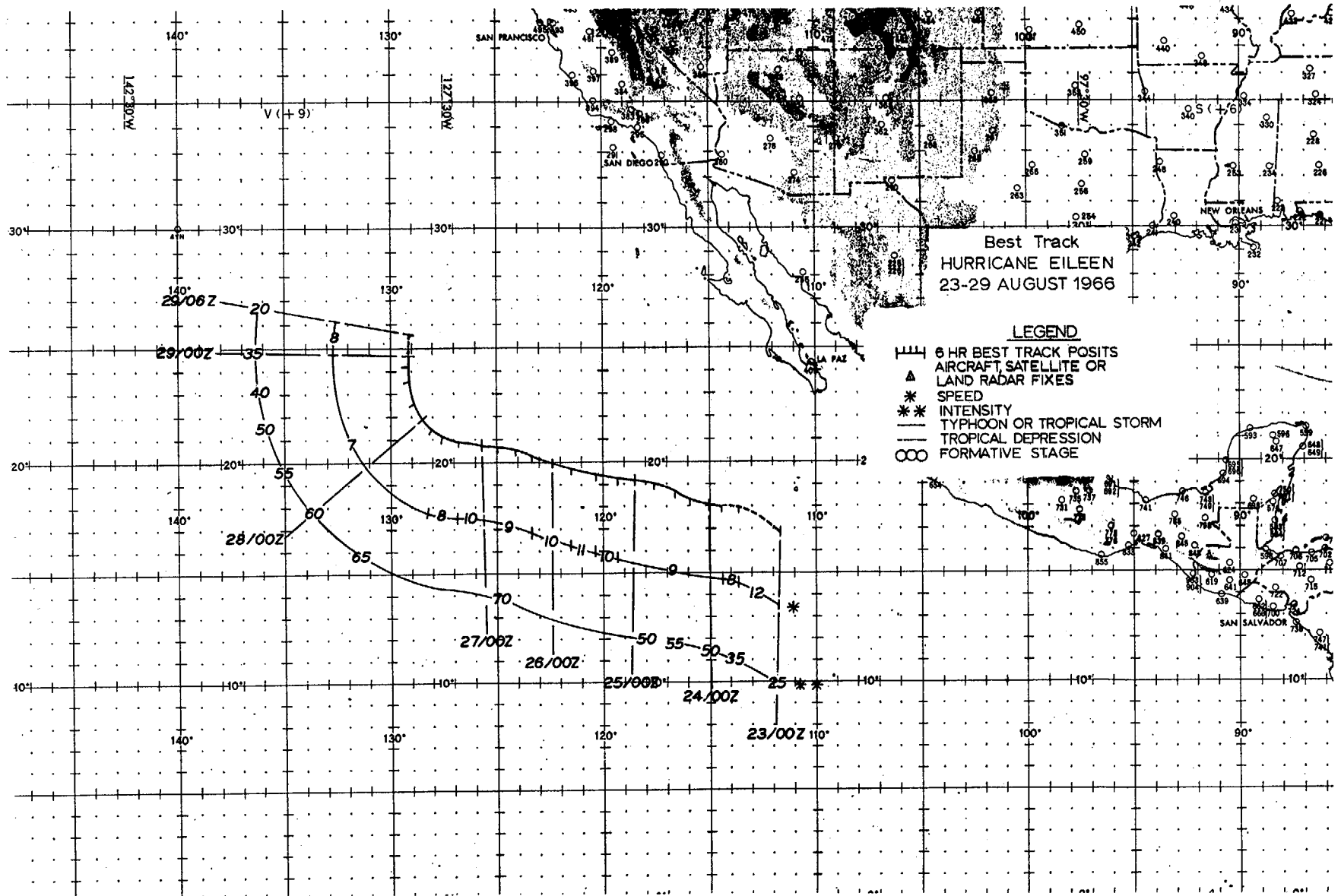
B. Initial surface vortex

1. 230000Z
2. Surface pressure less than 1010 mbs

C. Time storm reached hurricane intensity - 261800Z

III. FINAL DISPOSITION

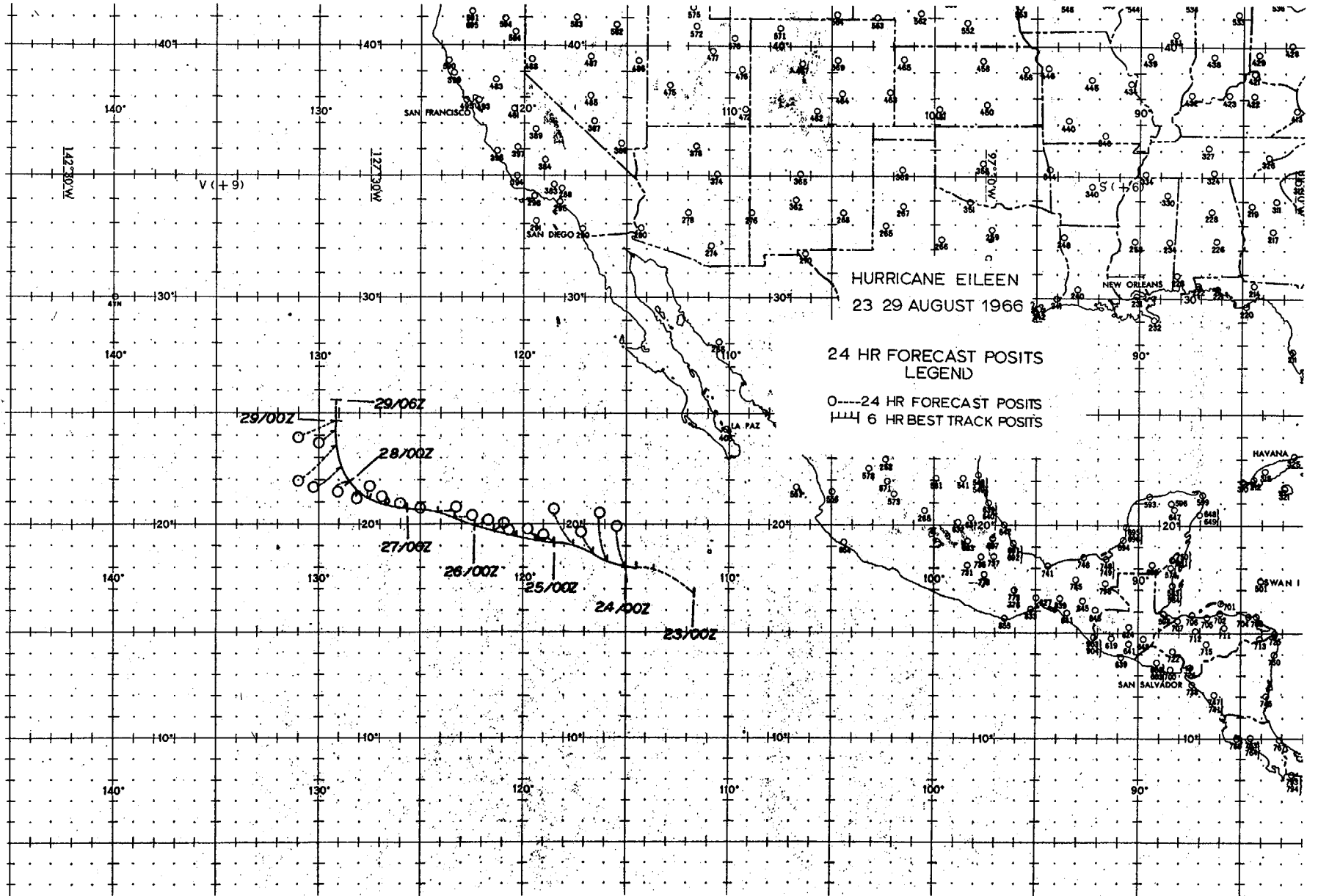
A. Dissipated over water



HURRICANE EILEEN 23 AUG-29 AUG 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR	48 HOUR ERROR
	LAT.	LONG.	DEG. DISTANCE	DEG. DISTANCE
230000Z	16.7N	111.7W	-----	-----
230600Z	17.6N	112.5W	-----	-----
231200Z	18.0N	113.6W	-----	-----
231800Z	18.0N	114.3W	-----	-----
240000Z	18.1N	115.2W	351-110	-----
240600Z	18.5N	116.0W	352-115	-----
241200Z	18.7N	116.8W	307-102	-----
241800Z	19.0N	117.7W	332-115	-----
250000Z	19.2N	118.5W	302-049	-----
250600Z	19.3N	119.4W	322-036	-----
251200Z	19.5N	120.4W	285-012	-----
251800Z	19.8N	121.5W	064-039	325-189
260000Z	20.0N	122.4W	083-054	321-084
260600Z	20.3N	123.3W	090-054	329-069
261200Z	20.5N	124.1W	079-055	330-038
261800Z	20.5N	125.0W	360-012	051-076
270000Z	20.7N	125.8W	349-020	071-096
270600Z	20.8N	126.7W	326-021	072-097
271200Z	21.1N	127.5W	335-023	063-081
271800Z	21.6N	128.0W	182-014	082-106
280000Z	22.1N	128.4W	239-055	190-024
280600Z	22.7N	128.8W	236-103	216-055
281200Z	23.3N	129.0W	237-140	235-114
281800Z	23.9N	129.1W	250-054	230-144

AVERAGE 24 HOUR ERROR 72 MI
 AVERAGE 48 HOUR ERROR 128 MI



HURRICANE FRANCESCA - 052028Z TO 160600Z SEPTEMBER

I. DATA

A. Statistics

1. Number of warnings issued - 44
2. Number of warnings with hurricane intensity - 12
3. Total distance traveled during tropical warning period - 2400 mi

B. Characteristics

1. Minimum observed SLP - 992 mbs at 120000Z
2. Minimum observed 700mb height - 3150 m. at 121200Z
3. Maximum surface wind - 68 kts
4. Maximum radius of surface circulation - 450 mi

II. DEVELOPMENT

A. Initial impetus - ITCZ

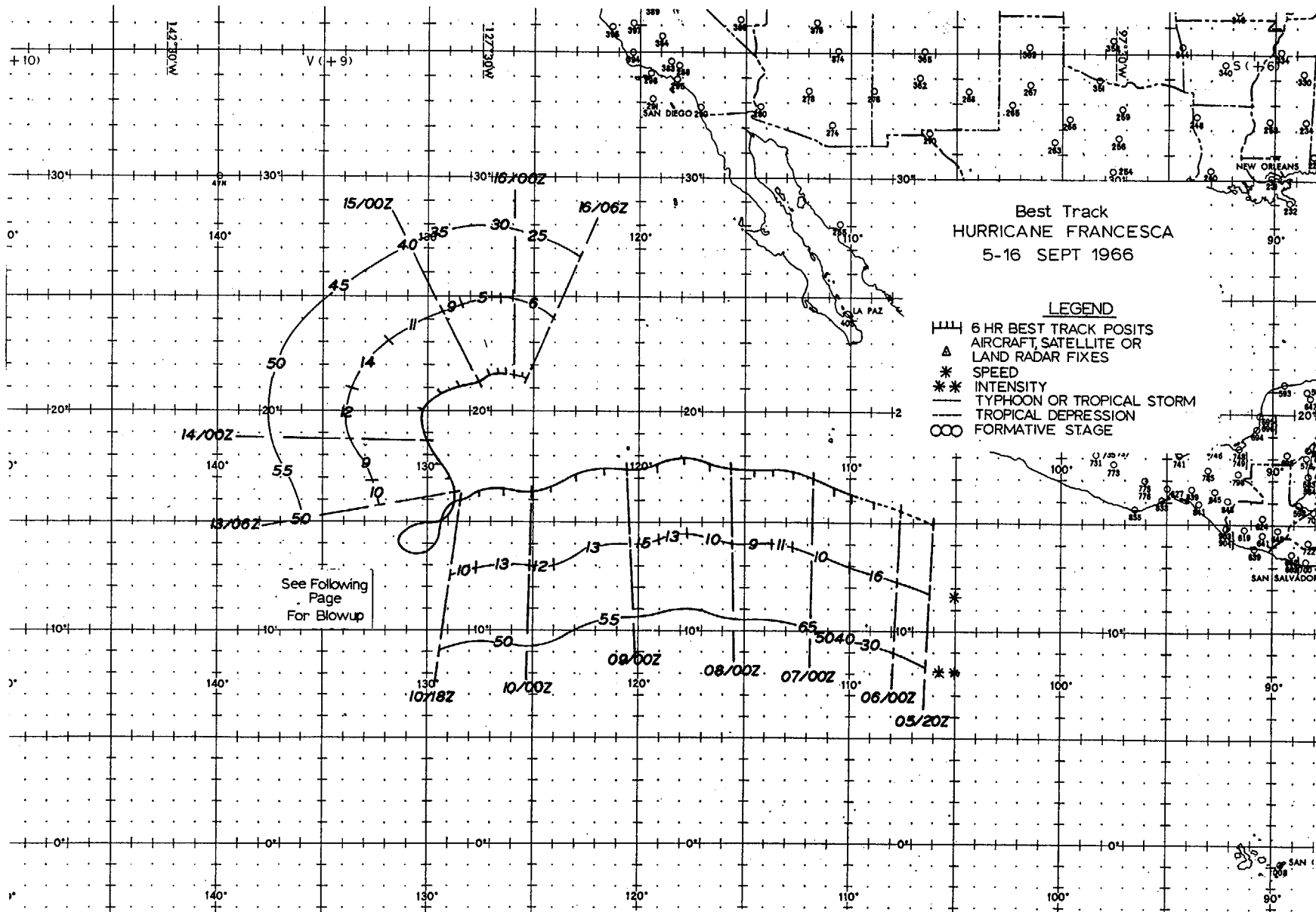
B. Initial surface vortex

1. 051800Z
2. Surface pressure less than 1008 mbs

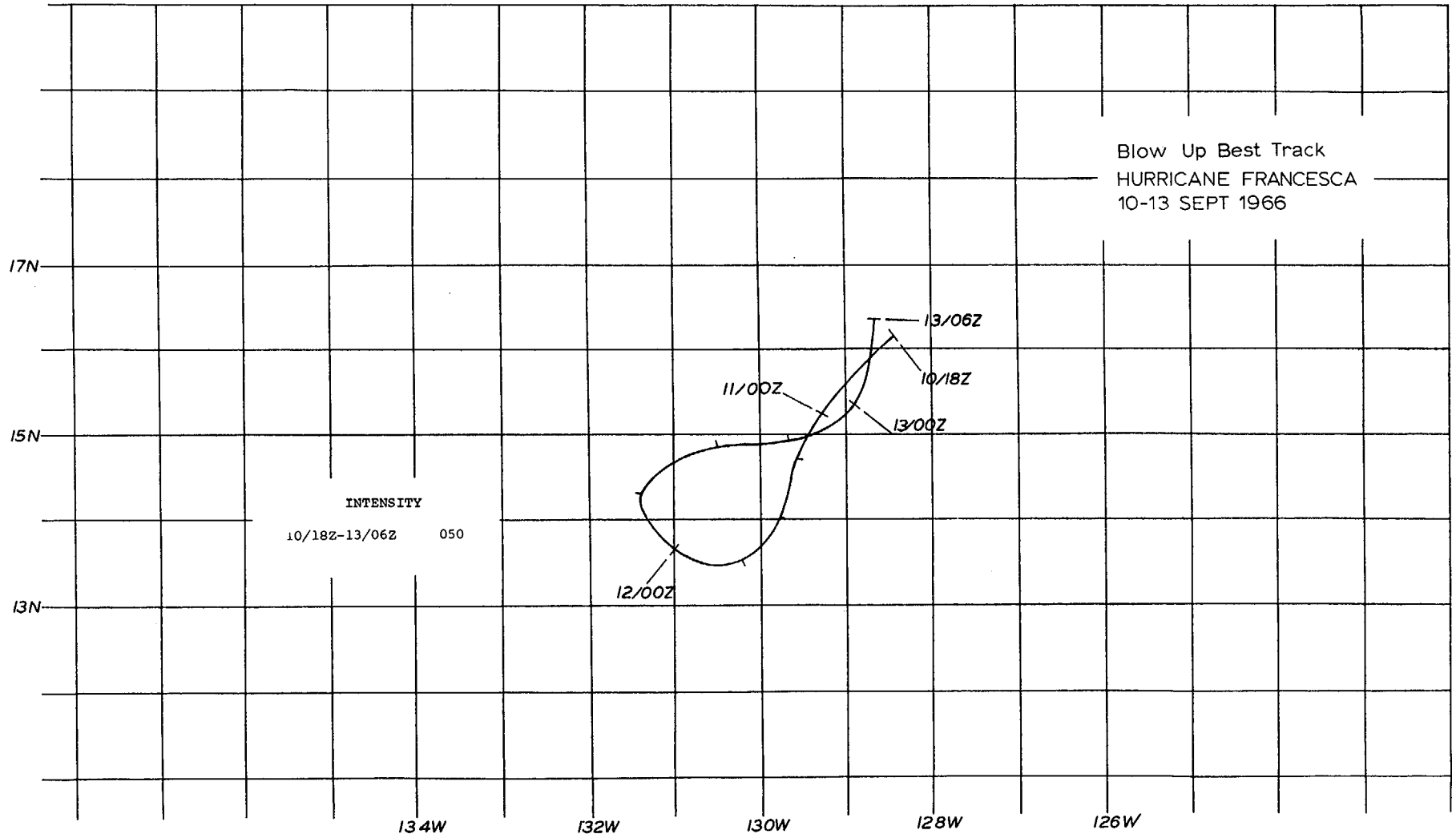
C. Time storm reached hurricane intensity - 061800Z

III. FINAL DISPOSITION

A. Dissipated over water



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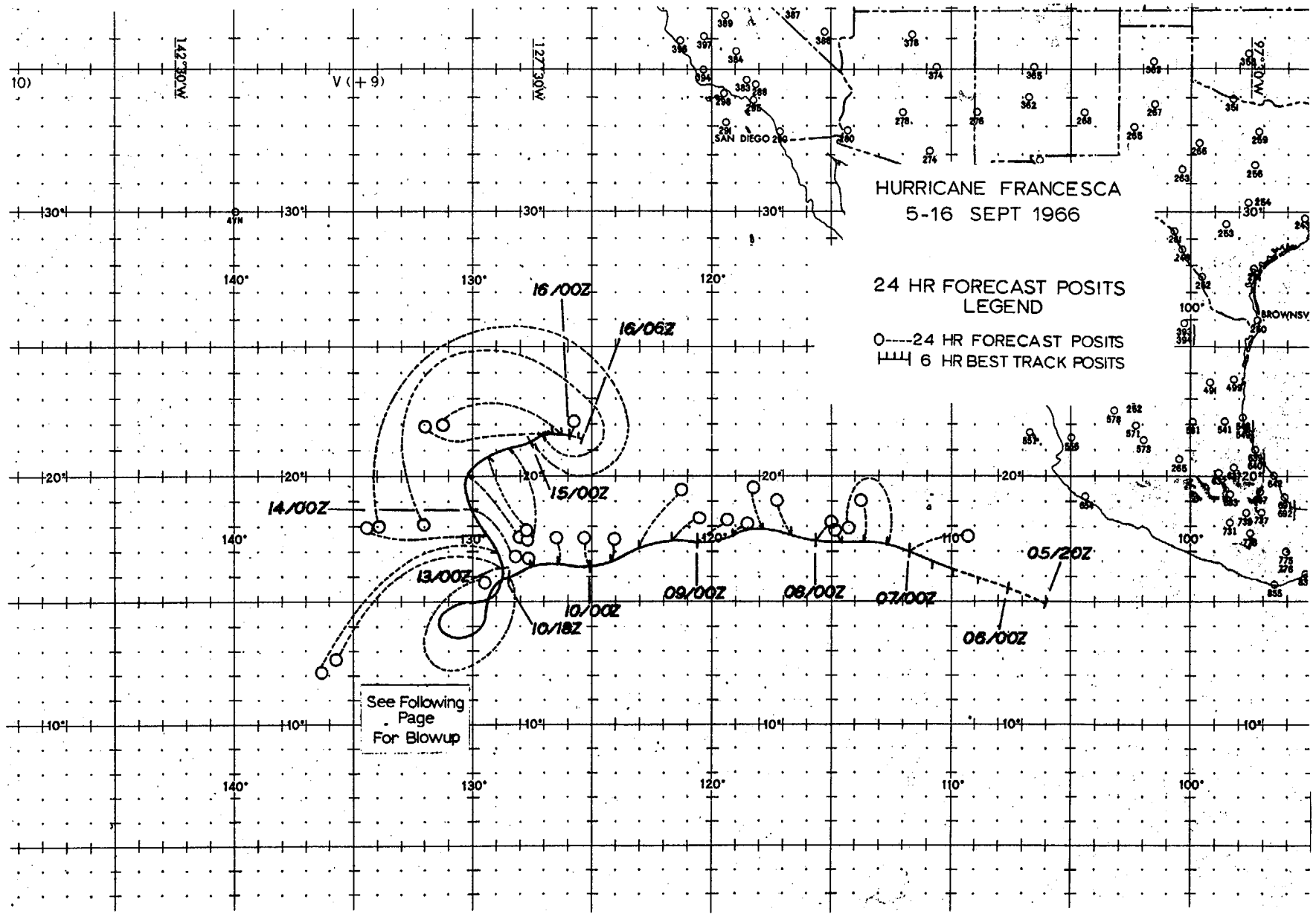
HURRICANE FRANCESCA 05 SEP-16 SEP 1966
 POSITION AND FORECAST VERIFICATION DATA

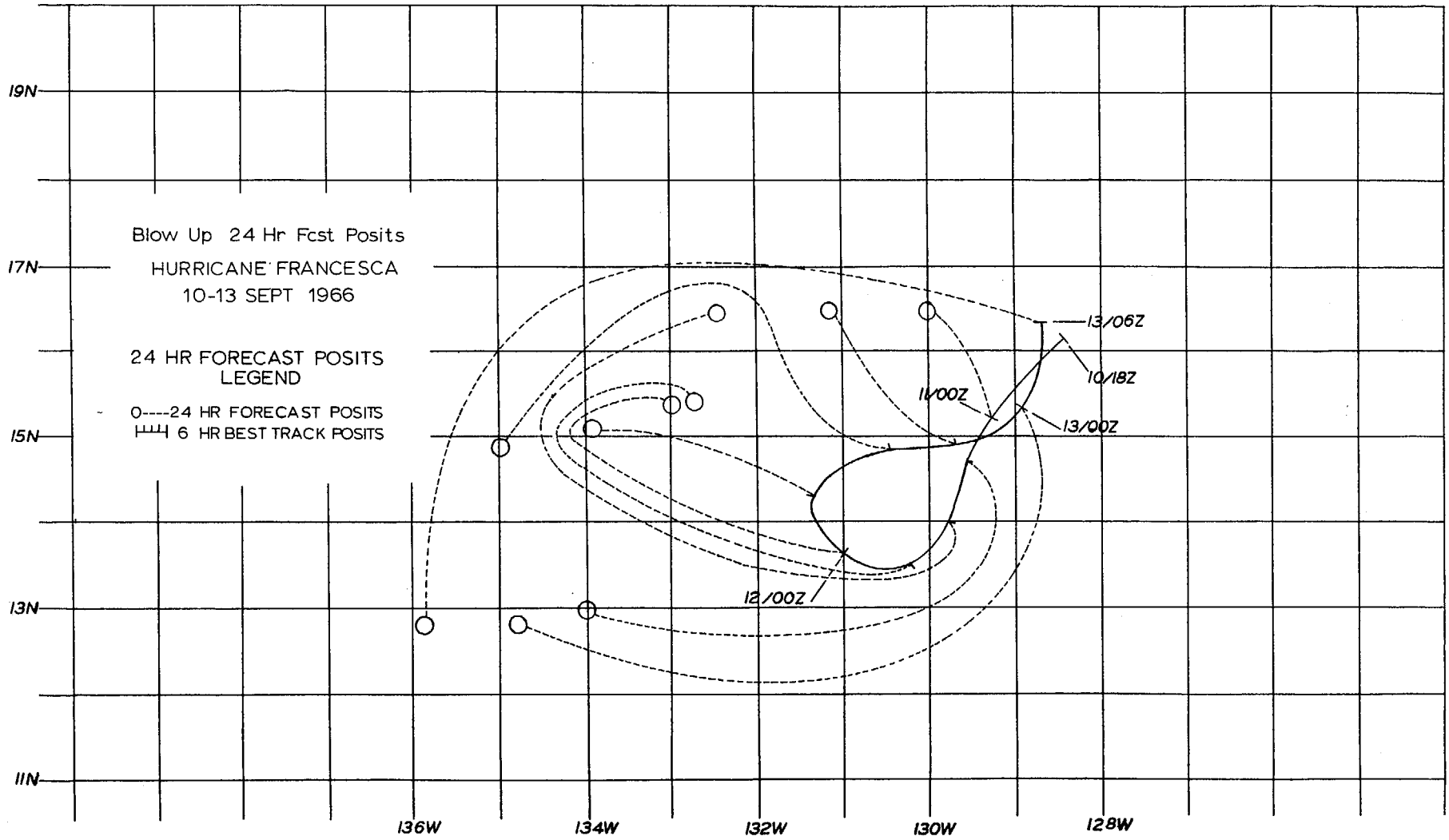
DTG	STORM POSITION		24 HOUR ERROR		48 HOUR ERROR	
	LAT.	LONG.	DEG.	DISTANCE	DEG.	DISTANCE
052000Z	15.0N	106.0W	-----		-----	
060000Z	15.7N	107.4W	-----		-----	
060600Z	16.0N	108.9W	-----		-----	
061200Z	16.2N	109.7W	-----		-----	
061800Z	16.6N	110.7W	053-106		-----	
070000Z	16.9N	111.6W	052-130		-----	
070600Z	17.2N	112.6W	294-105		-----	
071200Z	17.4N	113.7W	356-096		-----	
071800Z	17.3N	114.5W	339-050		-----	
080000Z	17.5N	115.5W	332-074		-----	
080600Z	17.7N	116.5W	331-087		-----	
081200Z	17.9N	117.8W	342-095		359-209	
081800Z	17.6N	119.0W	053-048		347-136	
090000Z	17.5N	120.5W	056-078		357-163	
090600Z	17.5N	121.6W	056-084		360-186	
091200Z	17.2N	123.0W	038-163		004-226	
091800Z	16.5N	124.0W	360-062		036-168	
100000Z	16.3N	125.1W	350-072		034-187	
100600Z	16.5N	126.3W	349-062		036-193	
101200Z	16.4N	127.5W	291-015		029-282	
101800Z	16.1N	128.4W	255-068		327-160	
110000Z	15.3N	129.3W	327-077		350-136	
110600Z	14.6N	129.6W	318-144		347-174	
111200Z	14.0N	129.7W	313-212		328-241	
111800Z	13.6N	130.2W	305-174		289-241	
120000Z	13.7N	131.0W	310-150		289-278	
120600Z	14.3N	131.4W	289-153		282-302	
121200Z	14.9N	130.5W	270-265		281-348	
121800Z	14.9N	129.7W	246-284		267-424	
130000Z	15.3N	128.9W	244-361		263-477	
130600Z	16.3N	128.6W	241-472		258-565	
131200Z	17.0N	129.0W	235-516		254-612	
131800Z	17.6N	129.7W	274-290		230-592	

HURRICANE FRANCESCA 05 SEP-16 SEP 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR		48 HOUR ERROR	
	LAT.	LONG.	DEG.	DISTANCE	DEG.	DISTANCE
140000Z	18.8N	130.1W	137-160		231-645	
140600Z	20.1N	130.2W	140-207		235-735	
141200Z	20.8N	129.4W	157-207		231-803	
141800Z	21.1N	128.4W	175-216		269-527	
150000Z	21.3N	127.5W	243-424		184-162	
150600Z	21.5N	127.1W	233-366		189-152	
151200Z	21.5N	126.7W	278-324		198-121	
151800Z	21.5N	126.3W	275-308		202-258	
160000Z	21.5N	126.0W	007-097		212-238	
160600Z	21.5N	125.5W	360-042		188-213	

AVERAGE 24 HOUR ERROR 157 MI
 AVERAGE 48 HOUR ERROR 329 MI





HURRICANE HELGA - 091200Z TO 150600 SEPTEMBER

I. DATA

A. Statistics

1. Number of warnings issued - 24
2. Number of warnings with hurricane intensity - 5
3. Total distance traveled during tropical warning period - 1365 mi

B. Characteristics

1. Minimum observed SLP - 992 mbs at 141800Z
2. Minimum observed 700mb height - 3150 m. at 121200Z
3. Maximum surface wind - 68 kts
4. Maximum radius of surface circulation - 600 mi

II. DEVELOPMENT

A. Initial impetus - ITCZ

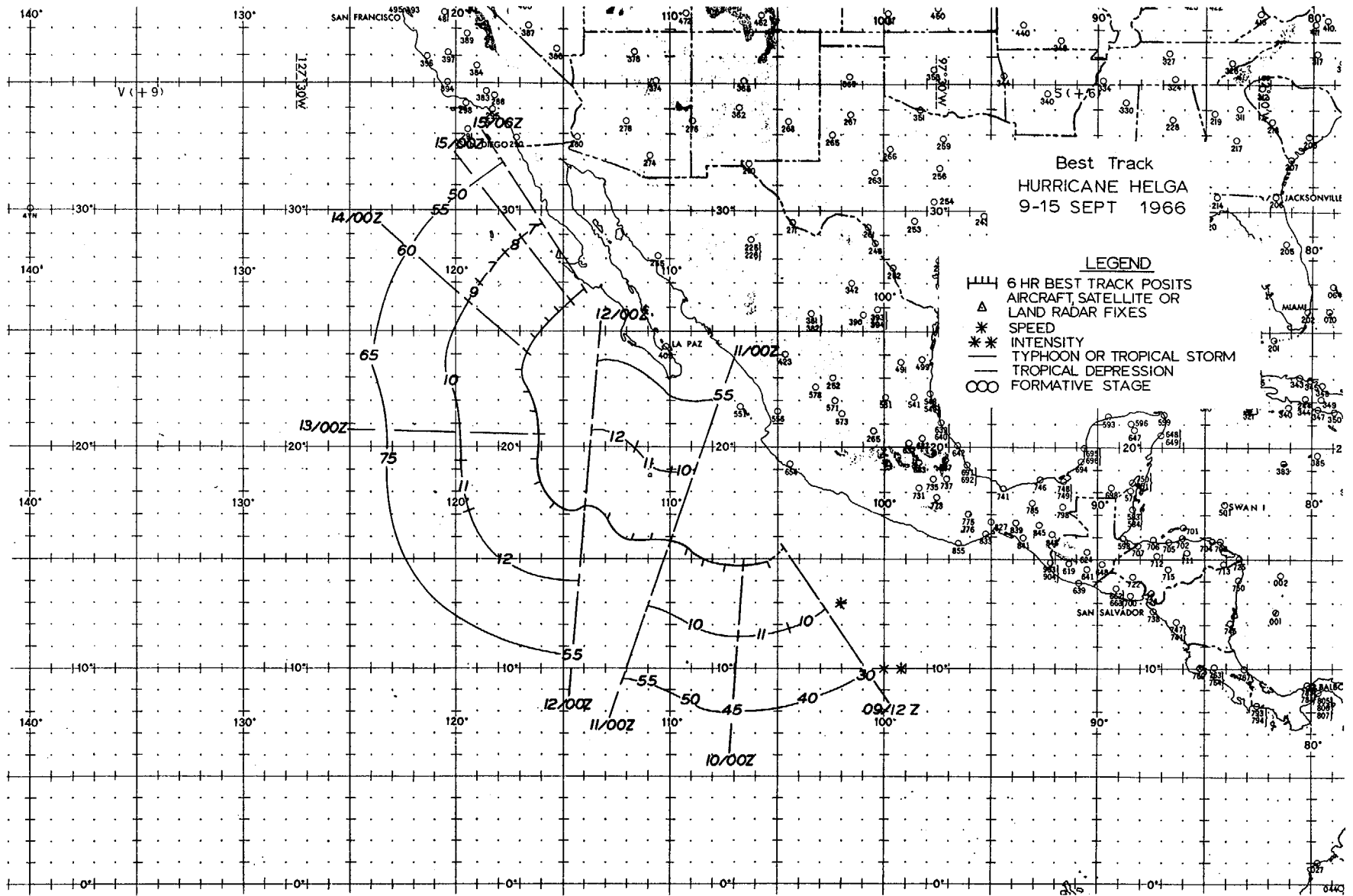
B. Initial surface vortex

1. 091200Z
2. Surface pressure less than 1008 mbs

C. Time storm reached hurricane intensity - 121800Z

III. FINAL DISPOSITION

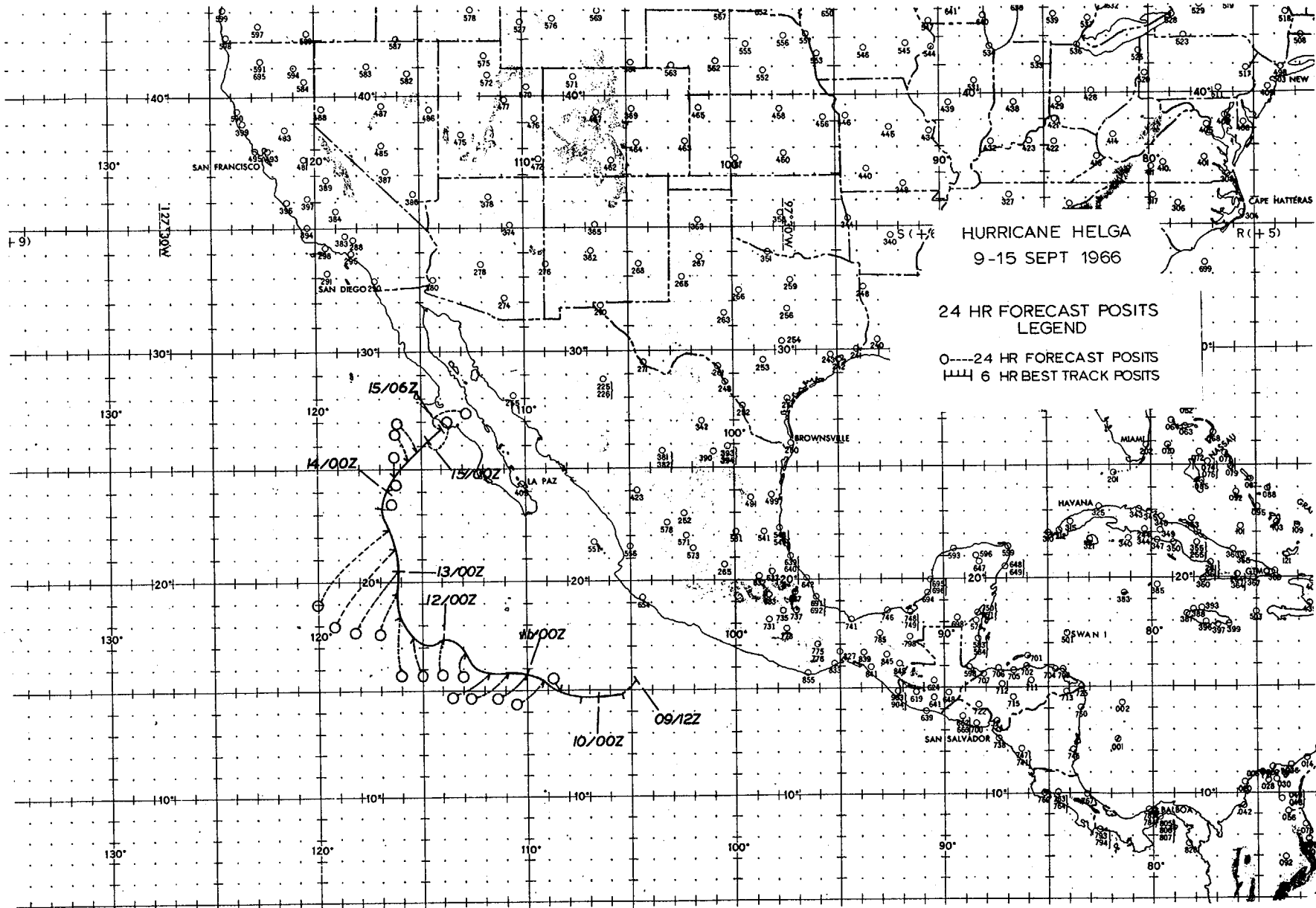
A. Dissipated over land



HURRICANE HELGA 09 SEP-15 SEP 1966
 POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION		24 HOUR ERROR		48 HOUR ERROR	
	LAT.	LONG.	DEG.	DISTANCE	DEG.	DISTANCE
091200Z	15.5N	104.8W	-----	-----	-----	-----
091800Z	14.8N	105.4W	-----	-----	-----	-----
100000Z	14.8N	106.6W	-----	-----	-----	-----
100600Z	14.8N	107.5W	-----	-----	-----	-----
101200Z	14.9N	108.5W	329-037	-----	-----	-----
101800Z	15.5N	109.1W	229-117	-----	-----	-----
110000Z	15.8N	110.0W	323-099	-----	-----	-----
110600Z	15.8N	111.0W	238-112	-----	-----	-----
111200Z	16.0N	112.2W	238-106	-----	-----	-----
111800Z	16.9N	112.9W	180-072	-----	210-265	-----
120000Z	17.2N	114.1W	178-078	-----	230-219	-----
120600Z	17.5N	115.4W	166-103	-----	228-236	-----
121200Z	18.4N	116.1W	178-156	-----	211-254	-----
121800Z	19.5N	116.2W	203-118	-----	192-238	-----
130000Z	20.5N	116.2W	218-196	-----	200-300	-----
130600Z	21.5N	116.2W	221-273	-----	206-380	-----
131200Z	22.3N	116.6W	226-282	-----	207-444	-----
131800Z	23.2N	117.0W	064-040	-----	220-378	-----
140000Z	24.0N	116.6W	039-039	-----	228-466	-----
140600Z	24.7N	116.2W	360-035	-----	228-546	-----
141200Z	25.3N	115.7W	338-079	-----	242-533	-----
141800Z	25.8N	115.2W	324-085	-----	046-097	-----
150000Z	26.2N	114.6W	042-064	-----	053-295	-----
150600Z	26.6N	114.1W	058-093	-----	046-295	-----

AVERAGE 24 HOUR ERROR 91 MI
 AVERAGE 48 HOUR ERROR 277 MI



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