Preliminary Report
Hurricane Jerry
12-16 October 1989

a. Synoptic History

On 23 September a westward moving tropical wave emerged from the northwest coast of Africa. The wave moved across the tropical Atlantic and the Caribbean Sea with no additional signs of organization. The wave's westward motion decreased over the Yucatan peninsula where a broad area of low pressure became evident in the surface pressure field and in the low cloud motions observed in the animation of satellite images. On 12 October the low first satisfied the Dvorak technique criteria and therefore was classified by NHC satellite analysts as it moved off the Yucatan peninsula into the Bay of Campeche. Shortly after an Air Force reconnaissance aircraft confirmed a circulation center near 1900 UTC on the 12th, the system was declared the fourteenth tropical depression of the 1989 hurricane season. Post-analysis suggests that the depression formed by 1200 UTC while located about 200 nautical miles east-northeast of Veracruz Mexico.

The depression moved slowly toward the north-northwest, with satellite and aircraft reconnaissance reports indicating it attained tropical storm strength early on 13 October. Tropical Storm Jerry moved generally northward at between 5 and 10 knots on the 13th while gradually strengthening. While in the west central Gulf of Mexico early on 14 October, Jerry turned toward the north-northeast and slowed in response to the approach of a mid- to upper-level trough from the west that weakened the steering currents. Later on 14 October, a mid- to upper-level low cut-off over the western Gulf of Mexico to the southwest of Jerry. This cut-off low was responsible for turning Jerry back toward the north-northwest. At the same time, the upper-level shear increased over the tropical cyclone, temporarily halting development. As Jerry continued north-northwestward, however, the mid- to upper-level low dropped southward into the southwest Gulf of Mexico, resulting in a more favorable upper-level outflow pattern over the tropical cyclone.

As the upper-level shear diminished, deep convection began developing near the center of Jerry, and the cyclone reached hurricane status by 1800 UTC on 15 October. Steering currents became somewhat stronger as a high pressure ridge built over the eastern Gulf of Mexico, and Hurricane Jerry's forward motion increased to slightly more than 10 knots as it moved toward the upper Texas coast.

Based on aircraft reconnaissance reports, Hurricane Jerry deepened 13 mb over a 13 hour period from near 0800 UTC to 2100 UTC on 15 October. While this does not qualify as rapid deepening, it is approximately twice as fast as the deepening observed on the 12th and 13th of October.

The center of Hurricane Jerry made landfall on Galveston Island near Jamaica Beach at approximately 0030 UTC on 16 October as a category one hurricane on the Saffir-Simpson Hurricane Scale. No hurricane has made landfall on the upper Texas coast as late in the season as did Jerry. The minimum pressure at landfall reported by aircraft reconnaissance aircraft was 983 mb. Once over land, Jerry turned toward the north and then north- northeast over eastern Texas at an increasing forward speed. The hurricane weakened rapidly and was downgraded to a tropical storm by 0600 UTC, and to a tropical depression by 1200 UTC. By 1800 UTC on 16 October, the remnants of Jerry were absorbed by a frontal trough over southwest Arkansas.

The synoptic 6-hourly positions by latitude and longitude, along with lowest sea-level pressure, maximum winds and classification by stage are shown in Table 1. The track of Hurricane Jerry with 0000 UTC and 1200 UTC positions is shown in Figure 1. Table 2 shows the watches and warnings issued for Jerry.

b. Meteorological Statistics

Figures 2 and 3 show the best track pressure and wind curves as a function of time, along with the observations on which they are based. Maximum sustained surface winds of 65 knots with gusts to 87 knots were measured at Scholes Field on Galveston Island as the eyewall passed over the airport. The observation site lost power near this time, and the observer estimated maximum sustained winds reached 70 knots with gusts of 90 to 100 knots shortly after the power outage. The estimated peak wind and gust occurred about the time an unconfirmed tornado was reported near Scholes Field. A total of six tornadoes were reported over eastern Texas in association with Jerry, although it is not clear whether they were in fact tornadoes or severe downbursts. The Galveston Weather Service Office, located to the east of Scholes Field, reported sustained winds of 40 knots with gusts to 74 knots.

The small size of the tropical cyclone is evident by the lack of sustained tropical storm force winds reported elsewhere over the upper Texas and western Louisiana coasts. Jerry also weakened quite rapidly after landfall, with less than tropical storm force winds reported at Houston International Airport and at Houston Hobby Airport.

An extrapolated minimum pressure of 982 mb was reported by a NOAA aircraft at 2002 UTC and by an Air Force plane at 2211 UTC on the 15th, just prior to landfall. The minimum pressure of 983 mb at the time of landfall was reported from an Air Force plane as the eye passed over Galveston Island.

Largest rainfall totals occurred at Silsbee, Friendship and Anahuac, Texas, where 24-hour totals ending at 1200 UTC on 16 October were 6.40, 4.75 and 4.50 inches, respectively.

Maximum tides of 6.0, 7.0, 5.3 and 2.3 feet MSL were reported

at the Galveston Flagship pier, Baytown, Anahuac and Sabine Pass, Texas, respectively. Cameron, Louisiana, reported tides of 3.2 feet, and the 2 foot tides estimated at St Mary Parish were probably representative of the Vermillion/Atachatalaya Bay area of Louisiana. Unofficial reports of tides surging to 8 feet were reported near the entrance of the Houston ship channel.

Table 3 is a listing of meteorological and hydrological observations.

c. Casualty and Damage Statistics

The death toll is reported to be three. The three people were in a car which either drove off the Galveston seawall in blinding rain, or was blown off by the winds. Light beach erosion was reported on portions of Galveston Island and the Bolivar Peninsula. A portion of Texas highway 87 between Sea Rim State Park and High Island was washed out.

The American Insurance Association reports 35 million dollars as the insured property damage for Texas. Hurricane damage estimates for past storms, however, have often been two to three times the insured property damage.

d. Forecast and Warning Critique

Jerry was a difficult cyclone to forecast. The strengthening prior to landfall and the continued motion to the north-northwest on 15 October were not anticipated. In retrospect, the strength of the mid- to upper-level cyclonic circulation observed in water vapor images on 15 October over the western Gulf of Mexico appears to have been a dominant influence on both the track and strengthening of Jerry. The impact of missing Brownsville rawinsonde reports, due to equipment failure from 1200 UTC on 14 October through landfall, on the objective track forecasting models is unkown.

The difficulty in forecasting the actual track and strengthening of Jerry resulted in only 8 hours lead time between the posting of the hurricane warning and the center crossing Galveston Island. Table 4 shows that Galveston did, however, have the highest probabilities of the center passing within 65 miles on the advisories issued after 0230 UTC on 15 October. This was due to the forecast track earlier on the 15th bowing toward the upper Texas coast before a forecast turn to the northeast, rather than the correct forecast of landfall. Fortunately, 8 hours lead time was sufficient for required response for this small and short lived category 1 hurricane. No massive evacuations were required and plans on Galveston Island worked well according to the mayor of Galveston.

The official forecast tracks were, in general, to the right of the actual track. The NHC83 track model, which has been one of the most reliable models in recent years, was also consistently

forecasting a track to the east of the actual track. The NHC83 problems were caused largely by the failure of the National Meteorological Center's Global Spectral Model to depict the geopotential height gradient with sufficient accuracy. Figure 4 shows guidance from various track prediction models initialized at 1200 UTC on 14 October, demonstrating an example of the tremendous scatter which existed with the objective aids throughout the life of Jerry.

It should also be noted that the only NHC intensity forecast scheme, SHIFOR, did not forecast Jerry to hurricane strength from initialized times of 0000 and 0600 UTC on 15 October.

It is fortunate, given the rate of deepening prior to landfall, that Jerry did not remain over water for a longer period of time, or deepen more quickly.

Max Mayfield
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Final Draft 11/21/89

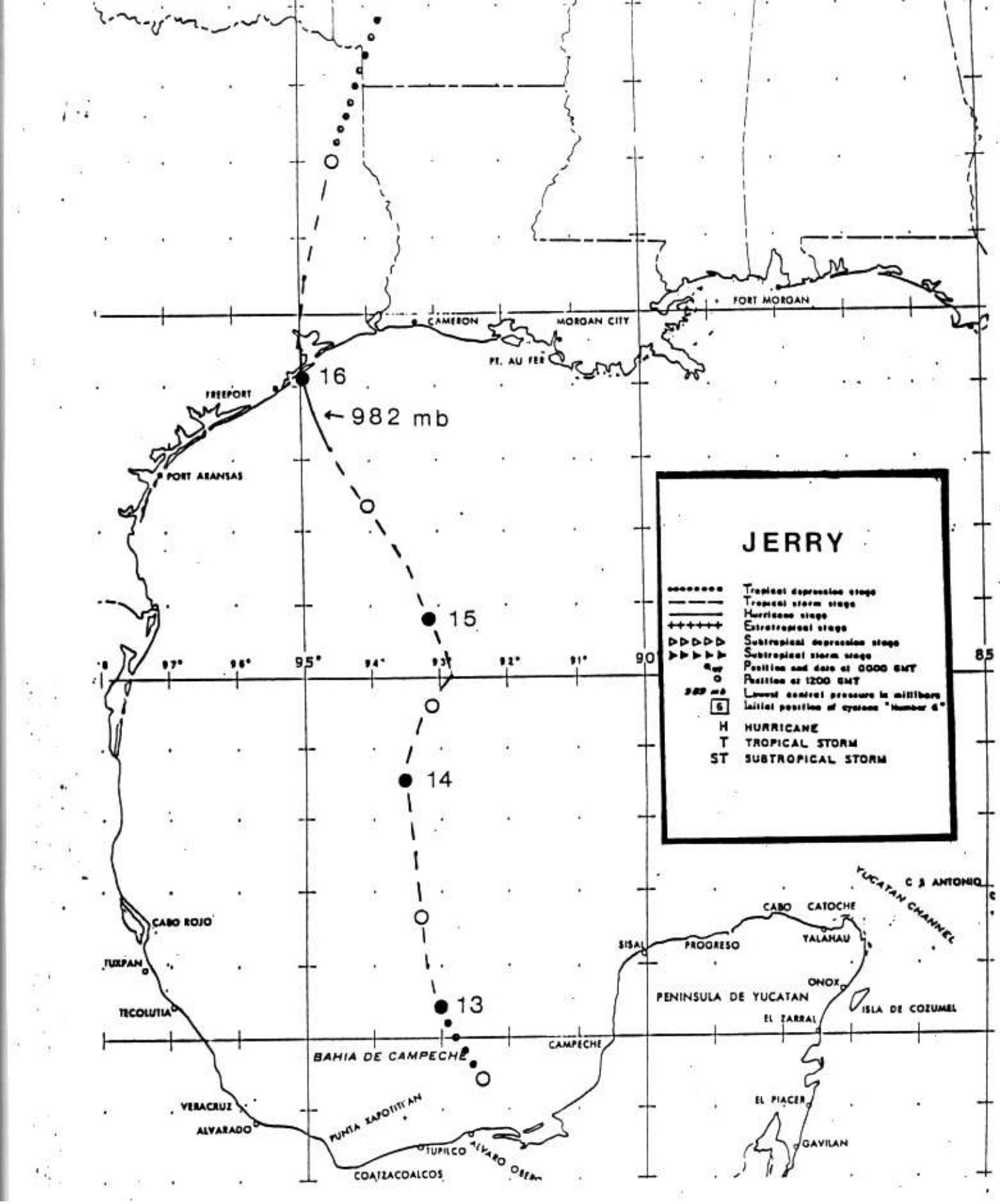
Figure Captions:

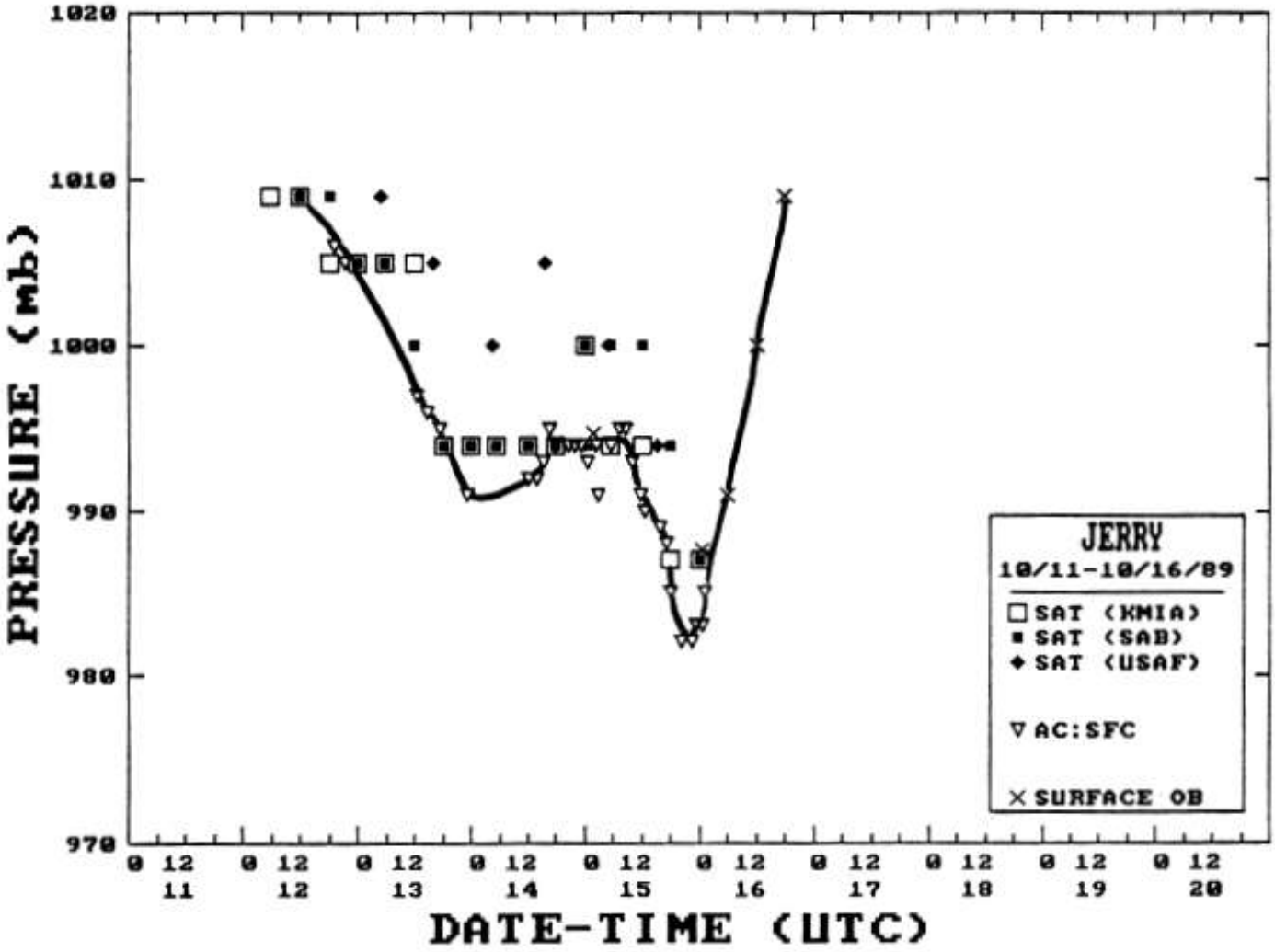
Fig. 1. Best track positions for Hurricane Jerry, 12-16 October 1989.

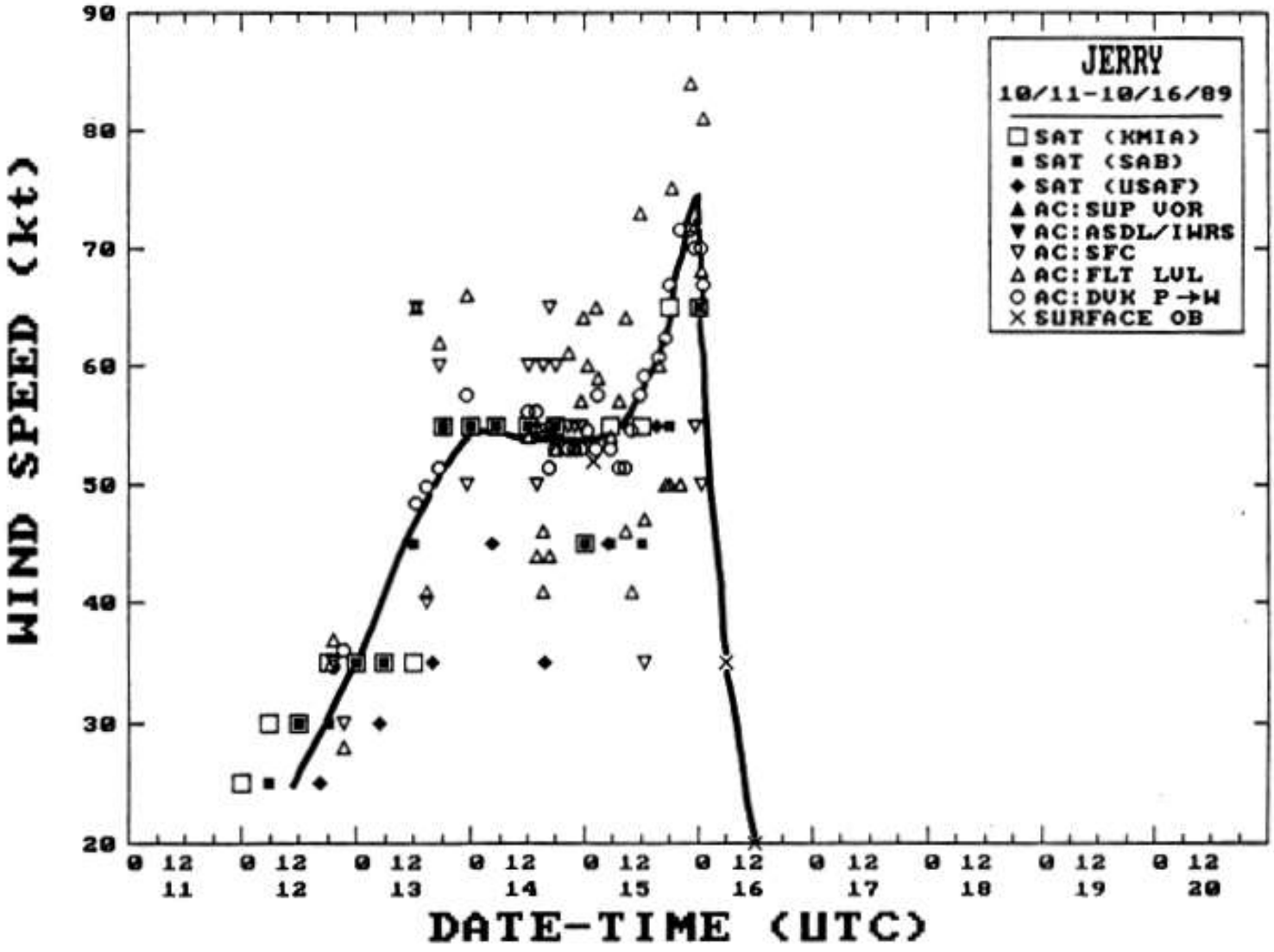
Fig. 2. Best track minimum central pressure curve for Hurricane Jerry, 12-16 October 1989.

Fig. 3. Best track maximum sustained wind speed curve for Hurricane Jerry, 12-16 October 1989.

Fig. 4. Guidance from various track prediction models available at the NHC. Model name is labelled near the 72 hour forecast position.


JERRY
Tropical depression stage
Tropical storm stage
Hurricane stage
Extratropical stage
Subtropical depression stage
Subtropical storm stage
Position and date at 0000 GMT
Position at 1200 GMT
Lowest central pressure in millibars
Initial position of cyclone "Number 6"
H HURRICANE
T TROPICAL STORM
ST SUBTROPICAL STORM
16
982 mb
15
14
13
FREEPORT
PORT ARANSAS
CAMERON
MORGAN CITY
PT. AU FER
FORT MORGAN
CABO ROJO
TUXPAN
TECOLUTLA
VERACRUZ
ALVARADO
PUNTA XAPOTITLAN
TUPILCO ALVARO OBRE
COATZACOALCOS
BAHIA DE CAMPECHE
CAMPECHE
SISAL
PROGRESO
CABO CATOCHE
YALAHAU
C. S. ANTONIO
YUCATAN CHANNEL
ONOX
PENINSULA DE YUCATAN
ISLA DE COZUMEL
EL ZARRAL
EL PLACER
GAVILAN
97°
96°
95°
94°
93°
92°
91°
90
85


1020
1010
1000
990
980
970
PRESSURE (mb)
0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12
11 12 13 14 15 16 17 18 19 20
DATE-TIME (UTC)
JERRY
10/11-10/16/89
SAT (KMIA)
SAT (SAB)
SAT (USAF)
AC:SFC
SURFACE OB


JERRY
10/11-10/16/89
SAT (KMIA)
SAT (SAB)
SAT (USAF)
AC:SUP VOR
AC:ASDL/IWRS
AC:SFC
AC:FLT LVL
AC:DVK P→W
SURFACE OB
WIND SPEED (kt)
90
80
70
60
50
40
30
20
0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12 0 12
11 12 13 14 15 16 17 18 19 20
DATE-TIME (UTC)

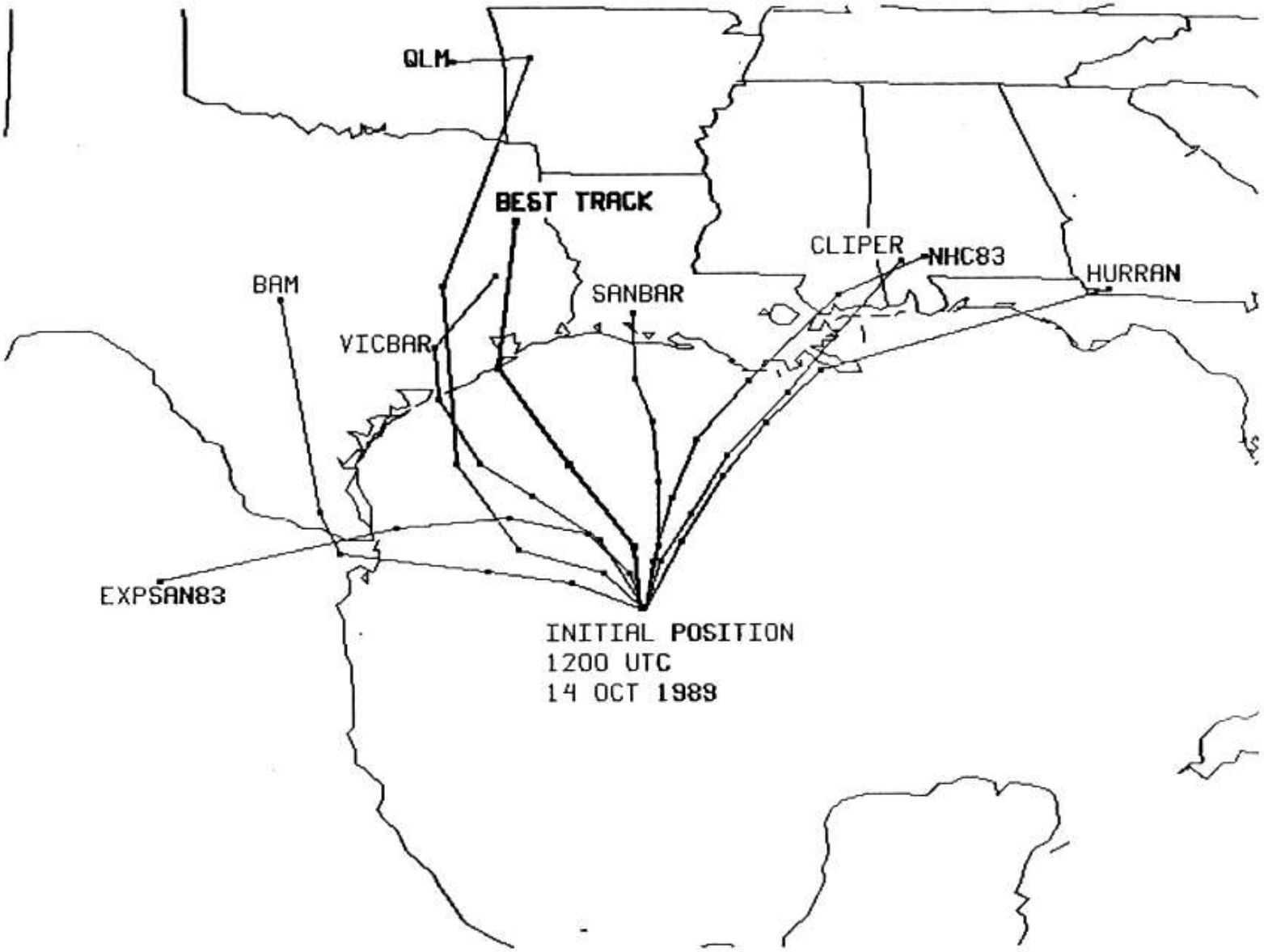

QLM
BEST TRACK
CLIPER
NHC83
HURRAN
BAM
SANBAR
VICBAR
EXPSAN83
INITIAL POSITION
1200 UTC
14 OCT 1989

TABLE 1. Preliminary best track, Hurricane Jerry, 12-16 October 1989.

Date/Time (UTC)	Position Lat.	Lon.	Pressure (mb)	Wind Speed (kt)	Stage
12/1200	19.4	92.4	1009	25	trop. depression
1800	19.8	92.7	1006	30	" "
13/0000	20.4	93.0	1004	35	trop. storm
0600	21.0	93.2	1001	40	" "
1200	21.7	93.3	997	45	" "
1800	22.6	93.4	995	50	" "
14/0000	23.5	93.5	991	55	" "
0600	24.2	93.3	992	55	" "
1200	24.6	93.1	992	55	" "
1800	25.0	92.8	994	55	" "
15/0000	25.8	93.1	994	55	" "
0600	26.5	93.4	994	55	" "
1200	27.3	94.0	991	60	" "
1800	28.1	94.6	986	65	hurricane
16/0000	29.1	95.0	983	75	"
0600	30.4	94.9	991	35	trop. storm
1200	32.0	94.5	1000	20	trop. depression
1800	33.8	93.8	1009	15	absorbed in front
Minimum pressure:					
15/2100	28.6	94.8	982	70	hurricane
Landfall:					
16/0030	29.2	95.0	983	75	hurricane

Table 2. Summary of watches and warnings on Hurricane Jerry, October 1989.

LOCATION	TYPE	EFFECTIVE	DISCONTD
Port Arthur TX to Mouth of Mississippi	Hurricane Watch	14/0230Z	14/2200Z
Louisiana Coast	Tropical Storm Watch	14/2200Z	15/1200Z
Port O Connor TX to Morgan City LA	Tropical Storm Watch	15/1200Z	15/1600Z
Freeport TX to Intracoastal City LA	Hurricane Warning	15/1600Z	16/0400Z
Matagorda to Freeport TX	Tropical Storm Warning	15/1600Z	16/0400Z
Intracoastal City to Morgan City LA	Tropical Storm Warning	15/1600Z	16/0200Z
Freeport TX to Intracoastal City LA	Tropical Storm Warning	16/0400Z	16/1000Z

TABLE 3. Hurricane Jerry selected surface observations October 1989.

Location	Minimum sea-level pressure		Maximum surface wind speed (knots)			Storm tide (height above MSL) (ft)	Rain ** (in)
	Pressure (mb)	Date/time (UTC)	1-minute average	Peak gust	Date/time (UTC)*		
Texas							
Scholes Field, Galveston	987.6	16/0034	65	87	16/0034	-.-	1.17
Galveston WSO	994.2	16/0018	40	75	16/0100	-.-	1.46
Houston Hobby A/P	997.0	16/0250	25	32	15/2350	-.-	0.14
Houston International	--	--	18	29	16/0150	-.-	Trace
Houston WSO, Alvin	--	--	--	--	--	-.-	0.25
Anahuac	--	--	--	--	--	5.3	4.50
Flagship Pier, Galveston	--	--	--	--	--	6.0	-.-
Baytown	--	--	--	--	--	7.0	-.-
Sabine Pass	--	--	--	--	--	2.3	-.-
Friendship	--	--	--	--	--	-.-	4.75
Silsbee	--	--	--	--	--	-.-	6.40

* Time of 1 minute wind speed
** 24 hour total ending 16/1200 UTC

TABLE 4. Chances of the center of Hurricane Jerry passing within 65 miles of listed locations by date and time (CDT) indicated; probabilities in percent.

ADVISORY DATE/TIME PROBABILITY TIME	13/8AM 16/7AM	13/11AM 16/7AM	13/5PM 16/1PM	13/930PM 16/7PM	14/5AM 17/1AM
23.8N 93.7W	39	--	--	--	--
26.4N 92.9W	19	--	--	--	--
MMSO 23.8N 98.2W	9	8	3	--	--
MMTM 22.2N 97.9W	8	6	--	--	--
MARCO ISLAND FL	2	2	--	--	--
FT MYERS FL	3	2	2	--	--
VENICE FL	3	3	2	--	2
TAMPA FL	4	4	3	--	3
CEDAR KEY FL	5	5	5	2	4
ST MARKS FL	6	6	8	4	7
APALACHICOLA FL	7	7	8	5	8
PANAMA CITY FL	7	8	10	7	9
PENSACOLA FL	8	9	12	13	13
MOBILE AL	9	10	13	17	15
GULFPORT MS	10	11	15	19	17
BURAS LA	11	13	16	23	18
NEW ORLEANS LA	11	12	16	24	20
NEW IBERIA LA	11	12	16	24	24
PORT ARTHUR TX	10	11	14	15	21
GALVESTON TX	11	11	13	12	21
FREEPORT TX	10	11	12	9	18
PORT O CONNOR TX	10	11	10	4	11
CORPUS CHRISTI TX	9	9	8	2	5
BROWNSVILLE TX	11	11	7	2	3
GULF 29N 85W	7	7	8	4	6
GULF 29N 87W	9	10	11	10	10
GULF 28N 89W	12	13	15	18	12
GULF 28N 91W	14	15	20	37	24
GULF 28N 93W	15	16	22	38	42
GULF 28N 95W	13	14	16	14	27
GULF 27N 96W	13	14	13	5	14
GULF 25N 96W	17	17	13	3	6
MMMD 21.0N 89.7W	--	3	--	--	--
26.3N 92.9W	--	--	--	67	--
28.5N 91.5W	--	--	--	36	--
31.0N 90.5W	--	--	--	20	--

TABLE 4. Chances of the center of Hurricane Jerry passing within 65 miles of listed locations by date and time (CDT) indicated; probabilities in percent.
(cont.)

ADVISORY DATE/TIME PROBABILITY TIME	14/8AM 17/7AM	14/11AM 17/7AM	14/5PM 17/1PM	14/930PM 17/7PM	15/5AM 18/1AM
MARCO ISLAND FL	2	2	2	--	--
FT MYERS FL	3	3	3	--	--
VENICE FL	3	4	4	--	--
TAMPA FL	5	5	5	--	--
CEDAR KEY FL	6	7	7	--	--
ST MARKS FL	9	10	10	2	--
APALACHICOLA FL	10	11	11	3	2
PANAMA CITY FL	11	12	12	5	3
PENSACOLA FL	14	14	14	9	6
MOBILE AL	15	15	15	11	8
GULFPORT MS	16	16	16	13	10
BURAS LA	18	18	18	14	11
NEW ORLEANS LA	17	17	17	16	14
NEW IBERIA LA	17	17	17	20	19
PORT ARTHUR TX	14	13	13	22	22
GALVESTON TX	13	12	12	28	28
FREEPORT TX	12	11	11	26	27
PORT O CONNOR TX	9	8	8	18	17
CORPUS CHRISTI TX	6	6	6	8	10
BROWNSVILLE TX	5	5	5	5	6
GULF 29N 85W	9	10	10	3	--
GULF 29N 87W	13	14	13	6	4
GULF 28N 89W	17	18	18	10	7
GULF 28N 91W	24	25	24	17	15
GULF 28N 93W	26	24	24	42	53
GULF 28N 95W	16	14	14	38	44
GULF 27N 96W	11	10	10	21	17
GULF 25N 96W	8	7	7	6	6
MMSO 23.8N 98.2W	--	--	--	--	2

TABLE 4. (cont.) Chances of the center of Hurricane Jerry passing within 65 miles of listed locations by date and time (CDT) indicated; probabilities in percent.

ADVISORY DATE/TIME PROBABILITY TIME	15/7AM 18/7AM	15/11AM 18/7AM	15/5PM 18/1PM
PENSACOLA FL	2	--	--
MOBILE AL	4	--	--
GULFPORT MS	5	--	--
BURAS LA	5	--	--
NEW ORLEANS LA	8	4	4
NEW IBERIA LA	17	22	23
PORT ARTHUR TX	36	50	69
GALVESTON TX	49	64	99
FREEPORT TX	43	52	99
PORT O CONNOR TX	23	21	11
CORPUS CHRISTI TX	10	2	--
BROWNSVILLE TX	3	--	--
GULF 28N 91W	6	2	--
GULF 28N 93W	64	99	53
GULF 28N 95W	57	99	99
GULF 27N 96W	15	7	--