PRELIMINARY REPORT

HURRICANE ALICIA

15 TO 21 AUGUST 1983

Hurricane Alicia was the first hurricane to strike the continental United States since Hurricane Allen moved over extreme south Texas on 10 August 1980. The three years and 8 days between these strikes is the longest period in this century that the United States mainland has gone without a hurricane landfall. The next longest period was from 28 September 1929 to 14 August 1932.

The system which was to become Hurricane Alicia formed on the extreme western end of a frontal trough which extended from off the New England coast south-westward into the middle Gulf of Mexico. Surface synoptic observations and satellite pictures indicate that a meso-scale low pressure area moved off the Mississippi and Alabama coasts on 14 August with the weak trough and was likely the precursor of the system which developed into Alicia. Pressures were high over the Gulf of Mexico and remained high during the early stages of the storm's development. A ship, located less than 60 miles to the northwest of the storm's center late on August 15, reported a pressure of 1015.5 MB...29.99 inches...when the system was upgraded to a tropical storm. Two other ships located a little over 60 miles south-east and southwest of the storm center at this time reported pressures of 1016 MB... 30.00 inches...or higher. With these high environmental pressures, the storm remained quite small and generated winds stronger than usually observed in storms with similar minimum central pressures. This condition persisted through August 16.

Steering currents over the storm were quite weak throughout most of Alicia's life-time over the water. However...a ridge was well established to the north through August 17. Slight pressure rises were observed to the north of the storm center and falls along the Texas coast from the 15th to the 17th. The result was that Alicia drifted toward the west through mid-day of the 16th when the storm took a turn toward the west northwest. This track continued through the early morning hours of August 18 when the storm took a more northerly track as the ridge to the north receded toward the east. During this period...an upper level anticyclone became well established over the storm. This factor, combined with the slow movement and long period over the warm Gulf waters (greater than 29C...84F), resulted in the storm deepening at a nearly steady rate of 1 MB per hour over the 40 hour period before landfall.

Alicia weakened rapidly after landfall and accelerated toward the northwest over Texas then northward over western Oklahoma. The storm started to lose tropical characteristics over Oklahoma and Kansas before merging with a trough and losing its identity while moving toward the northeast.

By hurricane standards, Alicia was only a small to medium sized hurricane which reached minimal category three status on the Saffir/Simpson scale at landfall. The center of Alicia moved over the coast about 25 miles southwest of Galveston, Texas, at 2 AM CDT...0700Z...on 18 August. The minimum central pressure as

determined by a NOAA reconnaissance aircraft at 3:42 AM CDT...0842Z...was 962 MB. The aircraft measured a wind at flight level (5000 feet) of 115 MPH along the coast just 12 miles east of Galveston at 2:36 AM CDT...0736Z. The wind measured 8 miles south of Galveston at 2:34 AM CDT...0734Z...at flight level was 83 MPH. The strongest winds reported on land for Alicia were at Galveston which remained just east of the eyewall. Sustained winds of 71 MPH and gusts of 98 MPH at 01:18 AM CDT...0718Z...with a gust of 102 MPH at 01:34 AM CDT...0634Z were reported. Winds were likely higher to the west in the eyewall and perhaps over Galveston Bay. Details on these wind fields will await more complete reports. However, aircraft observations indicate that only a 60 to 70 mile section of the coast extending northeastward from Freeport, Texas, experienced hurricane force winds. Surface observations, although initially sparse, support this premise. As the storm moved inland, the winds decreased rather rapidly. The highest winds reported at Hobby Airport, just south of Houston, were 81 MPH with gusts to 99 MPH. However, the strongest winds recorded at Houston International Airport, on the north side of Houston, were 51 MPH with gusts to 78 MPH. As the storm moved on inland, College Station reported winds of 40 MPH with gusts to 50 MPH, and Waco observed 29 MPH winds with gusts to 43 MPH as the center passed just to the east.

Storm tides near the time of landfall ranged from about 2 feet near Corpus Christi to more than 9 feet on the Gulf side of Galveston and 8 feet on the bay side and down to 3.5 feet at Calcasieu Pass south of Lake Charles, Louisiana. In addition, tides of 10 to 12 feet were estimated along upper Galveston Bay in Baytown. Many of the tide gauges failed and more exact values will await the results of the U. S. Army Corps of Engineers and other surveys.

Twenty-three tornadoes were reported to the Severe Local Storms Forecast Center in Kansas City. Fourteen of these tornadoes occurred between 7 AM CDT...1200Z... August 17 and 7 AM CDT...1200Z...August 18. These tornadoes were concentrated in the area south of Hobby Airport and north of Galveston. The other 9 tornadoes occurred during the next 24 hours and were scattered over an area north of Houston to Tyler, Texas.

Heavy rains caused flooded conditions over extreme southeast portions of Texas. Some preliminary reports indicate rainfall totals near 11 inches with actual measurements of 9.95 inches at Greens Bayou and 7.75 inches at Galveston.

Although Hurricane Alicia was a rather small hurricane and only a minimal category three storm at landfall, it is one of the costliest in Texas history. The estimated total damage of $1.5 to 2 billion is the largest dollar damage ever recorded for a hurricane striking Texas. However, taking inflation into account, Hurricane Carla may still rank first with a dollar damage of about $1.8 billion in 1983 dollars. Hurricane Carla was a much larger and much stronger storm than Alicia but Alicia struck a more populated area than did Carla. If a storm the size and strength of Carla were to strike the same area today as Alicia did, the losses would likely be 2 to 3 times larger than for Alicia. In any case, the losses from Alicia are still staggering. It is now estimated that 21 people lost their lives as a result of the hurricane, 25 were hospitalized, 7242 were ill or injured, 1209 houses, 633 apartments or condominiums and 455 mobile homes were destroyed, 2308 houses, 919 apartments or condominiums and 281 mobile homes received major damage, 10164 houses, 1938 apartments and condominiums and 753 mobile homes with minor damage. A total of 18,660 families were affected by these damages (Red Cross Report). The total insured losses are estimated at $700 million by the American Insurance Association and the Federal Emergency Reports that the total Federal disaster assistance expected is about $166 million.

Hurricane Alicia was not only the first hurricane to strike the United States mainland in more than three years, but it was also the first storm where landfall probabilities were issued by the National Weather Service. These probabilities provide a measure of the forecast accuracies and are designed for Government officials and industrial interests to use as guidance in their decision making processes. These processes often require lead times in excess of those provided by the standard hurricane watch and warnings issued by the National Weather Service. The first probabilities were issued when Alicia became a tropical storm, about 60 hours before landfall. Probabilities exceeded 10 percent from Buras, Louisiana to Brownsville, Texas, with the highest values of 15 to 17 percent from Corpus Christi to Port Arthur, Texas. Forty-eight hours before landfall, values ranged from 13 to 19 percent over the Texas and western Louisiana coasts. By 30 to 36 hours before landfall, probabilities exceeded 15 percent from New Iberia, Louisiana, to Corpus Christi, with the highest value being 36 percent at Galveston, Texas. However, probabilities of 25 percent or more were indicated from Port Arthur to Port O'Connor, Texas. The last probabilities issued 18 to 24 hours before landfall indicated values in excess of 20 percent from Port Arthur to Corpus Christi with a maximum value of 51 percent at Galveston. The issuance of probabilities was discontinued on the next regular advisory since hurricane warnings were up and any long lead time actions would have been well under way by this time. Table 1 summarizes the probabilities issued for this storm.

TABLE 1. CHANCES OF THE CENTER OF ALICIA PASSING WITHIN 65 MILES OF THE LISTED LOCATIONS BY DATE AND TIME (CDT) INDICATED (PROBABILITIES IN PERCENT).

ADVISORY DATE/TIME	15/5PM	15/9:30PM	16/5AM	16/11AM	16/5PM	16/11PM	17/5AM
PROBABILITY THRU	18/1PM	18/7PM	19/1AM	19/7AM	19/1PM	19/7PM	20/1AM
APPALACHICOLA FL	3	2	2	3	X	X	X
PANAMA CITY FL	3	3	2	4	2	X	X
PENSACOLA FL	5	4	4	6	3	2	2
MOBILE AL	7	6	5	8	5	4	3
GULFPORT MS	8	7	6	9	6	4	4
BURAS LA	11	9	8	11	7	4	4
NEW ORLEANS LA	12	10	9	12	9	17	6
NEW IBERIA LA	14	14	13	16	16	13	11
PORT ARTHUR TX	15	15	15	18	25	27	25
GALVESTON TX	17	18	19	21	36	46	51
PORT O CONNOR TX	16	17	19	19	25	28	34
CORPUS CHRISTI TX	15	15	17	15	17	17	20
BROWNSVILLE TX	14	15	16	14	11	9	10

X MEANS LESS THAN 2 PERCENT

TABLE 2. WATCHES AND WARNINGS.

LOCATION	TYPE	EFFECTIVE	DISCONTINUED
CORPUS CHRISTI, TX.	GALE WARNINGS	8/16/1600Z	8/17/1600Z
TO GRAND ISLE, LA.	HURRICANE WATCH	8/16/1600Z	8/17/1600Z
CORPUS CHRISTI, TX	HURRICANE WARNINGS	8/17/0100Z	
TO MORGAN CITY, LA.			
PORT O CONNOR, TX	HURRICANE WARNINGS		8/18/1600Z
SOUTHWARD			
PORT O CONNOR, TX	HURRICANE WARNINGS		8/18/1900Z
TO MORGAN CITY, LA.			

TABLE 3. SELECTED TEXAS METEOROLOGICAL AND HYDROLOGICAL STATISTICS.

LOCATION	STRONGEST WIND (MPH) DATE/TIME	SUSTD	PEAK	MIN PRESS. DATE/TM (IN)	RAINFALL (IN) DATE	24 HR	STORM TOTAL
GALVESTON	18/0717Z	71	98	18/0800Z	18	6.28	7.75
	18/0634Z		102	29.22			
ALVIN	18/0735Z	48	73	18/1025Z			
				28.55			
CORPUS CHRISTI	17/2150Z	16	-	18/0748Z		0	0
				29.82			
PORT ARTHUR	18/1250Z	40		18/0925Z		-	17-18 3.08
	18/1055Z		59	29.71			
VICTORIA	18/1550Z	18		18/1050Z		0	0
	18/1631Z		25	29.76			
PORT O CONNOR	18/1500Z		29	18/1550Z			
				29.76			
LAKE CHARLES LA.	18/1621Z	24		18/1149Z	18	.26	17-18 .36
	18/1829Z		39	29.86			
HOUSTON INTRNL	18/1253Z	51		18/1348Z			
	18/1246Z		78	29.11			
HOBBY AIRPORT	18/0900Z	81	99				
ELLINGTON AFB	18/1155Z		80	18/1155Z			
				29.04			
COLLEGE STATION	18/1638Z	40	50	18/1851Z			
				29.42			
WACO	18/2338Z	29	43	19/0152Z			
				29.57			
FORT WORTH	19/0500Z	32		19/0201Z			
	19/0149Z		44	29.67			
				29.81			
WICHITA FALLS	19/1500Z	17		19/1500Z			
				29.81			

MISCELLANEOUS RAINFALL STORM TOTALS.

LOCATION	TOTAL (INCHES)	LOCATION	TOTAL (INCHES)
GREENS BAYOU	9.95	SOUR LAKE	6.5
CENTERVILLE	8.25	NEW CANEY	6.5
NORMANGEE	7.60	GROESBECK	6.1
MEXIA	7.48	LIBERTY	5.4

MISCELLANEOUS MAXIMUM TIDE REPORTS FOR HURRICANE ALICIA.

LOCATION	TIDES (FEET)	LOCATION	TIDES (FEET)
GALVESTON		CALCASIEU PASS, LA.	3.5
PLEASURE PIER	8.67	CORPUS CHRISTI	2.0
PIER 21 (BAY)	5.61	BAYTOWN	10-12
PORT O CONNOR	4.5		

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PRELIMINARY BEST TRACK
HURRICANE ALICIA
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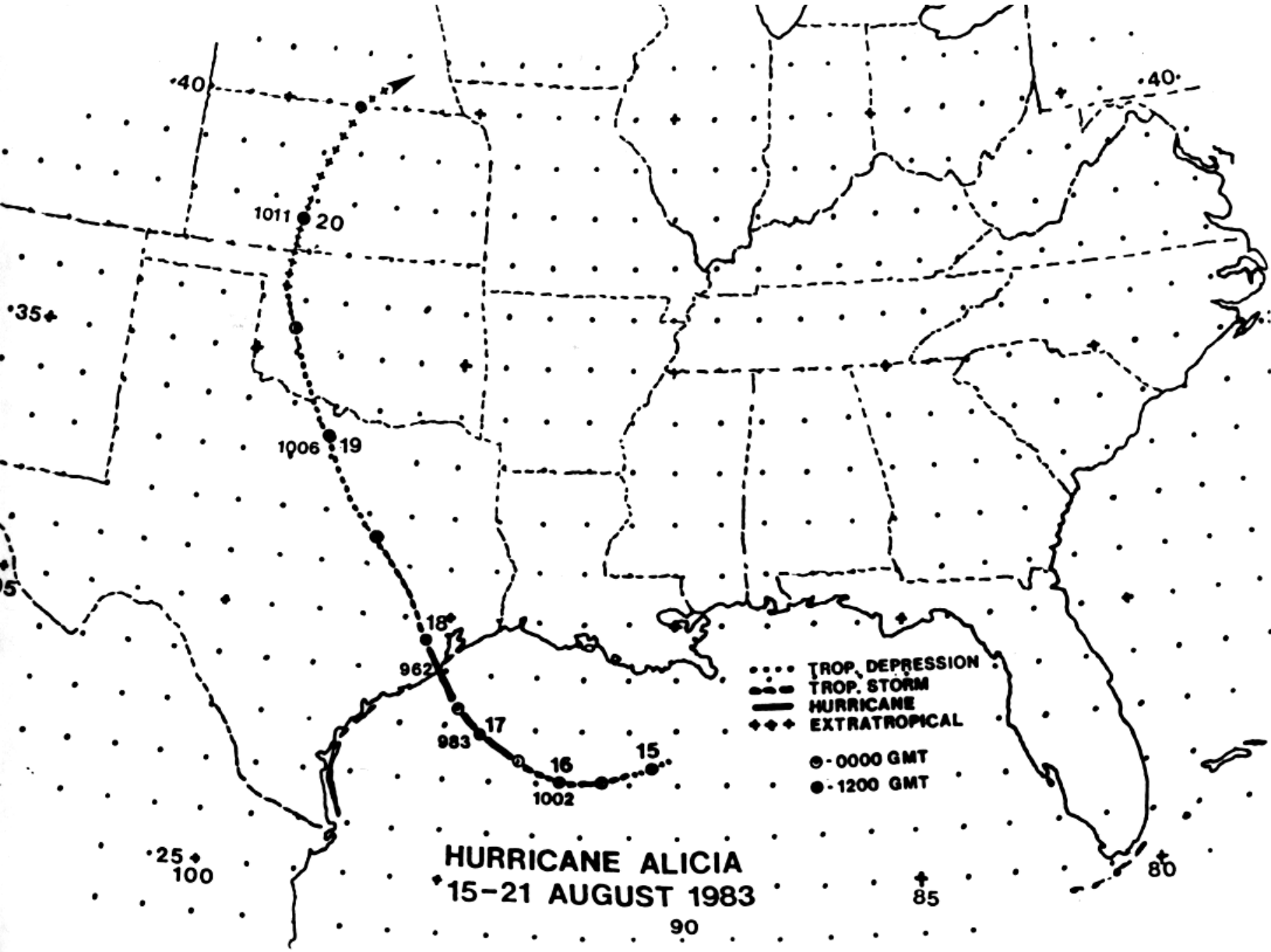
DATE	TIME (GMT)	POSITION LATITUDE	POSITION LONGITUDE	PRESSURE (MB)	WIND (KT)	STAGE
8/15	1200	27.3	90.5	1009	30	TROP. DEPRESSION
"	1800	27.2	91.0	1006	40	TROP. STORM
8/16	0000	27.1	91.5	1005	45	" "
"	0600	27.0	92.0	1004	50	" "
"	1200	27.1	92.4	1002	55	" "
"	1800	27.3	92.8	998	60	" "
8/17	0000	27.4	93.3	991	65	HURRICANE
"	0600	27.7	93.7	987	70	"
"	1200	27.9	94.2	983	75	"
"	1800	28.1	94.5	974	90	"
8/18	0000	28.4	94.8	969	95	"
"	0600	28.9	95.0	963	100	"
"	1200	29.7	95.5	965	80	"
"	1800	30.5	96.0	990	40	TROP. STORM
8/19	0000	31.5	96.7	998	35	" "
"	0600	32.4	97.4	1003	30	TROP. DEPRESSION
"	1200	33.3	98.0	1006	25	" "
"	1800	34.4	98.5	1009	25	" "
8/20	0000	35.4	99.0	1010	20	" "
"	0600	36.5	99.4	1011	20	EXTRATROPICAL
"	1200	37.6	99.2	1011	20	" "
"	1800	38.9	99.0	1011	20	" "
8/21	0000	40.0	98.0	1010	20	" "
"	0600	41.2	97.0	1010	20	" "

8/18	0700	29.1	95.1	962	100	LANDFALL
8/18	0842	29.2	95.2	962	100	MINIMUM PRESSURE

(MINIMUM PRESSURE EXTRAPOLATED BY NOAA RECONNAISSANCE AIRCRAFT)


40
40
1011
20
35
1006
19
18
962
17
983
16
15
1002
TROP. DEPRESSION
TROP. STORM
HURRICANE
EXTRATROPICAL
0000 GMT
1200 GMT
25
100
HURRICANE ALICIA
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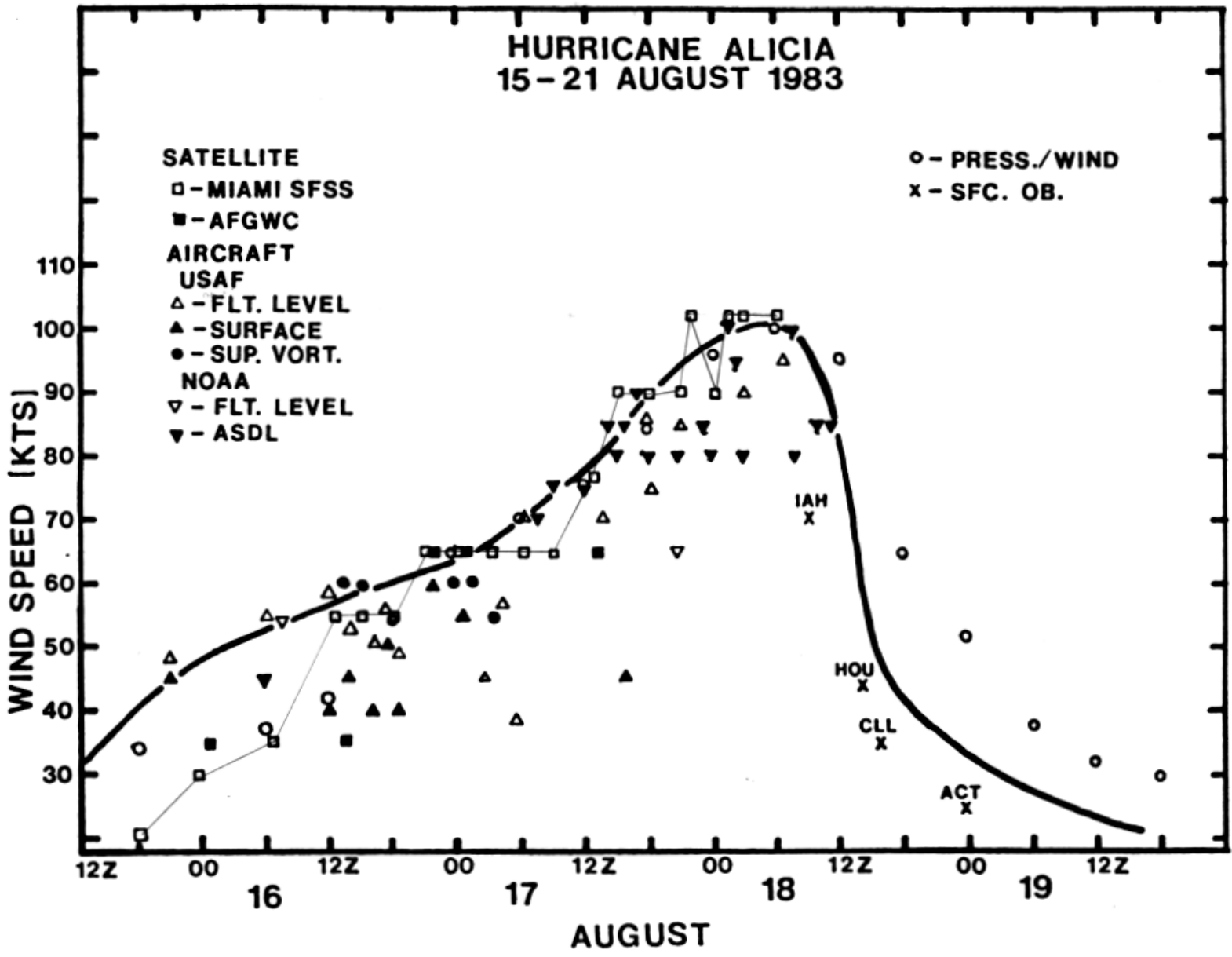
90
85
80


HURRICANE ALICIA
15 – 21 AUGUST 1983
SATELLITE
□ – MIAMI SFSS
■ – AFGWC
AIRCRAFT
USAF
△ – FLT. LEVEL
▲ – SURFACE
● – SUP. VORT.
NOAA
▽ – FLT. LEVEL
▼ – ASDL
o – PRESS./WIND
x – SFC. OB.
WIND SPEED [KTS]
110
100
90
80
70
60
50
40
30
IAH
HOU
CLL
ACT
12Z
00
12Z
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12Z
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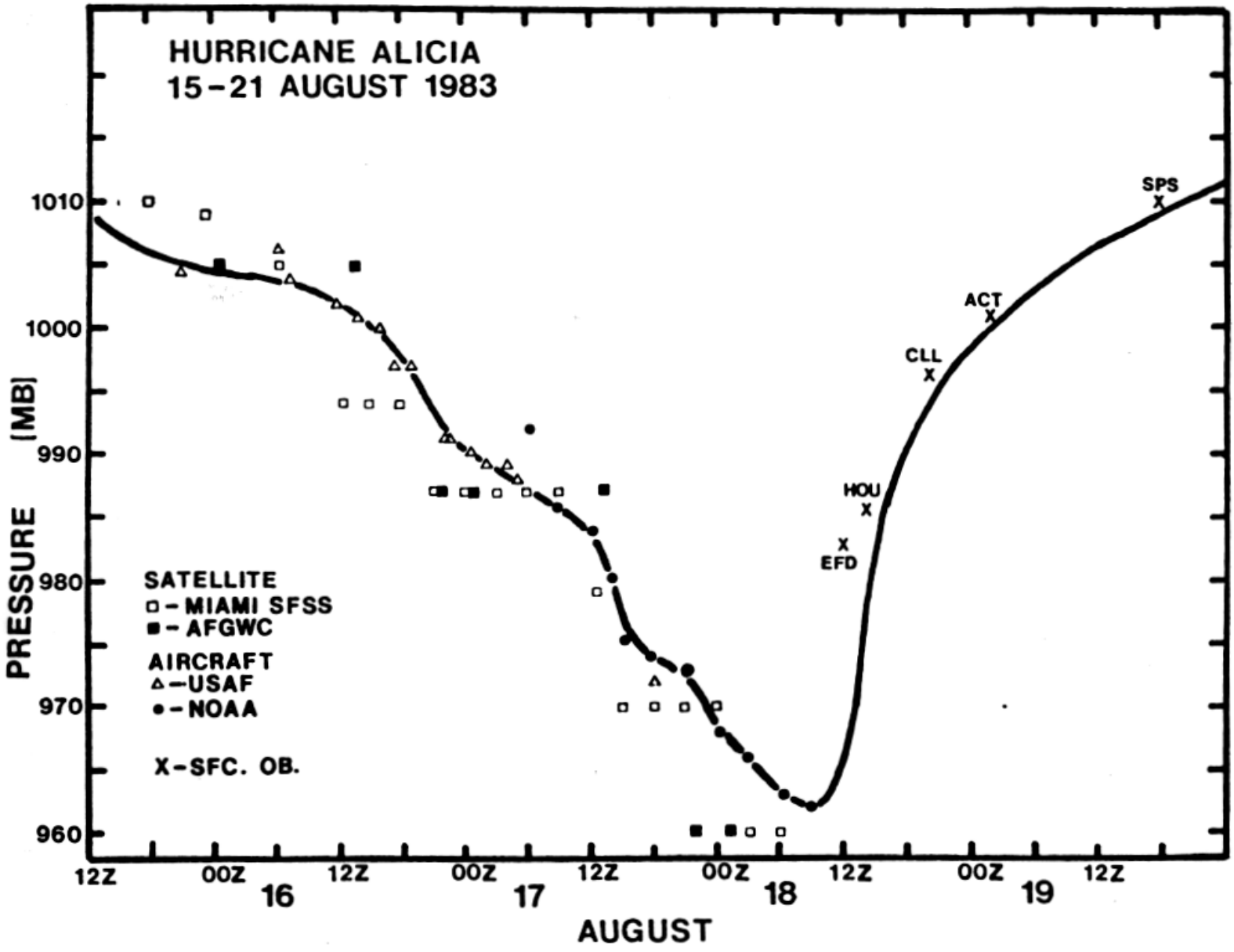
HURRICANE ALICIA
15-21 AUGUST 1983
PRESSURE (MB)
1010
1000
990
980
970
960
SATELLITE
□ - MIAMI SFSS
■ - AFGWC
AIRCRAFT
△ - USAF
● - NOAA
X - SFC. OB.
SPS
ACT
CLL
HOU
EFD
12Z
00Z
12Z
00Z
12Z
00Z
12Z
00Z
12Z
16
17
18
19
AUGUST