

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 lifetime 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.

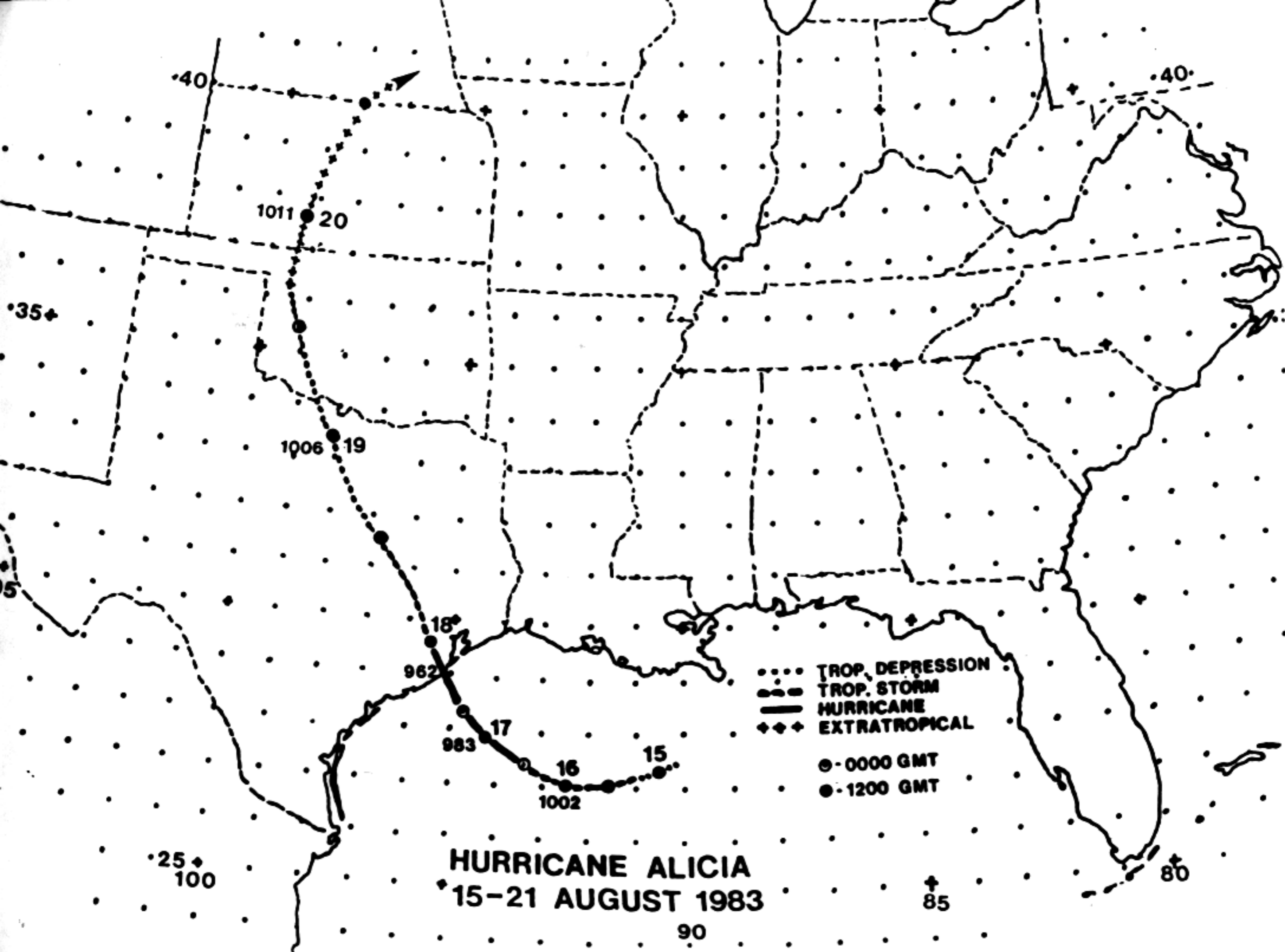
TABLE 1. CHANCES OF THE CENTER OF ALICIA PASSING WITHIN 65 MILES OF THE LISTED LOCATIONS BY DATE AND TIME (CDT) INDICATED (PROBABILITIES IN PERCENT).
ADVISORY DATE/TIME 15/5PM 15/9:30PM 16/5AM 16/11AM 16/5PM 16/11PM 17/5AM

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

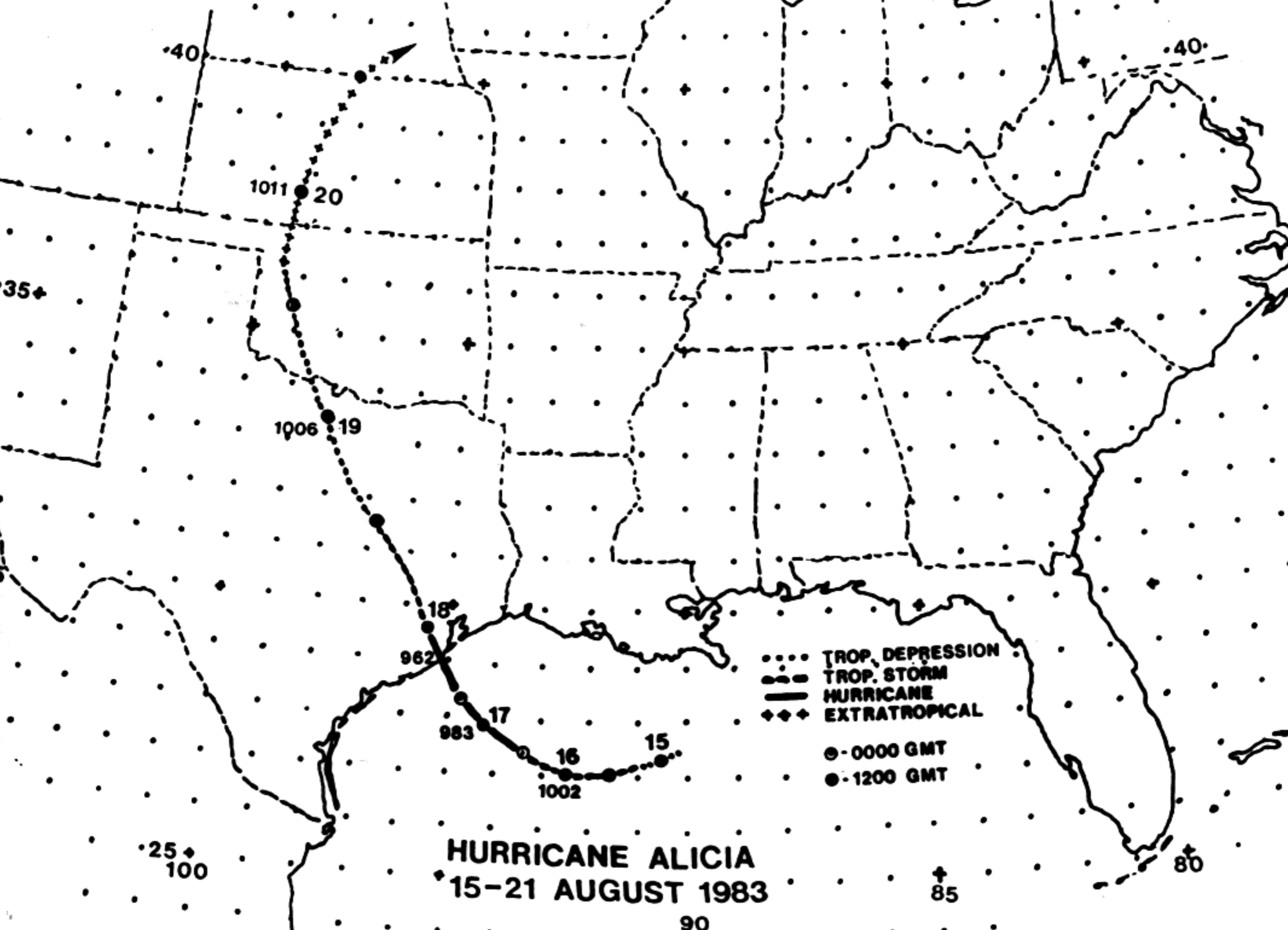
TABLE 2. WATCHES AND WARNINGS.

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

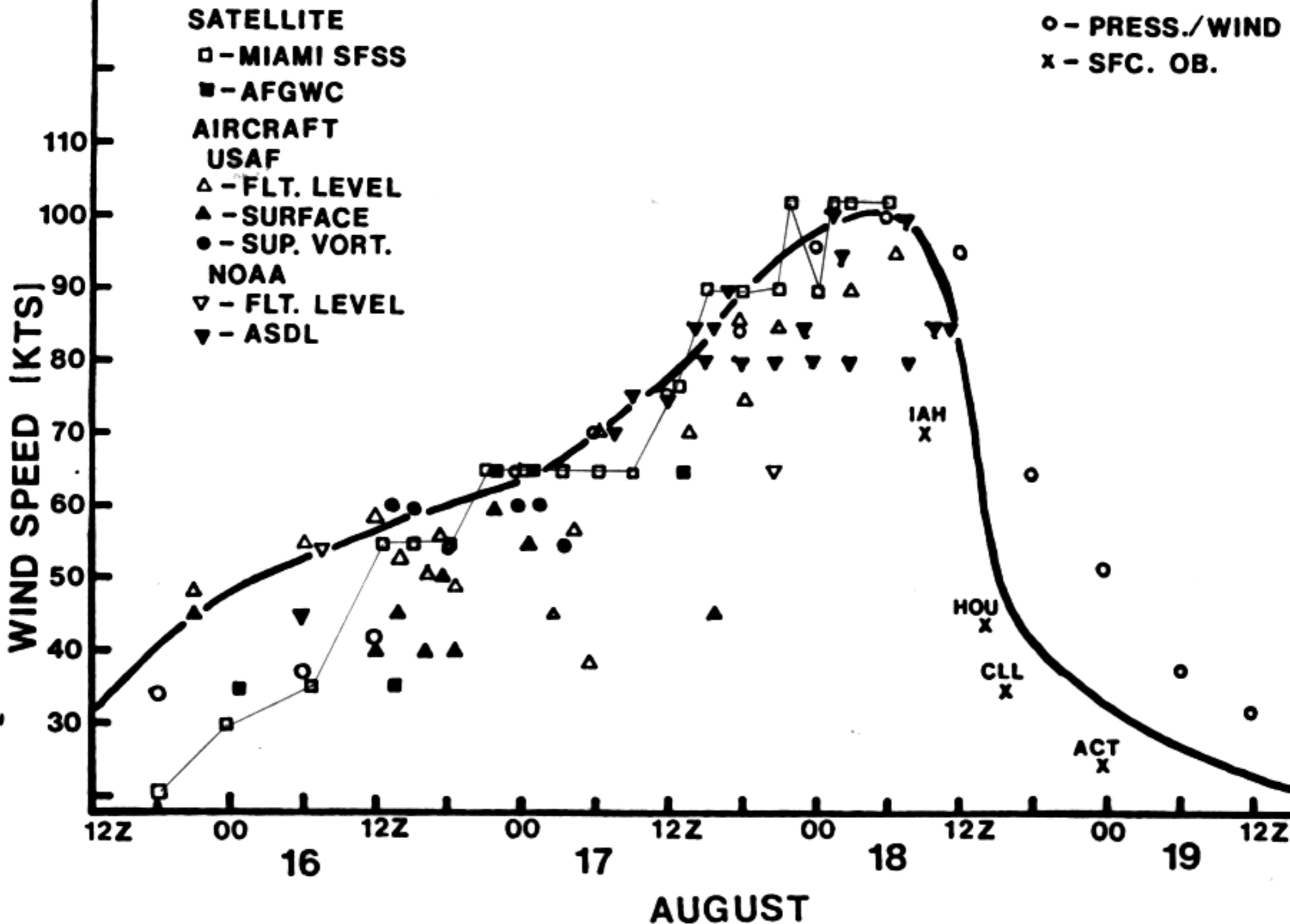


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15-21 AUGUST 1983

- TROP. DEPRESSION
- - - - TROP. STORM
- HURRICANE
- ◆◆◆◆ EXTRATROPICAL
- - 0000 GMT
- - 1200 GMT



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