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NOAA Technical Memorandum NWS SR-183

THE HISTORIC SOUTHEAST LOUISIANA AND SOUTHERN MISSISSIPPI FLOOD EVENT OF MAY 8-10, 1995

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UNITED STATES
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William M. Daley, Secretary

National Oceanic and Atmospheric Administration
James Baker
Under Secretary and Administrator

National Weather Service
Elbert W. Friday
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1. Introduction

Labelling the May 1995 flood event in southeastern Louisiana and southern Mississippi "memorable" and "paralyzing" may be an understatement in regard to the episode witnessed by residents of the region. Beside the very heavy rainfall, severe weather occurred with two confirmed tornadoes (one F1 and one F2 as defined by Fujita's Tornado Scale [Fujita 1971]) in Louisiana. Indeed, the event was historic, catastrophic, and devastating from both a meteorological and human perspective.

The event lasted about 40 hr, flooding over 44,000 homes, inundating countless roads, and impacting over one million residents. Damage assessments exceeded a staggering three billion dollars. Tragically, seven deaths occurred—six within the metropolitan New Orleans area and one in Harrison County, Mississippi. With extensive damage and scores of people needing immediate aid, President Clinton declared seven southeastern Louisiana parishes and four southern Mississippi counties disaster areas, qualifying them for federal assistance. Subsequently, the National Guard was activated to assist with evacuation and rescue efforts. A summary of the event's impact is included in Tables 1A and 1B. In comparison, Hurricane Andrew's 1992 Louisiana impact tallied $1.76 billion, eight directly related deaths, 18,247 homes damaged, and 36 parishes declared federal disaster areas (*Storm Data*, August 1992). In the wake of the flooding, community response was extraordinary. Numerous organizations from both states and around the country donated food, clothing, financial assistance, and household goods to flood victims, many of whom had lost all their personal possessions.

In the following sections, the meteorological conditions, including several local precipitation forecast techniques, will be discussed, followed by a description of the hydrological aspects of the event. Also, the impact of the episode on the communities of southeast Louisiana and southern Mississippi will be presented.

2. Synoptic/Mesoscale Patterns

a. *Synoptic*

The weather pattern leading up to the event was recognized to be a synoptic-type event (Maddox et al. 1979) during the initial 24 hr of the episode, but it evolved into a frontal type heavy rain event on day 2. A modified Pacific maritime cold front approached the region from the west, preceded by a squall line. The airmass that entered western Louisiana on May 8 exhibited considerably lower dewpoints than the tropical airmass across east Louisiana and southeast Mississippi. However, the mid-level short wave which accompanied the cold front quickly exited the region to the northeast. By the evening of May 9, the cold front dissipated in the vicinity of Baton Rouge. The remnant frontal trough served as a focusing axis for the heavy precipitation that continued into the late morning hours of May 10 (Figs. 1a and 1b).

In the upper levels of the atmosphere on May 8, a 50 ms^{-1} jet streak advanced from the northwest to the east of an amplifying trough situated over the Plains states. This persistent feature maintained an area of significant upper level divergence (associated with the right entrance region of the jet) over southeast Louisiana (Figs. 2, and 3). With time, the upper-level trough became negatively tilted to the west of the impact area, thereby providing ample upper-level divergence as well as mid- and upper-level cold and dry air advection, as evidenced in the satellite imagery (not shown).

Meanwhile, strong warm air and moisture advection from the Gulf of Mexico continued during the entire event. At 850 mb, a theta-e ridge persisted from the central Gulf of Mexico into the Mississippi River Delta area. It was in this general swath that the highest rainfall totals occurred. Most of the severe weather events during this episode also occurred in close proximity to the theta-e ridge (Figs. 2d and 3d).

b. *Mesoscale*

The smaller scale features on May 8 included the development of a meso-alpha scale low just north of Lake Pontchartrain about 80 mi east of the front. A pre-frontal trough extended from this low across western Lake Pontchartrain to just west of metropolitan New Orleans, to near Thibodaux, Louisiana (Fig. 1a). This subtle trough served as the primary focus for enhanced rainfall that occurred as convective cells moved to the northeast with the mean flow along the trough axis and across New Orleans. The position of this trough was coincident with the maximum divergence region of the jet structure aloft. Soundings indicated a highly unstable lapse rate on May 8, which became saturated through a great depth by 1200 UTC on May 9 (Fig. 4).

The rainfall abated during the early afternoon of May 9 as the environment stabilized. This marked the end of the first round of heavy rainfall. The Slidell sounding at 0000 UTC on May 10 indicated a CAPE of 4323 J/kg along with an 850 mb theta-e value of 344K. Around 0300 UTC May 10, the cold pool aloft, associated with the negative-tilt trough, advected over the region, thus rapidly destabilizing the environment. This was soon followed by the approach of a jet streak which rotated through the base of the upper-level trough. The surface boundary which served as the focusing mechanism was now aligned perpendicular to the low level flow and parallel with the thunderstorm propagation vector, resulting in a more efficient rain producer than on the previous night (Fig. 1b).

c. *Forecast/QPF Techniques*

Two in-house precipitation forecast techniques—The Flash Flood Decision Tree (Johnson and Moser 1992) and The Precipitation Calculator (Ricks 1992)—were employed by NWSFO New Orleans/Baton Rouge and the Lower Mississippi River Forecast Center (LMRFC) to estimate possible rainfall amounts over southeast Louisiana and southeast Mississippi. The use of these techniques helped forecasters make decisions on how to handle the event operationally. Rainfall estimates from these techniques for Monday and Tuesday are shown in Tables 2 and 3.

1. *Flash Flood Decision Tree*

The Flash Flood Decision Tree is a process a forecaster follows to determine if an environment is favorable for flash flood-producing rains. This process is based on empirical findings of 18 thermodynamic and kinematic parameters that were found to be relevant to heavy rain production in Louisiana. The forecaster determines the integrity of each parameter, and a weight of zero, 5, or 10 is given to each parameter. The sum of these weights yields a suggested action to be taken. The forecaster then completes a similar decision tree to estimate a precipitation amount. The precipitation estimation portion uses 11 weighted parameters that are added to a base amount of 2 in. A PC program was developed to assist in the calculations using this technique.

On May 8, using 1200 UTC model data and analyses, the technique yielded results that suggested a "Dangerous flash flood environment—Flash Flood Watch highly advised." The precipitation estimation indicated 7.5 in of rain possible in the watch area. It should be noted that a weight of zero was applied to the MCC parameter; otherwise, the estimation would have been 9.5 in. The use of this technique prompted the issuance of a Flash Flood Watch for south-central, east-central, and southeast Louisiana at 4:45 p.m. CDT. On May 9, using the latest 1200 UTC model data and analyses, the technique suggested, "Good potential for flash flooding—Watch recommended," with a precipitation estimation of 7.5 in. Again, the MCC parameter was set to zero. Based on this output, a new Flash Flood Watch was issued at 3:30 p.m. CDT for southeast Louisiana. Although the output on May 9 yielded a "Watch recommended" and not the "Watch highly advised" result, it should be noted that the total point score for May 9 was just fractionally lower (about 3 percent) than that of May 8.

2. *Precipitation Calculator*

The Precipitation Calculator utilizes parameters extracted from a skew-T, log-P analysis. Ideally, a lift representative of the 850 mb theta-e is used to determine the positive area of the environment. The parameters are input into a computation that yields two precipitation estimates. The first value is the expected amount of rainfall that could be associated with the theta-e value. The second value is the potential precipitation that could be realized if all of the convective process goes into precipitation production—an upper limit.

On May 8, using the Slidell sounding from 1200 UTC, it was determined that the 850 mb theta-e value was 325K. The low-level moist inflow and gridded model data suggested that this value would increase during the ensuing 12 to 24 hr to at least 340K. The Precipitation Calculator indicated that between 2.14 and 6.44 in of rain was possible at 340K, while the Ricks Index indicated a high risk for severe weather in the area. The technique was designed to indicate how much precipitation could be attained through one inflection of theta-e advection (i.e., one increase to a maximum value followed by a recession). In hindcast, it was noted that a double inflection in a relatively short time span was achieved. As a result, a doubling of the forecast values was possible, thus yielding 4.28 and 12.88 in. The maximum rainfall amount recorded during the first day of the event was 12.24 in at the New Orleans International Airport (Fig. 5a).

On May 9, once again using the 1200 UTC sounding from Slidell, the Precipitation Calculator generated 3.91 in of forecast precipitation with a maximum amount of 6.59 in. These values were correlated to a theta-e value of 345K. The orientation of upper level jet dynamics (left front quadrant followed by right rear quadrant) suggested a double inflection situation was once again possible. The operational forecast amounts then became 7.82 in with a maximum amount of 13.18 in. The maximum amount reported during the second day was 15.80 in (Fig. 5b).

3. Hydrometeorological Impact

a. Actual Rainfall

During the event, real-time precipitation estimates were obtained from the WSR-88D from Slidell and were supplemented by observations from New Orleans International Airport, New Orleans Lakefront Airport, and automated rainfall gauges at Audubon Park in New Orleans and the NWSFO in Slidell. Rainfall reports were also received via telephone from cooperative observers, parish and county emergency managers, and the public.

From Monday evening, May 8, through Wednesday morning, May 10, rainfall of 10 to 20 in was common over the area. Storm-total rainfall in excess of 20 in was widespread across the southern half of St. Tammany Parish in Louisiana, extreme south Pearl River County, the northern half of Hancock County, and extreme northwest Harrison County in Mississippi. The largest rainfall total was 27.5 in recorded from a bucket survey near Necaise Crossing in northern Hancock County, Mississippi (Pfost 1995) (Fig. 6).

The storm total rainfall can be separated into two distinct events of 6- to 12-hr duration. The first began the evening of Monday, May 8, and continued into the predawn hours of May 9, with rainfall amounts of 10 to 13 in across southeast Louisiana and coastal Mississippi. Most of the rain fell in a 3- to 6-hr period, including 8 in across southern St. Tammany Parish from 10 p.m. through 2 a.m. CDT. Audubon Park in New Orleans measured 12.2 in of rain between 6:30 p.m. and 11:30 p.m. CDT (Fig. 7a). Additionally, at the Saucier Experiment Forest Rain Station, 5.9 in of rain was measured in **one hour** from 6 a.m. to 7 a.m. May 9. This is believed to be a record for Mississippi. Considerable flooding, particularly in the Greater New Orleans area, resulted from this first onslaught of rain.

The second heavy rainfall period on the evening of May 9 and morning of May 10 was a record-breaker for the month—and the century—for southern St. Tammany Parish and parts of southeast Mississippi. Ten- to 15-in amounts fell on the communities of Covington, Mandeville, and Slidell. These same areas experienced heavy rainfall the previous night. Isolated 16- and 17-in amounts fell over Slidell and Abita Springs, respectively. Most of the rainfall occurred in an 8-hr period from around 11 p.m. CDT, May 9, through 7 a.m. CDT, May 10 (Fig. 7b). At the Saucier Experiment Forest, 14.40 in of rain fell in a 24-hr period from 5 a.m. CDT Tuesday, May 9, through 5 a.m. Wednesday, May 10. This measurement is the third largest 24-hr rainfall in Mississippi history (Pfost 1995). During this period, rainfall rates in excess of 9 in in 3 hr and 4 in in 1 hr were observed. Additional rains of 3 to 5 in occurred again in the greater New Orleans area the morning of May 10, aggravating already flooded areas.

The highest storm total recorded in southeastern Louisiana over the 40-hr period was 24.46 in at the Fire Tower Cooperative Station in Abita Springs (Fig. 6). Figures 5a and 5b are isohyetal analyses for the Monday and Tuesday night events, respectively, using rainfall reports from first-order aviation stations, automated gauges, and cooperative observers.

b. Effects of Flooding

This catastrophic flood paralyzed many parishes and counties in southern Louisiana and southeastern Mississippi. The total event lasted about 40 hr. Virtually all roads were inundated or impassable during the height of the event, especially in the New Orleans metropolitan area and in the Covington to Slidell area of south St. Tammany Parish. Portions of Interstate 12 between Covington and Slidell were under water. Homes receiving water damage included 18,000 in New Orleans, 7,000 in Slidell, 15,000 in Jefferson Parish, and 3,500 in St. Charles Parish in Louisiana, and over 1,000 homes in southeastern Mississippi. Well over a million residents were affected in some manner by the heavy rain and flooding. Seven parishes in Louisiana and four counties in southeastern Mississippi were declared disaster areas.

Seven deaths were attributed to flooding. Six of the deaths occurred in the metropolitan New Orleans area. Five of these deaths were males ranging in age from 27 to 56 and occurred on May 9. The sixth, an infant, was found floating on water toward a drainage pump on May 11. There was one death, a female, in Slidell that occurred on May 10; however, her death was likely attributed to a traffic accident. The seventh death occurred in Harrison County, Mississippi, when a 32-year-old male in his vehicle was swept away by the swollen Wolf River north of Long Beach.

c. *Hydrological Impact*

The hydrologic significance of the floods was extreme (Table 1B). Not only were flood stages well exceeded, but previous high water marks were literally submerged. Several river gauges were lost due to the extreme flows across the Gulf drainage basins. Based on preliminary studies by the USGS, the floods on the Biloxi and Tchoutacabouffa Rivers are estimated to be 100-year frequency occurrences (Turnipseed et al. 1995). Many homes near and along the Jourdan River had their roofs topped by flood waters.

In southern Louisiana, intense rainfall produced considerable urban flooding; however, only minor rises occurred on the Tangipahoa, Tchefuncte, and lower Pearl River basins. Near Slidell, the Pearl River at Pearl River Village, which had been in minor flood since April, rose only a foot during this event, cresting at 16.23 ft. However, this 1-ft rise reflected an increase in discharge of approximately 18,000 cfs. Flood stage is 14 ft. The Pearl River is the largest river system within the area impacted by the rainfall.

4. User Response

User survey questionnaires were sent to the Emergency Operations Coordinators of the southern Mississippi Counties. The responses were of a positive tone from the aspect of quality of service provided by National Weather Service offices. There was one recommendation to possibly use fax machines to send pertinent information to emergency preparedness officials. The responses indicated that adequate notification and coordination efforts were provided. User feedback was provided by several letterhead memos addressed to the New Orleans NWS office.

5. Summary and Conclusions

A 40-hr heavy rain event took place across the middle Gulf of Mexico coast region of Louisiana and Mississippi. This event was classified as a Maddox synoptic-type heavy rain event that evolved into a Maddox frontal-type event. Record 24-hr rain amounts fell across and around the New Orleans metropolitan area and coastal Mississippi, affecting over one million people. River flooding was extreme in the Gulf drainage systems of coastal Mississippi where 100- to 500-year frequencies occurred. Monetary loss greater than three billion dollars made this one of the most costly weather-related events in United States history.

Operationally, there were several aspects of the event that proved challenging to the forecast and service process. Access to the NWSFO/RFC facility was impaired due to excessive street flooding on the only road to the office. Several staff members worked in excess of 40 consecutive hours, providing uninterrupted services to the public. Other staff members became isolated at home, waiting for the waters to recede enough to report for duty.

The WSR-88D precipitation estimates from Slidell underestimated the rainfall by about 50 percent, while the Mobile precipitation estimates were closer to observed amounts. As rivers exceeded previous levels in the Gulf drainage basins, river gauging equipment was lost, thus negating a valuable data source for operational forecasting during the flood.

There were several lessons learned from this monumental event. Weather pattern recognition was key in staying ahead of the situation and taking the appropriate forecast actions. Locally derived techniques proved beneficial in alerting forecasters to an unusual situation beyond what synoptic models indicated, though the techniques underestimated the magnitude of the event. Increased research and improved mesoscale modeling should ultimately provide more accurate forecasts during such a rare event.

6. Acknowledgements

This paper is a collaboration of the efforts of all the men and women who served the public during this memorable weather event. A major contribution to this paper was the bucket survey conducted by the staff members of NWSFO Jackson: Larry Arnold (Cooperative Program Manager), Tom Thompson (Service Hydrologist), Johnny Baxter and Charlie Smith (Hydromet Techs), and Brad Regan (forecaster). Gratitude is expressed to Michael Koziara (SOO, NWSFO New Orleans Area) and Michael Shields (forecaster, NWSFO New Orleans area) for the technical review of this paper. Jim Moser (NWSFO New Orleans Area) provided assistance with the graphics and model data collection. Monetary loss figures were provided by the Federal Emergency Management Agency. Hydrologic data were provided by Bob Stucky (DOH, LMRFC), Jeff Graschel (Sr. HAS forecaster, LMRFC), and Philip Turnipseed (USGS-Vicksburg District).

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TABLE 1A.

Impact of Southeast Louisiana/Southern Mississipp Flood of May 8-10, 1996

Duration of Event	40 Hours
Homes Receiving Water Damage	44,500
Deaths	7
Parishes/Counties Declared Disaster Areas	11
Monetary Impact	$3.1 Billion
Severe Thunderstorm/Tornado Watches and Warnings Issued by NWSFO New Orleans During Event	85
Flood/Flash Flood Watches/Warnings Issued by NWSFO New Orleans During Event	48
Maximum Rainfall Day One	315 mm (12.4 inches) Kenner (Jefferson Parish), La.
Maximum Rainfall Day Two	401 mm (15.8 inches) Abita Springs Fire Tower (St. Tammany Parish), La.
Maximum Two-Day Rainfall	699 mm (27.50 inches) Necaise Crossing (Hancock County), Ms.

TABLE 1B.

Hydrologic Impact of the Southeast Louisiana/Southern Mississippi Flood of May 8-10, 1996

River	Flood Stage (Ft.)	Crest (Ft.)	Remarks
Jourdan at County Road 43	N/A	12.60	500 Year Flood
Wolf at Landon	N/A	28.85	50 year flood Highest Crest Since 21.06 Ft. on 4/27/64.
Wolf at Gulfport	8	15.39	100 Year Flood Previous Record was 12.3 Ft. Jan. 1993.
Biloxi at Wortham	N/A	28.94	100+ Year Flood Previous Record was 25.30 Ft. in 1948.
Biloxi at Lyman	12	20.95	100+ Year Flood Previous Record was 18.50 Ft. in 1957.
Tchoutacabouffa at D'Iberville	8	18.10	100 Year Flood Previous Record was 16.80 Ft. in 1987.
Tuxachanie Creek	N/A	24.74	200-500 Year Flood Previous Record was 23.63 Ft. on 8/15/87.

Flash Flood Decision 5/8/95	Ans	Points
1. Quasi-stnry sfc baroclinic zone w/temp diff of 1) <7deg 2) 7-12 deg 3) >12 deg	1	0
2. Moist inflow dewpts at the surface 1) <60 deg 2) 60-68 deg 3) >68 deg	3	10
3. Moist inflow windspeed at surface? 1) <10 kt 2) 10-20 kt 3) >20 kt	3	10
4. Temp advctn at the sfc? 1) Cold 2) Neutral 3) Warm	3	10
5. 850mb mstr rdg intxng the sfc bndry w/dewpts 1) <10 deg 2) 10-13 deg 3) >13 deg	3	10
6. 850mb wind max within mstr rdg with speeds 1) <15 kt 2) 15-25 kt 3) >25 kt	3	10
7. Angle on intxn of 850 mstr rdg and sfc baclin zn ? 1) <45 deg 2) 45-60 deg 3) >60 deg	1	0
7a. Axis of Theta-e ridge 1) <330 2) 330-340 3) >340	2	5
8. 700mb temperature advection ? 1) Cold 2) Neutral 3) Warm	3	10
9. 700mb mstr rdg near the sfc bndry with dewpts 1) <2 deg 2) 2 deg 3) >2 deg	3	10
10. 500mb dynamic forcing of vertical motion 1) NVA 2) Neutral 3) PVA	3	10
11. 500mb temp being advctd into area 1) >-10 deg 2) -10 to -11 deg 3) <-11 deg	3	10
12. Location in relation to jets 1) Not LF/RR 2) LF/RR 3) LF/RR Paired jets	2	5
13. Sfc to 500mb wind shear 1) >30 kt 2) 15-30 kt 3) <15 kt	2	5
14. Average relative humidity 1) <65% 2) 65-75% 3) >75%	2	5
15. Precipitable water 1) <1.25 in 2) 1.25-1.5 in 3) >1.5 in	3	10
16. K index 1) <28 deg 2) 28-32 deg 3) >32 deg	3	10
17. LI Index 1) >1 deg 2) 1 to -2 deg 3) <-2 deg	3	10
18. Std Deviation of thkness from optimum 1) >2 std dev 2) 1-2 std dev 3) <1 std dev	2	5
19. Tropical plume over threat area? 1) No 3) Yes	1	0

TABLE 2

Point Total 145

Good Potential for Flash Flooding - Watch Recommended - Hit Print button - then Hit Precip Estmn Button

Precipitation Estimation (Base Amount = 2.0")	Ans	Value
1. Stg warm advctn at 700mb or 850mb in Watch area? 0) No 1) Yes	1	1.0
2. Stg diffluence alft (200-300mb) 0) No 1) Yes	1	1.0
3. Sfc meso boundaries present in the Watch area? 0) No 1) Yes	0	0.0
4. Repeated radar echoes expected over the Watch area? 0) No 1) Yes	1	1.0
5. Cell movement in Watch area expected <=10 kt? 0) No 1) Yes	0	0.0
6. Watch area will be in the LF/RR quadrant of Jet maxima? 0) No 1) Yes	1	0.5
7. SFC-500 RH over Watch area increased >=50% in last 12 hrs? 0) No 1) Yes	1	0.5
8. Precipitable water over the Watch area will be >=130% normal? 0) No 1) Yes	1	0.5
9. K index >=34 0) No 1) Yes	1	0.5
10. Lifted index <= -4 0) No 1) Yes	1	0.5
11. MCC expected over the Watch area? 0) No 1) Yes	0	0.0

Estimated 7.5

Flash Flood Decision 5/9/95	Ans	Points
1. Quasi-stnry sfc baroclinic zone w/temp diff of 1) <7deg 2) 7-12 deg 3) >12 deg	2	5
2. Moist inflow dewpts at the surface 1) <60 deg 2) 60-68 deg 3) >68 deg	3	10
3. Moist inflow windspeed at surface? 1) <10 kt 2) 10-20 kt 3) >20 kt	2	5
4. Temp advctn at the sfc? 1) Cold 2) Neutral 3) Warm	3	10
5. 850mb mstr rdg intxng the sfc bndry w/dewpts 1) <10 deg 2) 10-13 deg 3) >13 deg	3	10
6. 850mb wind max within mstr rdg with speeds 1) <15 kt 2) 15-25 kt 3) >25 kt	3	10
7. Angle on intxn of 850 mstr rdg and sfc baclin zn ? 1) <45 deg 2) 45-60 deg 3) >60 deg	3	10
7a. Axis of Theta-e ridge 1) <330 2) 330-340 3) >340	2	5
8. 700mb temperature advection ? 1) Cold 2) Neutral 3) Warm	3	10
9. 700mb mstr rdg near the sfc bndry with dewpts 1) <2 deg 2) 2 deg 3) >2 deg	3	10
10. 500mb dynamic forcing of vertical motion 1) NVA 2) Neutral 3) PVA	3	10
11. 500mb temp being advctd into area 1) >-10 deg 2) -10 to -11 deg 3) <-11 deg	1	0
12. Location in relation to jets 1) Not LF/RR 2) LF/RR 3) LF/RR Paired jets	2	5
13. Sfc to 500mb wind shear 1) >30 kt 2) 15-30 kt 3) <15 kt	2	5
14. Average relative humidity 1) <65% 2) 65-75% 3) >75%	3	10
15. Precipitable water 1) <1.25 in 2) 1.25-1.5 in 3) >1.5 in	3	10
16. K index 1) <28 deg 2) 28-32 deg 3) >32 deg	2	5
17. LI Index 1) >1 deg 2) 1 to -2 deg 3) <-2 deg	2	5
18. Std Deviation of thkness from optimum 1) >2 std dev 2) 1-2 std dev 3) <1 std dev	2	5
19. Tropical plume over threat area? 1) No 3) Yes	1	0

Point Total 140

Good Potential for Flash Flooding - Watch Recommended - Hit Print button - then Hit Precip Estmn Button

Precipitation Estimation (Base Amount = 2.0")	Ans	Value
1. Stg warm advctn at 700mb or 850mb in Watch area? 0) No 1) Yes	1	1.0
2. Stg diffluence alft (200-300mb) 0) No 1) Yes	1	1.0
3. Sfc meso boundaries present in the Watch area? 0) No 1) Yes	1	1.0
4. Repeated radar echoes expected over the Watch area? 0) No 1) Yes	1	1.0
5. Cell movement in Watch area expected <=10 kt? 0) No 1) Yes	0	0.0
6. Watch area will be in the LF/RR quadrant of Jet maxima? 0) No 1) Yes	1	0.5
7. SFC-500 RH over Watch area increased >=50% in last 12 hrs? 0) No 1) Yes	0	0.0
8. Precipitable water over the Watch area will be >=130% normal? 0) No 1) Yes	1	0.5
9. K index >=34 0) No 1) Yes	0	0.0
10. Lifted index <= -4 0) No 1) Yes	1	0.5
11. MCC expected over the Watch area? 0) No 1) Yes	0	0.0

Estimated 7.5

TABLE 3

```
STATION: SIL                    DATE/TIME OF SNDG: 05-09-1995 12Z

FREEZING LEVEL (mb) ====> 607
WET BULB ZERO (mb) =====> 672
THETA-ES ZERO (mb) =====> 561
AVG MIXING RATIO (g/kg)> 6.3
LFC (mb) ==============> 798
EL (mb) ===============> 200
WB INSTABILITY ========> 0
THETA-E (K) ===========> 345
CRITICAL TEMP (F) =====> 72
MAX TEMP (F) ==========> 85
MIN TEMP (F) ==========> 69

RICKS INDEX ===> 108           DP(mb) ===>157


THERE IS A 90% CHANCE FOR RW AND 70% CHANCE FOR TRW

P R E C I P I T A T I O N  (inches) =   3.91
   POTENTIAL PRECIPITATION (inches) =   6.59
```

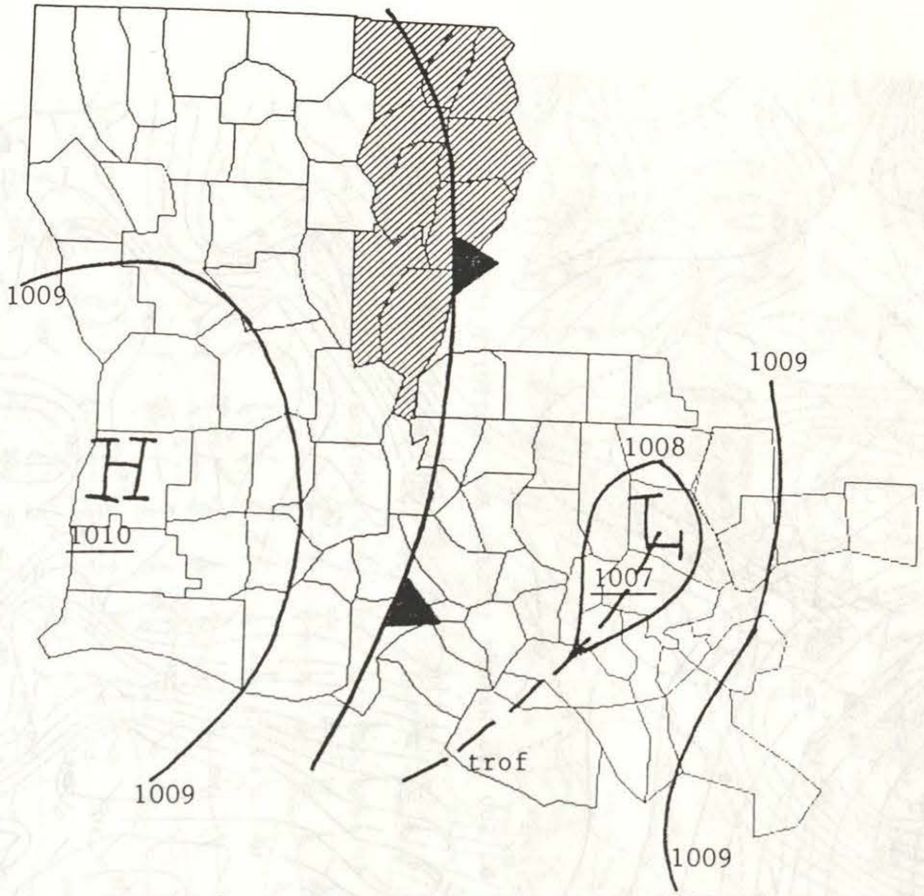
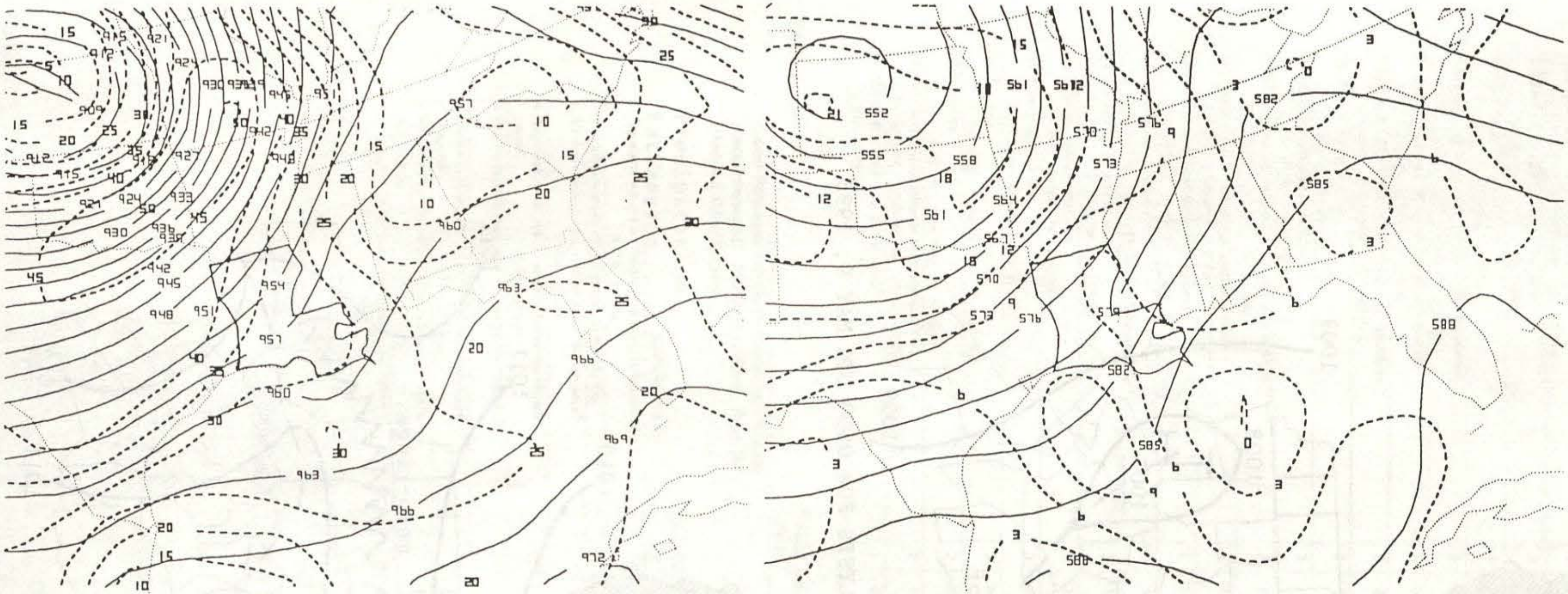


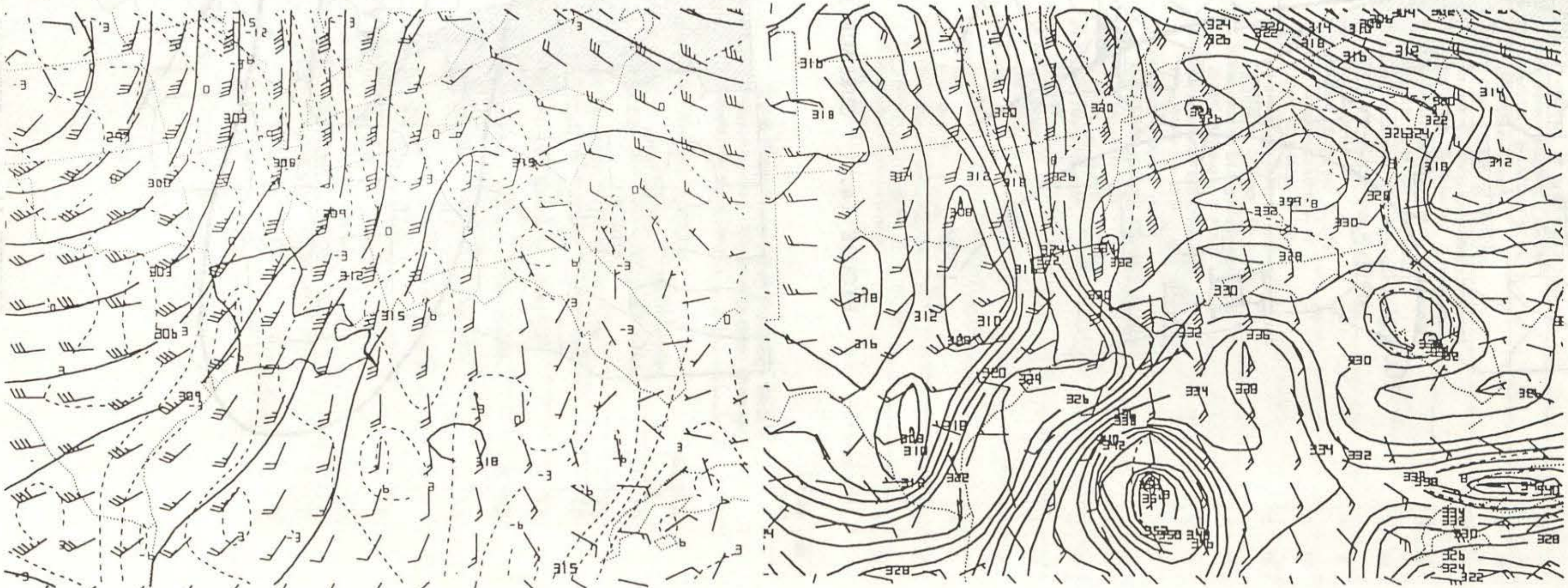
FIGURE 1a. SURFACE ANALYSIS FOR 0600 UTC MAY 9, 1995

FIGURE 1b. SURFACE ANALYSIS FOR 0600 UTC MAY 10, 1995



a. 300 HPa HEIGHT (SOLID) AND WIND SPEED (M/S)(DASHED)

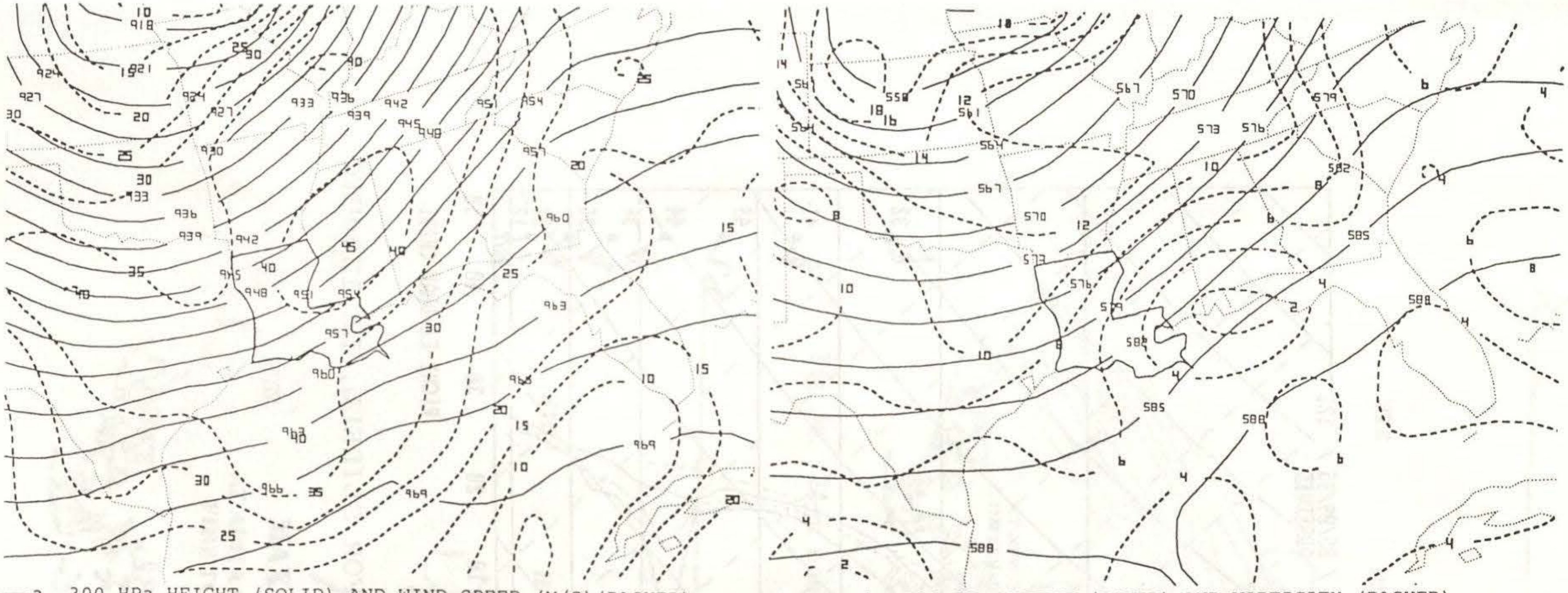
b. 500 HPa HEIGHT (SOLID) AND VORTICITY (DASHED)



00 HPa HEIGHT (SOLID), VERTICAL VELOCITY (DASHED), AND WIND BARBED KNOTS)

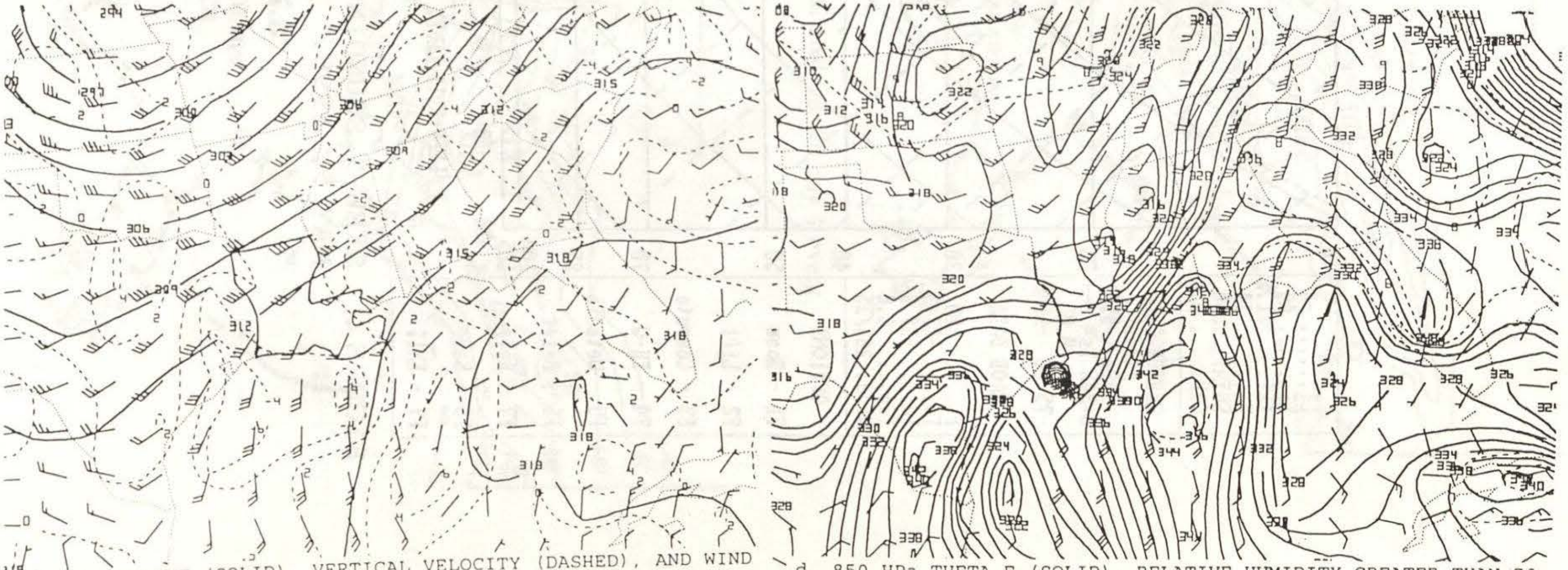
d. 850 HPa THETA-E (SOLID), RELATIVE HUMIDITY GREATER THAN 70 PERCENT (DASHED), AND WIND (BARBED KNOTS)

FIGURE 2. UPPER AIR ANALYSIS FROM 0000UTC MAY 09, 1995
USING THE NGM INITIAL CONDITIONS FROM
PCGRIDDS DATASET



a. 300 HPa HEIGHT (SOLID) AND WIND SPEED (M/S) (DASHED)

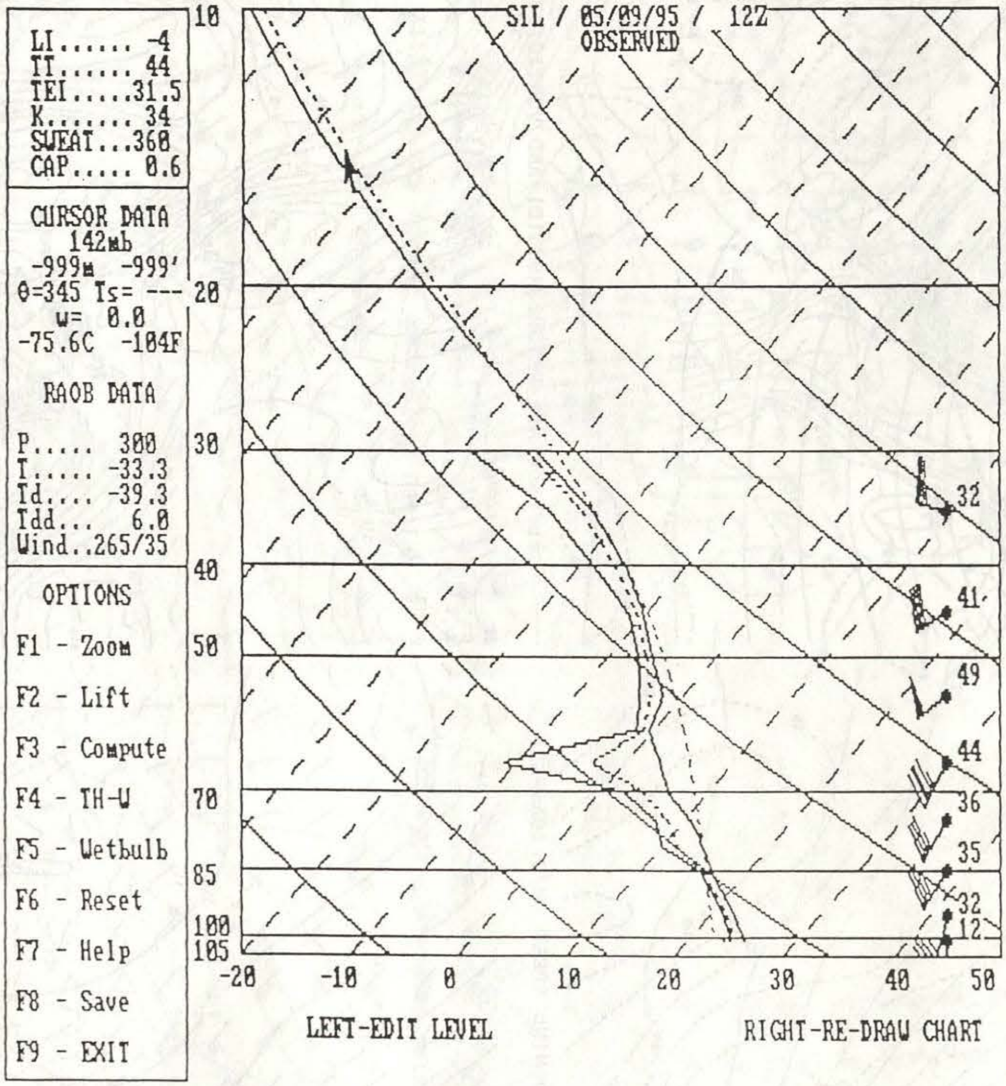
b. 500 HPa HEIGHT (SOLID) AND VORTICITY (DASHED)



700 HPa HEIGHT (SOLID), VERTICAL VELOCITY (DASHED), AND WIND (BARBED KNOTS)

d. 850 HPa THETA-E (SOLID), RELATIVE HUMIDITY GREATER THAN 70 PERCENT (DASHED), AND WIND (BARBED KNOTS)

FIGURE 3. UPPER AIR ANALYSIS FROM 0000UTC MAY 10, 1995
USING THE NGM INITIAL CONDITIONS FROM
PCGRIDDS DATASET



SIL / 05/09/95 / 12Z
OBSERVED

LI...... -4
TT...... 44
TEI.....31.5
K....... 34
SWEAT...360
CAP..... 0.6

CURSOR DATA
142mb
-999m -999'
θ=345 Ts= ---
w= 0.0
-75.6C -104F

RAOB DATA

P..... 300
T..... -33.3
Td.... -39.3
Tdd... 6.0
Wind..265/35

FIGURE 4. SKEW-T SOUNDING FOR SLIDELL, LA 1200UTC MAY 9, 1995.

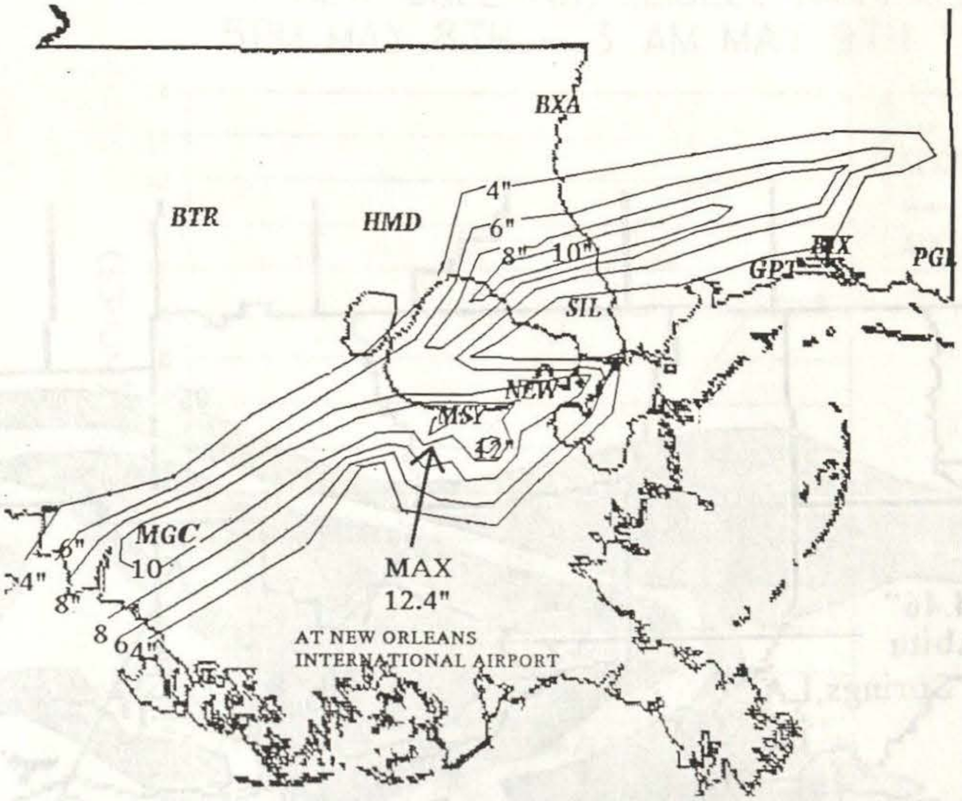


Fig. 5a. 24-hr isohyetal analysis for day 1 event.

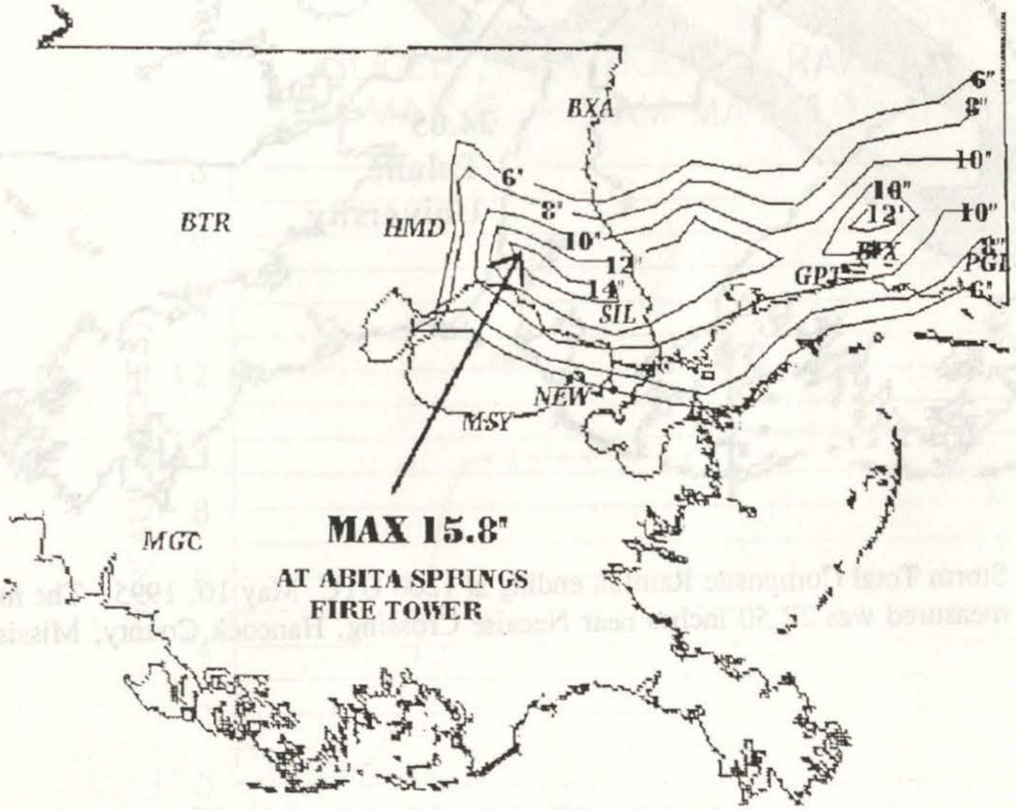


Fig. 5b. 24-hr isohyetal analysis for day 2 event.

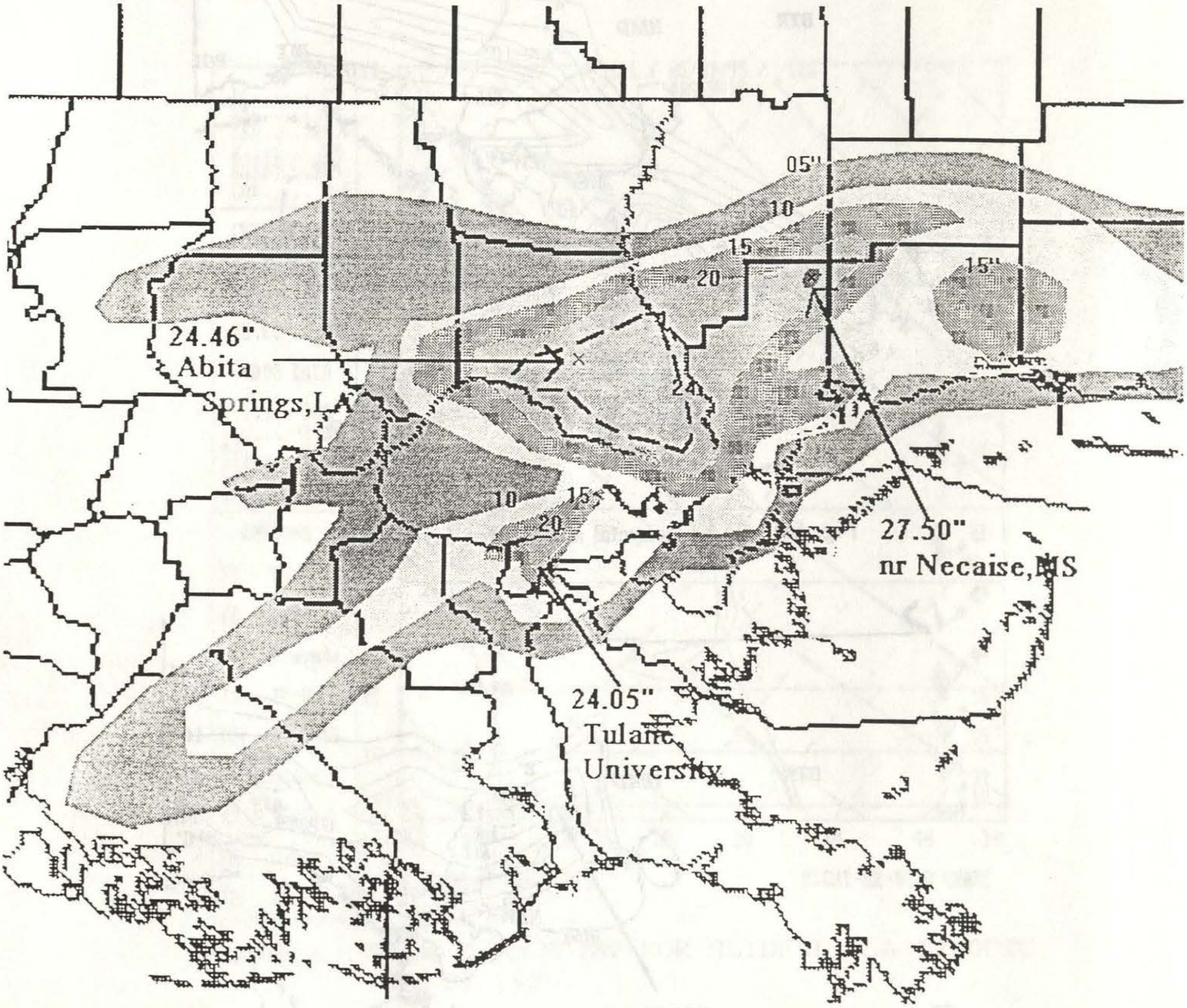


Fig. 6. Storm Total Composite Rainfall ending at 1200 UTC, May 10, 1995. The maximum measured was 27.50 inches near Necaise Crossing, Hancock County, Mississippi.

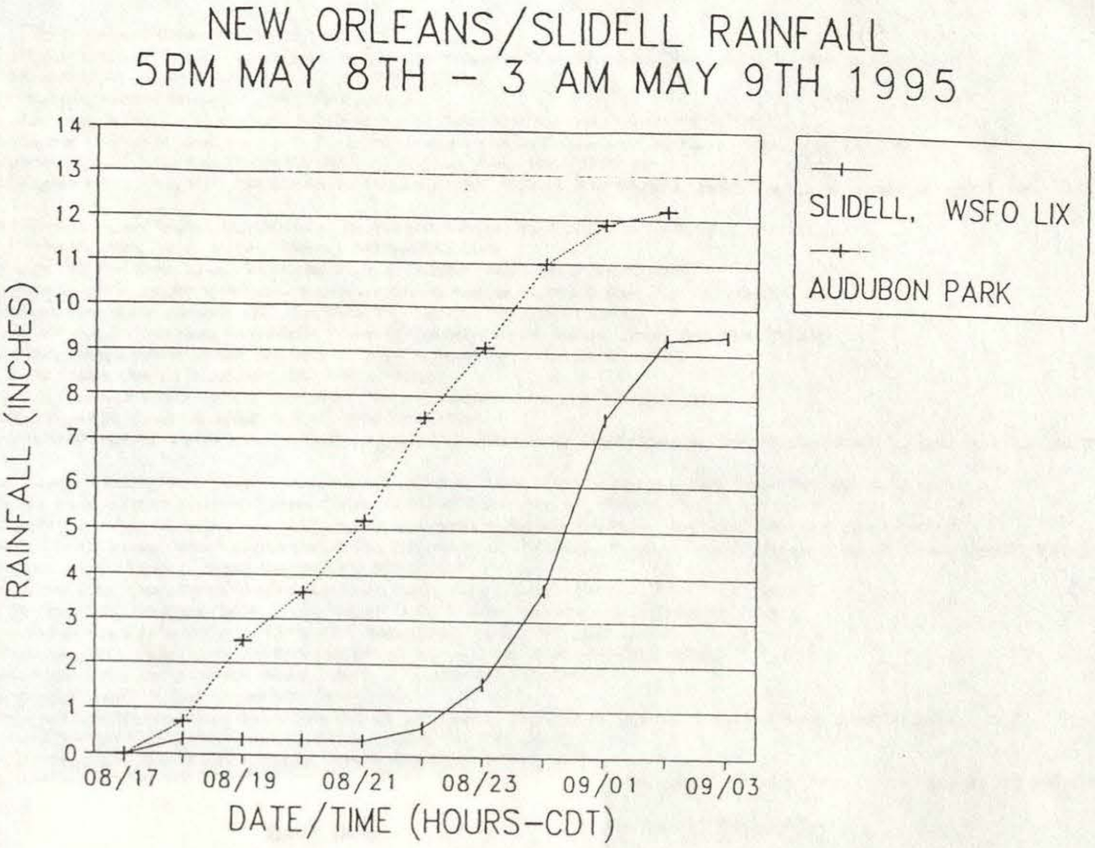


FIGURE 7a. NEW ORLEANS AUDUBON PARK AND SLIDELL WSFO LIX HOURLY RAINFALL DURING THE FIRST 10 HOURS OF THE EVENT. NOTE THE STEEP RAINFALL RATES AND THE LAG TIME OF THE HEAVIEST RAINFALL BETWEEN NEW ORLEANS AND SLIDELL.

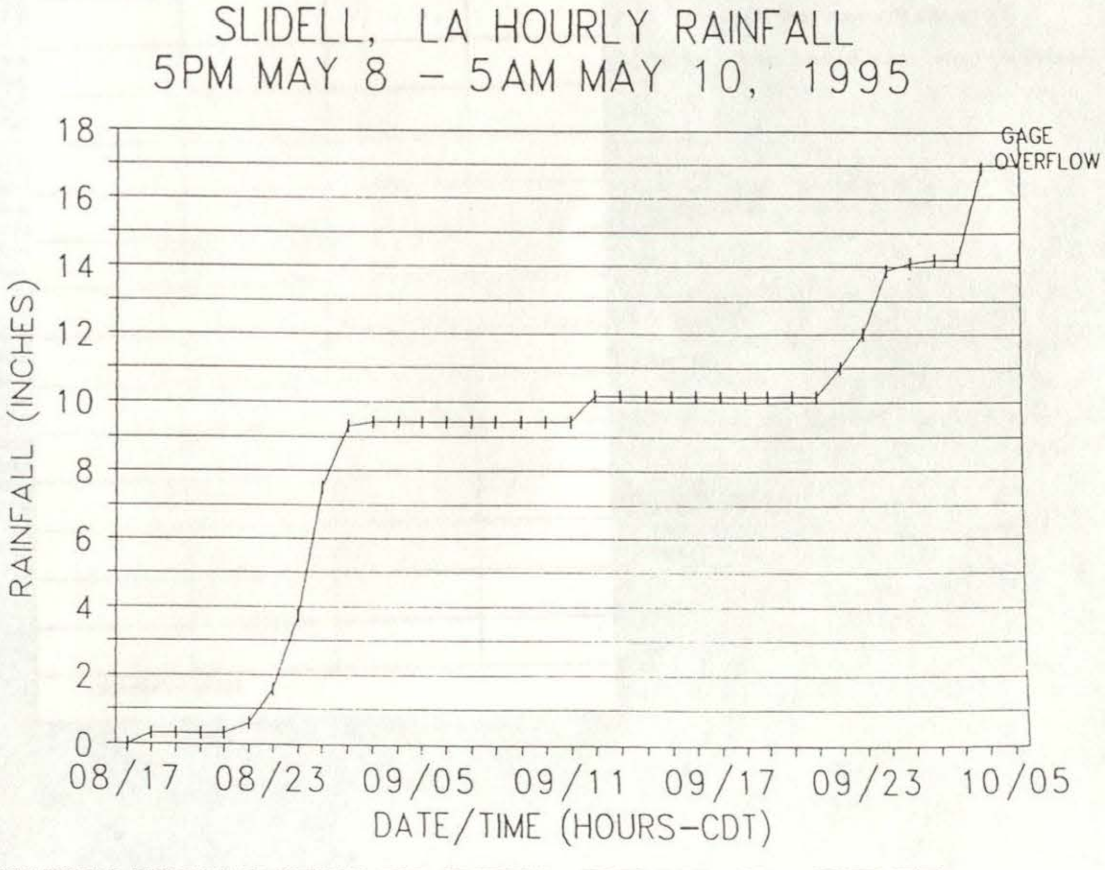


FIGURE 7b. STORM TOTAL HOURLY RAINFALL FOR SLIDELL, WSFO LIX, LA. NOTE THE TWO DISTINCTIVE EPISODES OF HEAVY RAIN THAT COMPRISED THIS 40 HOUR EVENT. THE FISHER-PORTER GAGE OVERFLOWED AT 17 INCHES.

(Continued from inside front cover)

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