Tropical Cyclone Report
Tropical Storm Allison
5-17 June 2001

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28 November 2001

Updated 11 August 2011 to revise damage estimate

Tropical Storm Allison developed over the northwestern Gulf of Mexico and moved inland over the upper Texas coast, producing extremely heavy rainfall and catastrophic floods in the Houston area. Allison then acquired subtropical characteristics and continued to produce heavy rainfall and flooding near its track from Louisiana eastward to North Carolina, and then northward along the U.S. east coast to Massachusetts.

a. Synoptic History

Satellite images and synoptic data indicate that Allison originated from a tropical wave that moved off the west coast of Africa on 21 May. The wave tracked westward at about 15 kt across the tropical Atlantic with little associated convection before moving inland over the northern part of South America on 26 May. It emerged over the southwestern Caribbean Sea on 29 May. The wave moved westward into the eastern North Pacific Ocean on 1 June, then slowed down over the Gulf of Tehuantepec. On 2 June, the wave produced a low-level cyclonic circulation centered about 200 n mi south-southeast of Salina Cruz, Mexico.

On 3 June, low- to mid-level southwesterly flow in the southeast quadrant of the Mexican thermal low moved the broad cyclonic circulation inland over extreme southeastern Mexico and western Guatemala. The low-level circulation weakened and became ill-defined after moving inland, whereas the strong mid-level circulation remained intact and tracked northeastward over the southern Yucatan Peninsula early on the 4th. By 0000 UTC 5 June, the mid-level circulation had moved northwestward into the Bay of Campeche of the Gulf of Mexico. Deep convection developed along the western (cyclonic-shear) side of a 30 to 40 kt low-level jet whose axis extended north-northwestward from Merida, Mexico to the Texas-Louisiana border. The deep convection persisted during the night of the 5th and eventually moved north-northwestward around an upper-level cold low centered over south Texas. The difluent eastern semicircle of the upper-level low acted to enhance the development of deep convection.

By 1200 UTC on the 5th, satellite imagery and surface observations suggest that the mid-level circulation developed downward and became Tropical Storm Allison about 120 n mi south of Galveston, TX (see Figs. 1-3 and Table 1). The cold-core nature of the upper low detected in 0000 and 1200 UTC 5 June upper-air data suggests, however, that this system possessed some subtropical characteristics.

A strong pressure gradient developed between Allison's center and the Atlantic subtropical ridge, which extended westward across Florida and the southeast U.S. and into the northeast Gulf of Mexico. Allison's central pressure dropped and sustained winds increased across a large portion of the central Gulf of Mexico. Winds as high as 40kt, with gusts to 50 kt, occurred more than 200 n mi east of the center. At 1500 UTC, a ship reported a sustained wind of 43 kt with gusts to 60 kt.

(see Table 2) about 90 n mi east of the estimated center location.

Confirmation of a closed circulation came at 1800 UTC when Buoy 42019 (located about 60 n mi south of Freeport, TX) reported a light northwest wind and a pressure of 1006.6 mb just west of the surface center. At 1852 UTC, aircraft personnel on the first U.S. Air Force Reserve reconnaissance flight of the day "closed off" the low-level circulation about 80 n mi south-southwest of Galveston, TX. A combination of a 55 kt flight-level (1500 ft) wind report and the earlier ship reports indicated that the storm had strengthened. The cyclone tracked slowly north-northwestward and weakened slightly (based on offshore buoy reports) just before making landfall southwest of Galveston near Freeport, TX. Its center then tracked slowly northward across the western portions of the Houston metropolitan area during the night of the 5th and the morning of the 6th.

After moving inland, surface observations indicated that Allison quickly weakened to a tropical depression. It drifted slowly northward before becoming stationary over eastern Texas near Lufkin on 7 June. On 8 June, Tropical Depression Allison began to move slowly southward. It eventually moved back over the Gulf of Mexico around 0000 UTC on the 10th, at nearly the same location where it had made landfall as a tropical storm. Although the low-level center remained over warm water on the 10th, very dry air in the mid- and upper-levels of the troposphere overlaid the surface center. The dry air, combined with moderate upper-level westerly shear, inhibited the redevelopment of thunderstorms near the low-level center.

Upper-air observations indicated that by 0000 UTC Allison had acquired some baroclinic characteristics and became a subtropical depression. Most of the persistent deep convection was then developing a couple hundred miles east of the low-level center. A new low-level circulation developed around 0000 UTC 11 June, near the strongest thunderstorms about 150 n mi east of the original center, approximately 50 n mi south of Intracoastal City, LA. By 0200 UTC 11 June, the new center moved inland over southeast Louisiana near Morgan City.

During the early morning hours of the 11th, strong thunderstorms became organized near the low-level circulation center and surface observations indicated that Allison had become a subtropical storm by 0600 UTC. Convection wrapped all the way around the center creating an "eye-like" feature (Fig. 4) near 1200 UTC. In spite of the eye-like feature apparent in radar imagery, the cyclone's radius of maximum winds (~ 100 n mi) was more typical of a subtropical low. Also, surrounding upper-air observations continued to show that Allison was in a weakly baroclinic environment.

The subtropical storm tracked east-northeastward across southern Mississippi. It weakened back to subtropical depression status by 0000 UTC 12 June, when the system was located over southwestern Alabama. It continued to track east-northeastward across southern Alabama, southern Georgia, and southern South Carolina before becoming stationary just north of Wilmington, NC on the 14th. The center of Allison then drifted slowly northward over eastern North Carolina and extreme southeastern Virginia on the 15th. It then moved more quickly northeastward and reached the mid-Atlantic coast on the 17th and eventually cleared the United States mainland along the Delmarva Peninsula later that day. At 1200 UTC 17 June, Allison began to interact with an approaching cold front and briefly strengthened back to a subtropical storm.

Allison merged with the cold front around 0000 UTC 18 June, then becoming an extratropical low pressure system. Shortly after becoming extratropical, the system accelerated east-northeastward before dissipating southeast of Nova Scotia around 0600 UTC 19 June.

b. Meteorological Statistics

Observations in Figs. 2 and 3 include satellite-based Dvorak technique intensity estimates from the NOAA Tropical Prediction Center's (TPC) Tropical Analysis and Forecast Branch (TAFB), the NOAA Satellite Analysis Branch (SAB), and the U. S. Air Force Weather Agency (AFWA), as well as data from flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command.

Ship reports of tropical storm force winds associated with Allison are in Table 2, and selected surface observations from land stations, C-MAN stations, and data buoys are in Table 3. Allison's peak intensity of 50 kt at 1800 UTC 5 June was based on a 1700 UTC ship (**WTEJ**) observation of 48 kt and a 55 kt surface wind estimate made by reconnaissance flight crew personnel at 1852 UTC.

During and after Allison's landfall over the upper Texas coast and its southward return to the Gulf of Mexico, extremely heavy rainfall occurred over much of eastern and southeastern Texas, including the Houston metroplex, and much of southwestern Louisiana. Several locations on the east side of Houston received more than 30 inches of rainfall (Fig. 5). Heavy rainfall and widespread flooding also occurred with the subtropical low pressure system as it tracked across the southeast and eastern United States (Fig. 6).

Evacuations of the west end of Galveston Island were required due to coastal flooding since this area is not protected by the seawall that was built after the Great Hurricane of 1900. Storm surge of 2 to 3 feet, when combined with wave heights up to 8 feet, created considerable overwash. This resulted in significant beach erosion and damage to some of the island's roads. Additional storm surge of 1 to 2 feet occurred over southeast Louisiana on the 11th when Allison passed over that area as a subtropical storm.

A total of 23 tornadoes were confirmed from Mississippi to South Carolina from 11-16 June Specifically, 10 tornadoes were reported in South Carolina, 4 in Mississippi, 3 in Florida, 2 in both Alabama and Georgia, and 1 each in Louisiana and Virginia.

In addition, on 17 June, several sailboats participating in a sailing race from Annapolis, MD to Newport, RI reported sustained winds from the northwest as high as 48 kt and gusts as high as 68 kt at the mouth of Delaware Bay and just off Cape May, NJ. However, the accuracy of these unofficial observations is in doubt since they were not consistent with surrounding official observations. The maximum sustained wind observed was only 31 kt, at Buoy 44009 located just east of the mouth of Delaware Bay. The highest official gust observed during the passage of Subtropical Storm Allison off the U. S. east coast was 36 kt at Atlantic City, NJ. The local pressure gradient along the Delaware and New Jersey coasts also did not support winds as high as those indicated by the sailing vessels. Interestingly enough, though, the brisk winds associated with the subtropical storm resulted in the previous race course record being broken by 5 hours.

c. Casualty and Damage Statistics

Allison's heavy rains produced catastrophic flooding over portions of the upper Texas coastal area, and significant flooding along the remainder of its track. The American Insurance Group reported an insured property loss estimate of $1.22 billion. The TPC standard procedure is to double the insured loss. This results in a final total loss estimate of $2.44 billion. However, damage estimates reported by the Federal Emergency Management Agency (FEMA) and other state emergency management agencies are near $5 billion, with approximately $4.8 billion in the Houston

metropolitan area alone. These damage estimates in the Houston area include: $2.04 billion to public facilities (especially the Texas Medical Center), $1.76 billion to residential properties, $1.08 billion to businesses. More than 14,000 homes were destroyed or received major damage, and nearly an additional 34,000 homes incurred at least minor damage. Some of the damage estimates from emergency management agencies may include costs and expenses not directly associated with the flood-related damage. *11 August 2011 update: The total damage estimate has been revised to $9 billion.*

Forty-one deaths are directly related to the heavy rain, flooding, tornadoes, and high surf generated by Tropical Storm Allison and its remnant subtropical circulation. The death toll by state is as follows: Texas 23, Florida 8, Pennsylvania 7, Louisiana 1, Mississippi 1, and Virginia 1. Twenty-seven of these deaths were due to drowning in freshwater flooding. Early morning on the 11th in Zachary, LA, a tornado (intensity unknown) knocked down trees onto a pickup truck, killing the male driver. Later that morning, an F1 tornado cut a 4 mile long path across George County, MS. It damaged several manufactured homes and completely destroyed a mobile home (tiedowns were pulled out of the ground and the home turned over and fell apart as it rolled), severely injuring a female occupant. There were also 9 indirect deaths in North Carolina as a result of traffic accidents occurring on wet roads. These damage and direct death toll estimates make Allison the deadliest and most costly tropical or subtropical storm on record in the United States.

d. Forecast and Warning Critique

No meaningful track and wind forecast statistics are available due to the limited period for which the National Hurricane Center (NHC) issued forecasts. Since the system reached storm strength quickly, there was little warning lead time. A tropical storm warning was issued at 1900 UTC 05 June from Sargent, Texas eastward along the Gulf of Mexico coast to Morgan City, Louisiana. This was less than 3 hours before tropical storm force winds were reported along the upper Texas coast. A subsequent analysis of satellite and surface observation data indicate that Allison was likely a tropical storm by 1200 UTC 5 June. Determination of a closed surface low pressure system was delayed by at least 6 hours as a result of Buoy 42002 not reporting due to its previous collision with a ship. In addition, Dvorak satellite classifications were not representative of the true intensity of the hybrid system.

After Tropical Depression Allison emerged over the northern Gulf of Mexico, the TAFB issued a gale warning for the northeastern Gulf of Mexico about three hours prior to Allison reaching subtropical storm status. The sustained gale force winds were primarily confined to a thunderstorm squall line in the eastern portion of the low pressure system. The Marine Prediction Center (MPC) in Washington, D.C. also issued gale warnings for portions of the mid-Atlantic offshore waters on 14 and 15 June when Allison was expected to move off the North Carolina and Virginia coasts and possibly reach subtropical storm strength.

Consistent with operational protocol, responsibility for Allison was transferred from the TPC/NHC to the Hydrometeorological Prediction Center (HPC) in Washington, D.C. when the cyclone initially moved inland, weakened to a tropical depression, and coastal warnings were discontinued. By then, the primary threat had become mainly fresh water flooding due to the heavy rainfall.

Operationally, HPC continued to issue products through the remainder of Allison's track. Frequent coordination calls occurred between HPC, TPC, and National Weather Service (NWS) forecast offices during this period of highly-unusual cyclone activity where the system was a tropical

depression, subtropical depression/storm, and then an extratropical cyclone. This included the short (12 to 18 hour) period when gale force winds were observed in association with the second center. While this post-storm analysis shows Allison then as a subtropical system (and, hence, technically the forecast responsibility of the TPC/NHC), the decision for the HPC to retain forecast responsibility is supported by the (1) need for consistency in service source, (2) uncertainty in storm type, (3) short duration of gale-force winds, and (4) center remaining mostly over land.

Acknowledgments

Some of the data in this report was furnished by the National Climatic Data Center in Asheville, NC, various state emergency management agencies, FEMA, National Weather Service Offices in Houston, Lake Charles, New Orleans (Slidell), Mobile, Tallahassee, Jacksonville, Atlanta, Columbia, Charleston, Newport/Morehead City, Raleigh/Durham, Wakefield, Wilmington, Baltimore/Washington, and Mount Holly (Philadelphia), and by the HPC.

Table 1. Best track for Tropical Storm Allison, 5-17 June, 2001.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
05 / 1200	27.5	95.0	1007	40	tropical storm
05 / 1800	28.5	95.3	1002	50	"
06 / 0000	29.3	95.3	1003	45	"
06 / 0600	30.1	95.2	1006	30	tropical depression
06 / 1200	31.0	95.2	1005	20	"
06 / 1800	31.5	95.0	1005	20	"
07 / 0000	31.6	95.0	1005	20	"
07 / 0600	31.8	94.9	1006	20	"
07 / 1200	31.4	94.9	1006	20	"
07 / 1800	31.1	95.0	1007	15	"
08 / 0000	30.9	95.6	1002	15	"
08 / 0600	30.7	96.1	1004	20	"
08 / 1200	30.4	96.2	1007	20	"
08 / 1800	30.2	96.1	1007	20	"
09 / 0000	29.9	95.9	1007	20	"
09 / 0600	29.6	95.8	1007	20	"
09 / 1200	29.3	95.8	1007	20	"
09 / 1800	28.9	95.6	1008	20	"
10 / 0000	28.6	95.2	1008	20	subtropical depression
10 / 0600	28.6	94.7	1007	25	"
10 / 1200	28.7	94.3	1006	25	"
10 / 1800	28.8	93.5	1006	30	"
11 / 0000	29.1	92.3	1005	30	" (New center)
11 / 0600	30.0	90.5	1003	35	subtropical storm
11 / 1200	30.7	89.4	1000	40	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
11 / 1800	31.0	88.4	1002	35	"
12 / 0000	31.3	87.4	1004	25	subtropical depression
12 / 0600	31.8	86.1	1005	20	"
12 / 1200	32.4	84.7	1006	20	"
12 / 1800	32.8	83.6	1006	20	"
13 / 0000	33.1	82.6	1006	20	"
13 / 0600	33.4	81.6	1004	25	"
13 / 1200	33.7	80.7	1005	25	"
13 / 1800	34.0	79.6	1006	25	"
14 / 0000	34.3	78.5	1006	25	"
14 / 0600	34.6	77.9	1006	25	"
14 / 1200	34.7	77.7	1007	25	"
14 / 1800	34.6	77.6	1008	25	"
15 / 0000	34.6	77.2	1008	25	"
15 / 0600	34.9	77.0	1008	25	"
15 / 1200	35.5	76.9	1008	25	"
15 / 1800	35.9	76.8	1009	25	"
16 / 0000	36.3	76.6	1007	25	"
16 / 0600	36.6	76.2	1007	25	"
16 / 1200	36.8	75.9	1007	25	"
16 / 1800	37.2	75.5	1006	25	"
17 / 0000	37.8	75.4	1006	25	"
17 / 0600	38.6	74.5	1005	30	"
17 / 1200	39.3	73.4	1004	40	subtropical storm
17 / 1800	40.0	72.1	1005	35	"
18 / 0000	40.6	70.8	1006	30	extratropical low

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
18 / 0600	41.3	69.4	1008	30	"
18 / 1200	42.0	67.4	1009	30	"
18 / 1800	42.7	64.6	1011	25	"
19 / 0000	43.5	61.0	1012	20	"
19 / 0600					dissipated
05 / 2100	28.9	95.3	1003	45	landfall near Freeport, TX
11 / 0200	29.6	91.6	1004	30	landfall near Morgan City, LA
11 / 1200	30.7	89.4	1000	40	minimum pressure

Table 2. Selected ship reports with winds of at least 34 kt for Tropical Storm Allison, 5-17 June, 2001. "G" indicates peak gust.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
05 / 1200	KDGR	25.0	89.8	100 / 34	1008.2
05 / 1500	WTEJ	27.8	92.8	110 / 43G60	1010.7
05 / 1600	WTEJ	27.8	92.7	120 / 40	1011.9
05 / 1700	WTEJ	27.8	92.6	120 / 48	1011.1
05 / 1800	WTEJ	27.7	92.5	120 / 44	1010.1
05 / 1800	KDGR	24.5	88.1	110 / 34	1009.4
05 / 1900	WTEJ	27.6	92.5	120 / 46	1009.9
05 / 2000	WTEJ	27.6	92.4	120 / 40	1010.2
05 / 2100	WTEJ	27.5	92.3	150 / 44	1010.5
05 / 2200	WTEJ	27.4	92.2	140 / 40	1010.0
05 / 2300	WTEJ	27.4	92.1	140 / 38	1009.9

Table 3. Selected surface observations for Tropical Storm Allison, 5-17 June 2001.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained(kt)[b]	Gust (kt)			
Alabama								
Evergreen (KGZH)	12/0018	1004.4	11/2201	19	28			
Mobile/Brookley (KBFM)	11/1853	1006.55	11/1353	23				
Mobile/Brookley (KBFM)			11/1309		38			
Mobile (KMOB)	11/1556	1005.7	11/1230	24	46			
Delaware								
Dover AFB (KDOV)								3.94
Georgetown (KGED)	17/0754	1008.1	17/0954	17	28			
Greenwood								4.08
Florida								
Pensacola (KPNS)	11/2153	1007.3	11/1346	30	36			
Tallahassee (KTLH)								10.13
Georgia								
Siloam								5.75
Louisiana								
Acadiana (KARA)	06/1047	1010.2	05/1905	24	31			
Alexandria (KAEX)	06/2333	1008.8	05/1927	23	33			
Barataria Bay (USGS)			06/0545		37			
Bootheville (KBVE)	11/0931	1005.4	11/0920	26	39			
Cameron						2.5		
Door Point (USGS)			11/0400		36			
Grand Pass (USGS)			11/0400		38			
Lake Charles (KLCH)	06/0912	1008.5	05/1906	27	31			
Lafayette (KLFT)								15.58
Morgan City								20.96
NE Bay Gardene (USGS)			11/0354		46			
NOLa Moisant (KMSY)	11/0739	1003.7		24	29			
NOLa Lakefront (KNEW)	11/0753	1003.7	11/0854	33	38			
Salt Point (KP92)	06/1021	1009.8	05/1305		35			27.55
Slidell (KASD)	11/0905	1002.0		19	28			
Thibodaux								29.86
WFO Slidell								21.35
Maryland								
Denton								7.50

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained(kt)[b]	Gust (kt)			
Salisbury (KSBY)	17/0754	1007.8	17/1854		23			
Mississippi								
KBIX (Keesler AFB)	11/1053	1005.3	11/1040	34	55			
KGPT (Gulfport/Biloxi)			11/0914	28	38			11.99
New Jersey								
Absecon								4.60
Atlantic City (KACY)	17/1241	1008.8	17/1246	28	36			
Atlantic City (KACY)			17/1313	21	36			
Atlantic City (KACY)			17/1431	26	34			
Chatham								4.30
Howell								4.86
Margate								4.00
Millville (KMIV)	17/0754	1009.4	17/1437		24			
Verga								4.40
Wertzville								4.33
North Carolina								
Askewville								8.50
Pennsylvania								
Abington								9.00
Chanfont								10.17
Doylestown								9.35
Horsham								8.00
Willow Grove (KNXX)								10.16
South Carolina								
Columbia FD								12.00+
Texas								
Alvin								11.23
Anahuac								12.50
Angleton (KLBX)	06/0223	1004.1	05/2229		23			
Beaumont (KBPT)	06/0929	1006.8	05/1520	31	36			
Bellaire								11.25
Brays Bayou (Stella Link)								19.72
Brays Bayou (Lawndale)								21.46
Buffalo Bayou								23.54
Chigger Creek (Windsong)								18.78

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained(kt)[b]	Gust (kt)			
Clear Creek (Tele. Rd.)								20.04
College Station (KCLL)	06/1014	1006.8						3.49
Conroe								18.08
Conroe (KCXO)	06/0757	1002.7	06/0444		26			17.48
Cypress Creek (at Grant)								21.41
Deer Park								22.99
Coward Creek (at Baker)								27.95
Dickinson								14.48
Eagle Point (port)	06/0230	1005.4	05/2130	37	42			
Ellington Field (KEFD)	06/0250	1004.4	06/0130	20	44			
Freeport								12.12
Friendswood								25.98
Furr H.S. (Harris Co.)								35.14
Galveston (KGLS)	06/0215	1004.4	05/2123	33	40			9.77
Galveston Bay, N. Jetty	06/0012	1002.9	05/2116	35	42	1.8		
Galveston Pleasure Pier	06/0130	1003.7	05/2118	38	45	2.1		
Garners Bayou (B'tway 8)								24.61
Greens Bayou (US 59)								35.76
Harris Co. Museum N.S.								20.83
Heights (Harris Co.)								32.00
Houston Hobby (KHOU)	06/0253	1004.4	05/2005	27				18.77
Houston Hobby (KHOU)			05/2254		33			
Houston Int'cntl (KIAH)	06/0413	1003.0	06/0313	21	28			16.48
Hunting Bayou (Houston)								35.75
Huntsville (KUTS)	06/0943	1003.7						12.16
Imperial Sugar								15.57
Jamaica beach	06/0100	1004.3						12.13
Kingwood								21.00
La Porte								18.86
League City (NWS HGX)	06/0300	1005.6	05/2100		25			19.41
Little Vince (at Jackson)								22.40
Missouri City								10.98
Morgans Point (port)	06/0300	1004.6	06/0318	27	36	1.2		
Palacios (KPSX)	06/0048	1005.8	06/0003		24			
Pearland (KLVJ)	06/0300	1004.1	05/2216	26	32			21.41

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained(kt)[b]	Gust (kt)			
Pennington								15.60
Port of Houston								36.99
Sabine Pass						2.5		
Sugarland (KSGR)	06/0336	1005.4	05/2225		25			9.61
Sugarland City Hall								15.31
Tomball								16.20
Tomball (KDWH)	06/0559	1003.4	06/0409	21	29			13.14
Vince Bayou (W. Ellaine)								25.31
Westheimer (Houston)								33.00
Westbury								19.53
White Oak Bayou (Ella)								18.19
Winnie								16.58
Virginia								
Wallops Island (KWAL)	17/0154	1006.3	16/2103	16	23			
C-MAN Stations								
ALSN6 (40.5N 73.8W)	17/1800	1010.8	17/1650	28	30			
BURL1 (28.9N 89.4W)	11/1100	1004.5	11/1110	41				
BURL1 (28.9N 89.4W)			11/1121		49			
BURL1 (28.9N 89.4W)	11/1200	1004.5						
CHLV2 (36.9N 75.7W)	16/1000	1007.5	16/1610	33	34			
CLKN7 (34.6N 76.5W)	14/0800	1009.1	14/0600		53			
CSBF1 (29.7N 85.4W)			12/0442		35			
DPIA1 (30.3N 88.1W)	11/1600	1007.5	11/1420	31	44			
DSLN7 (35.2N 75.3W)	14/0900	1013.0	14/1400		36			
GDIL1 (29.3N 90.0W)	11/0900	1005.1	11/0850	34	45			
SRST2 (29.7N 94.1W)			05/1450	41	53			
TPLM2 (38.9N 76.4W)	16/2100	1011.0						
Moored Buoys								
42007 (30.1N 88.8W)			11/1120	34				
42007 (30.1N 88.8W)			11/1108		49			
42019 (27.9N 95.4W)			05/1300	27	33			
42035 (29.3N 94.4W)			05/1500	31	41			
42040 (29.2N 88.2W)	11/1100	1008.4	11/1600	33				
42040 (29.2N 88.2W)			11/1541		41			
44004 (38.5N 70.5W)	17/2100	1011.7	17/2310	29	33			

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft)[c]	Storm tide (ft)[d]	Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained(kt)[b]	Gust (kt)			
44008 (40.5N 69.4W)	18/0400	1007.0						
44009 (38.5N 74.7W)	17/1000	1004.4	11/1330	31	33			
44011 (41.1N 66.6W)	18/1000	1008.8						
44014 (36.6N 74.8W)	16/0900	1009.1						
44025 (40.3N 70.2W)	17/1800	1008.3	17/1800	27	33			
Oil Rig Platforms								
K7B5 (28.1N 93.2W)			05/1400	40	50			
K3B6 (28.0N 92.8W)			10/1445	42				
K7R8 (28.3N 92.0W)			10/1542		35			

[a] Date/time is for sustained wind when both sustained and gust are listed.
[b] Except as noted, sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min.
[c] Storm surge is water height above normal astronomical tide level.
[d] Storm tide is water height above National Geodetic Vertical Datum (1929 mean sea level).

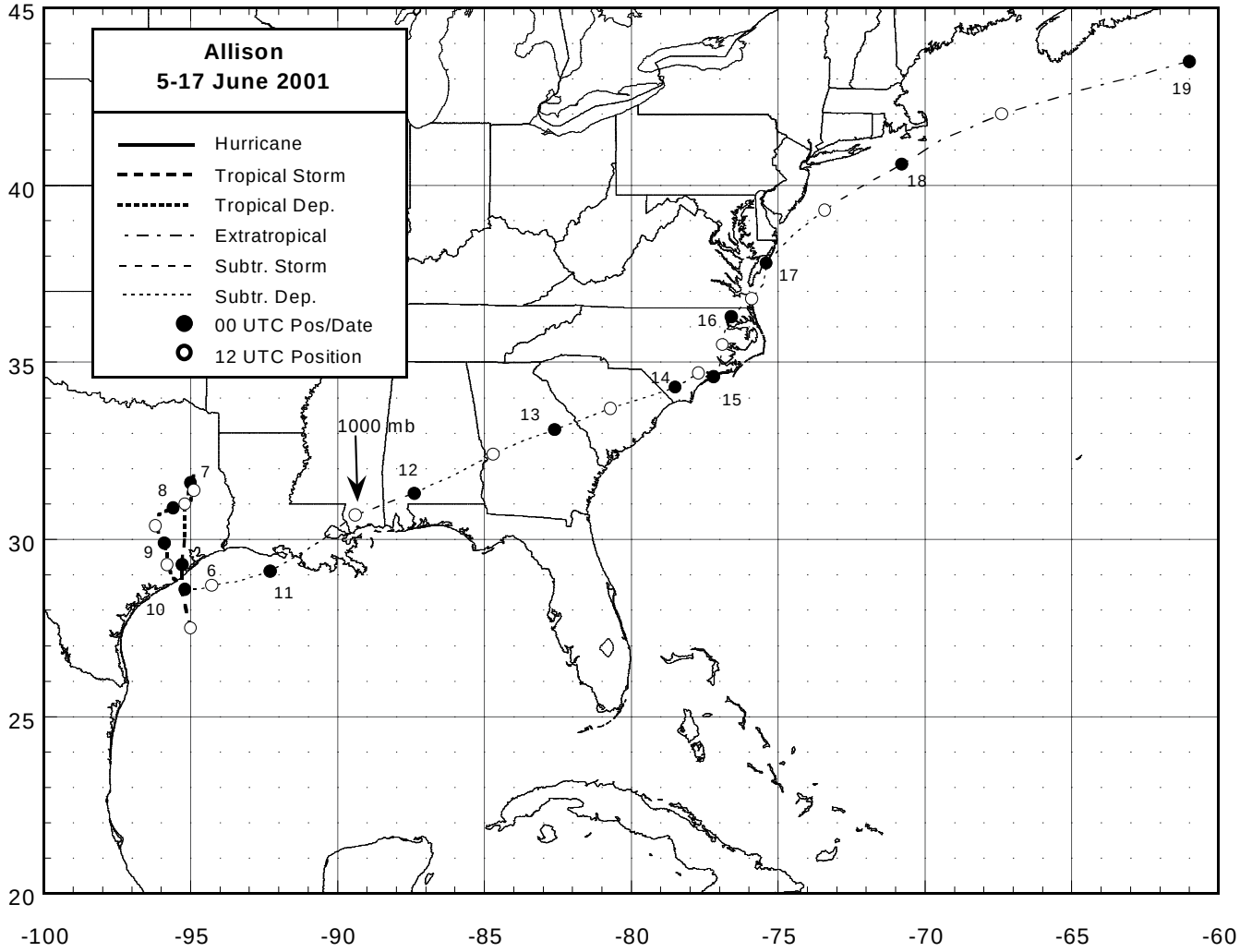

Figure 1. Best track positions for Tropical Storm Allison, 5-17 June 2001.

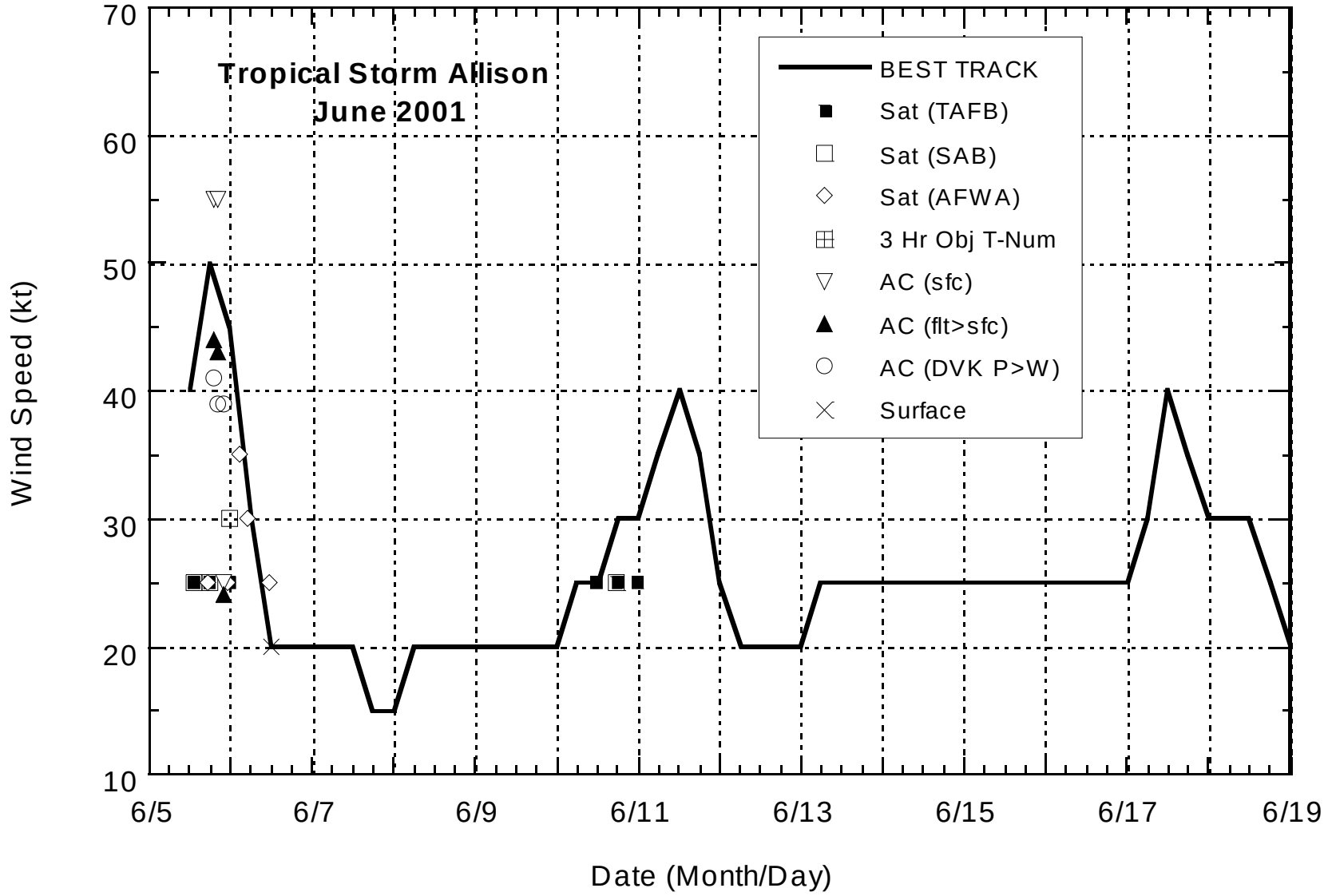

Figure 2. Best track maximum sustained surface wind speed curve for Tropical Storm Allison, 5-17 June 2001. Aircraft observations have been adjusted for elevation using an 85% reduction factor for observations at 1500 ft. Wind curve is based primarily on surface observations after 1200 UTC 6 June.

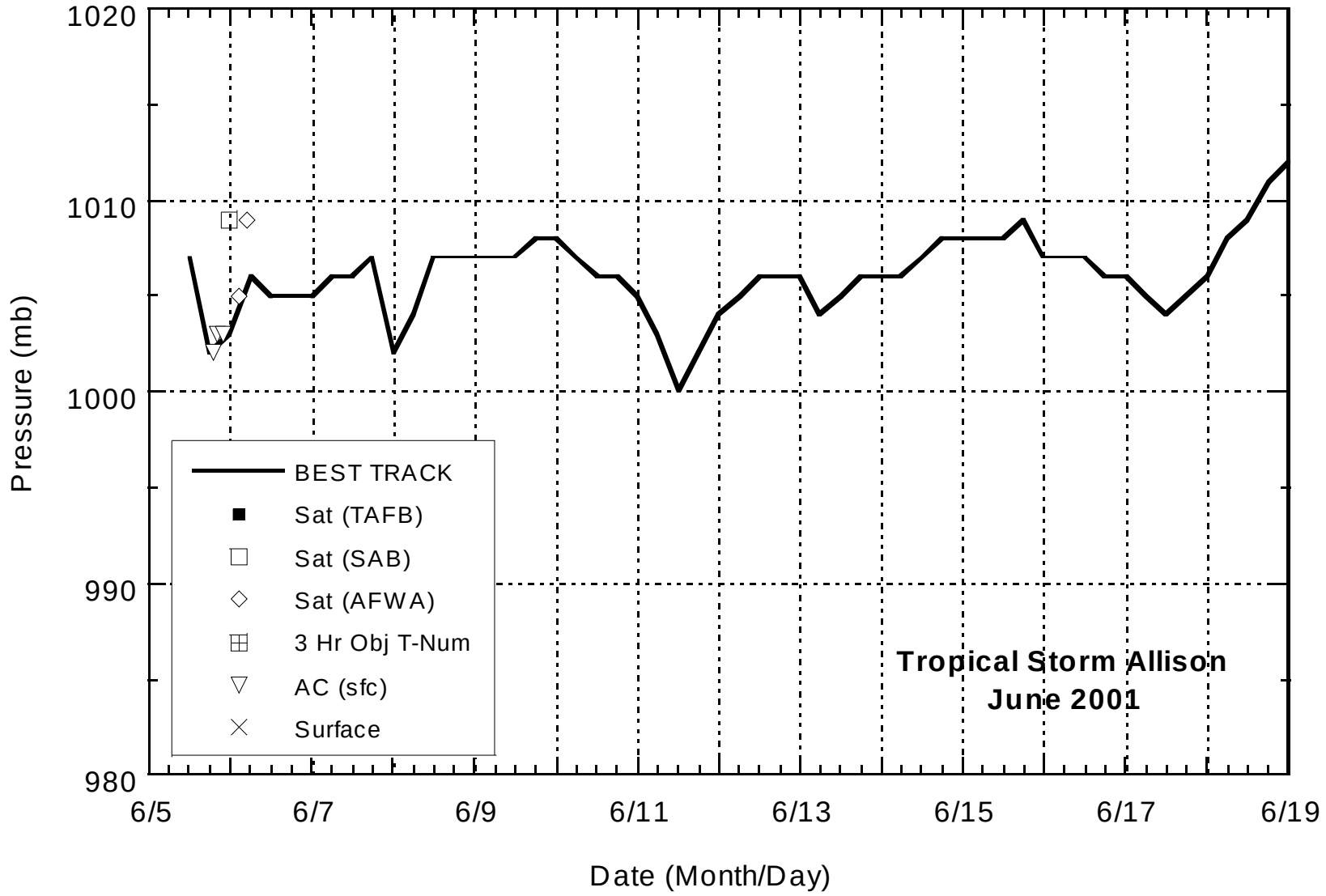

Figure 3. Best track minimum central pressure curve for Tropical Storm Allison, 5-17 June 2001. Pressure curve is based on surface observations after 0600 UTC 6 June. Estimates during the extratropical stage are based on analyses from the NOAA Marine Prediction Center.

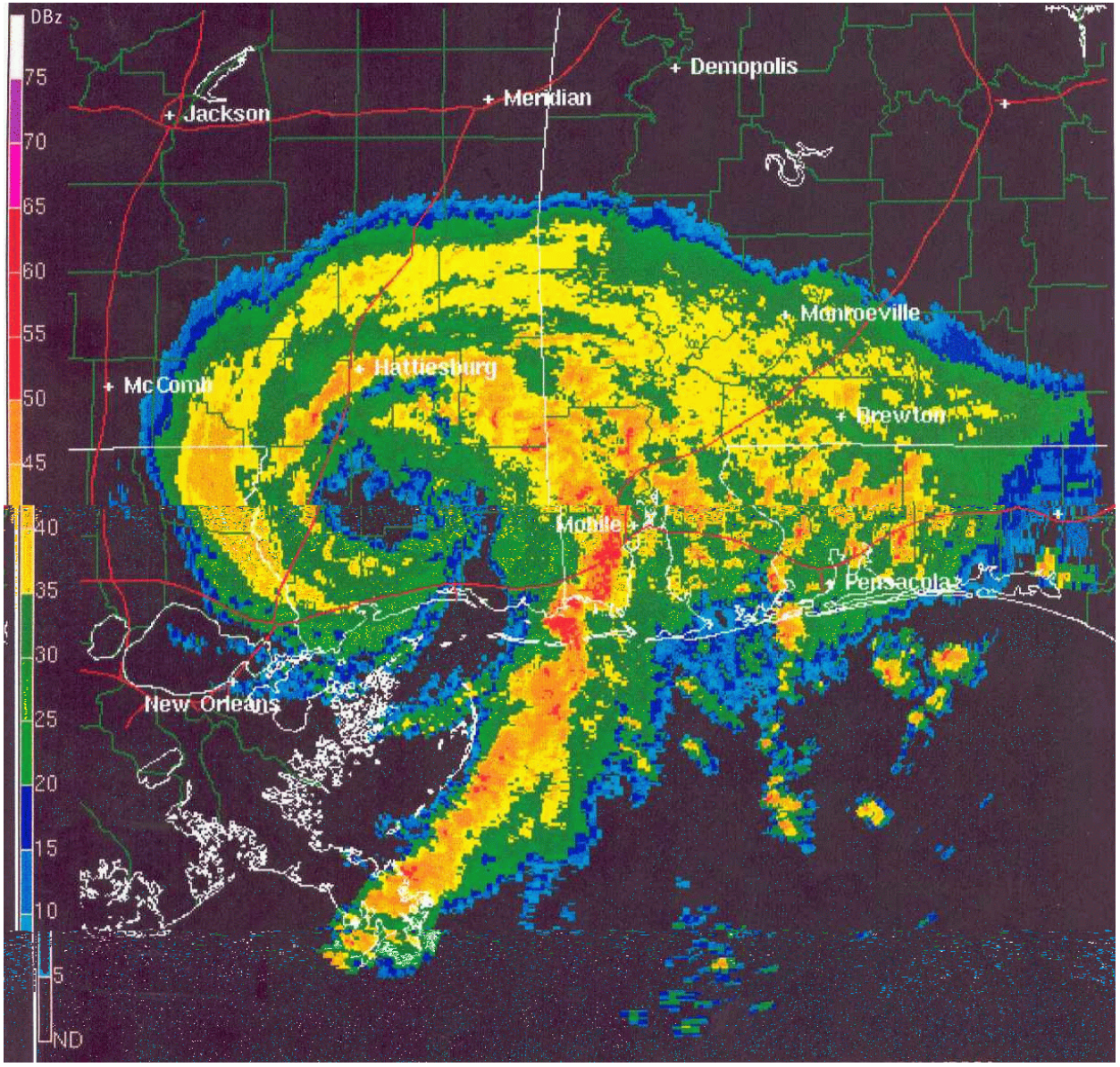

Figure 4. 1227 UTC 11 June 2001 radar reflectivity image from Mobile, AL. Note the eye-like feature over southern Mississippi and the squall line to the east. The intensity was near 40 kt at this time.

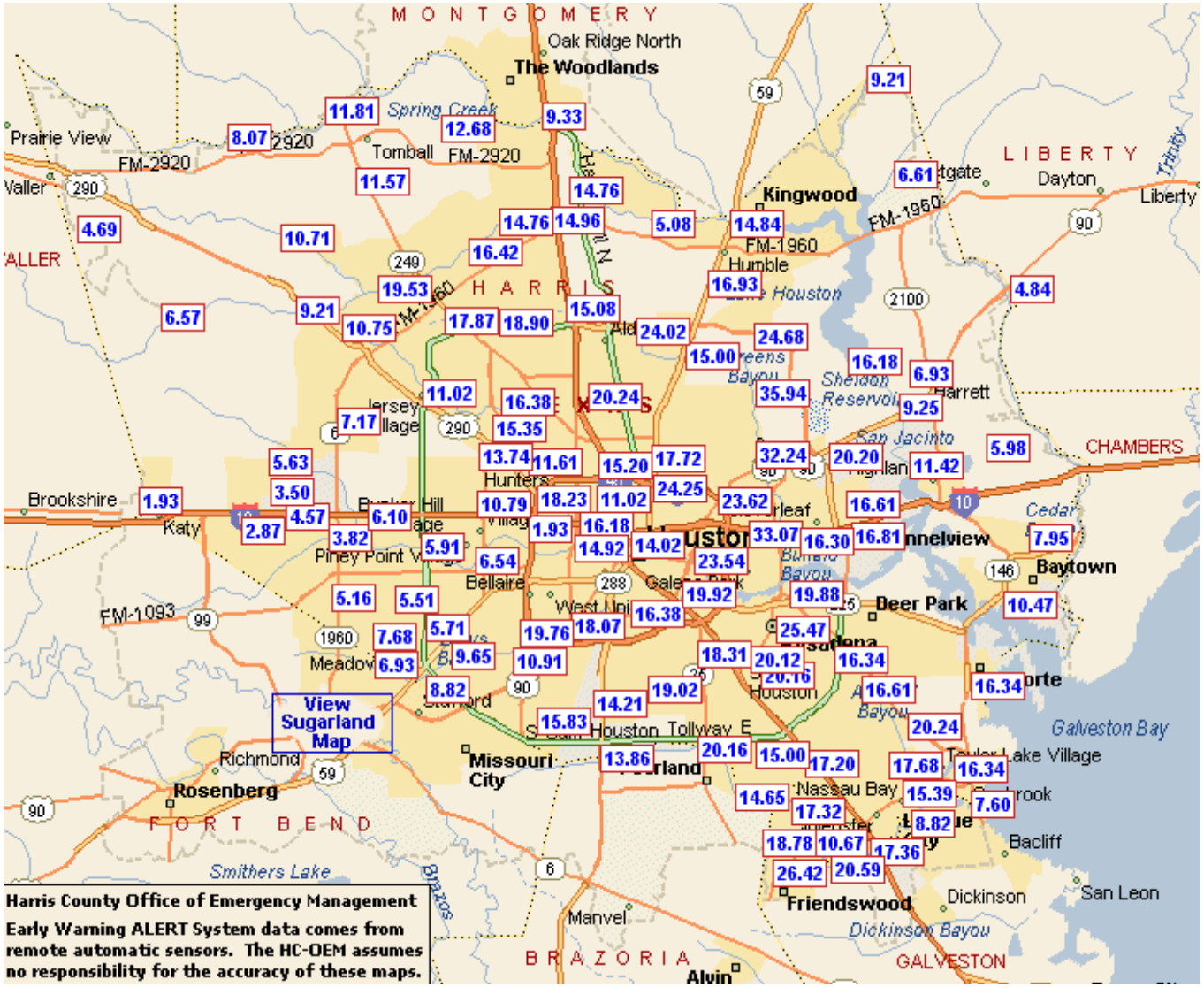

Figure 5. Storm total rainfall (in) for the Houston metropolitan area (data provided by the Harris Co., TX Office of Emergency Management).

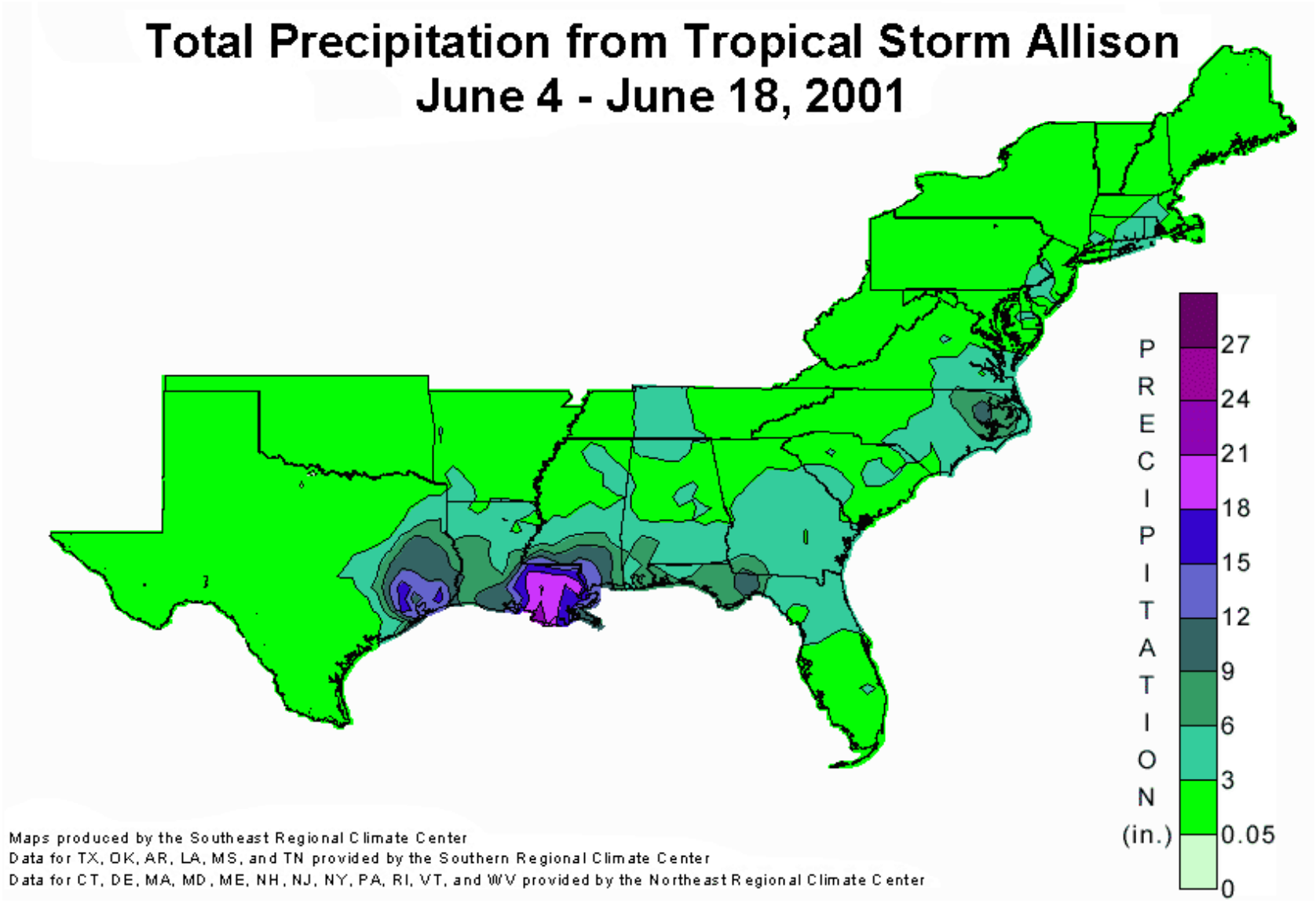

Figure 6. Storm total rainfall for Tropical Storm Allison during the period 4-18 June 2001.

Rainfall data were obtained from the standard rainfall reporting network. This map does not include some isolated amounts, which were up to nearly 37 inches.