SEPTEMBER 1981 VOLUME 23 NUMBER 9

STORM DATA

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REFERENCE NOTES

† Storm damage categories are from 1 to 9 as follows:

1 Less than $50
2 $50 to $500
3 $500 to $5,000
4 $5,000 to $50,000
5 $50,000 to $500,000
6 $500,000 to $5 Million
7 $5 Million to $50 Million
8 $50 Million to $500 Million
9 $500 Million to $5 Billion

* Miles instead of yards
** Yards instead of miles
° Includes crop damage
@ Includes heavy sleet storm
# Freezing drizzle and freezing rain, commonly known as glaze
‡ Not received or incomplete

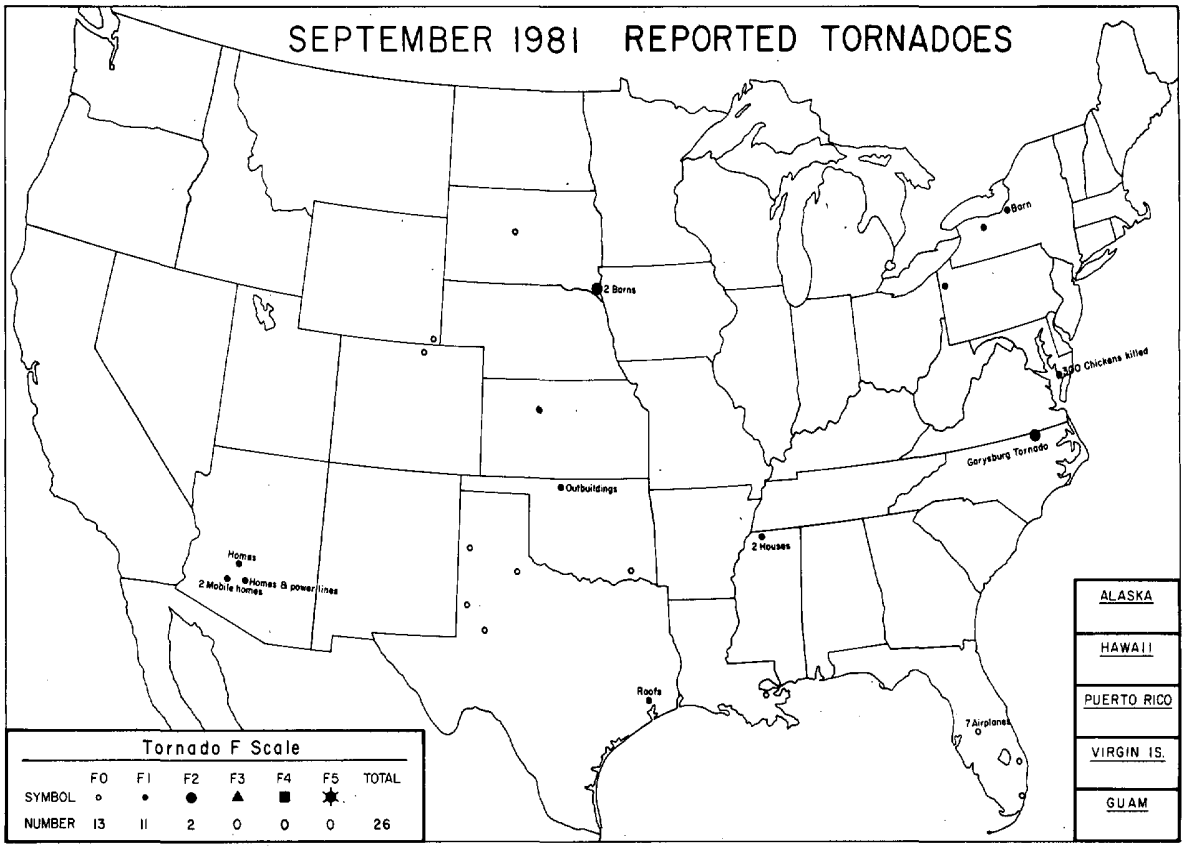
"F" SCALE DEFINITIONS

0 =	40-72	MPH	Breaks branches off trees; signboards damaged.
1 =	73-112	MPH	Peels surface off roofs; trailer houses pushed or damaged.
2 =	113-157	MPH	Tears roofs off frame houses and outbuildings; cars blown off highway.
3 =	158-206	MPH	Windows of skyscrapers smashed; frame houses destroyed; cars lifted off ground.
4 =	207-260	MPH	Skyscrapers twisted; frame houses leveled; cars blown some distance.
5 =	261-	MPH	or greater.

NOTE: This publication contains our best information on storms but, due to the difficulties inherent in collection of this type of data, it is not all-inclusive. Late Reports and Corrections will be carried quarterly.

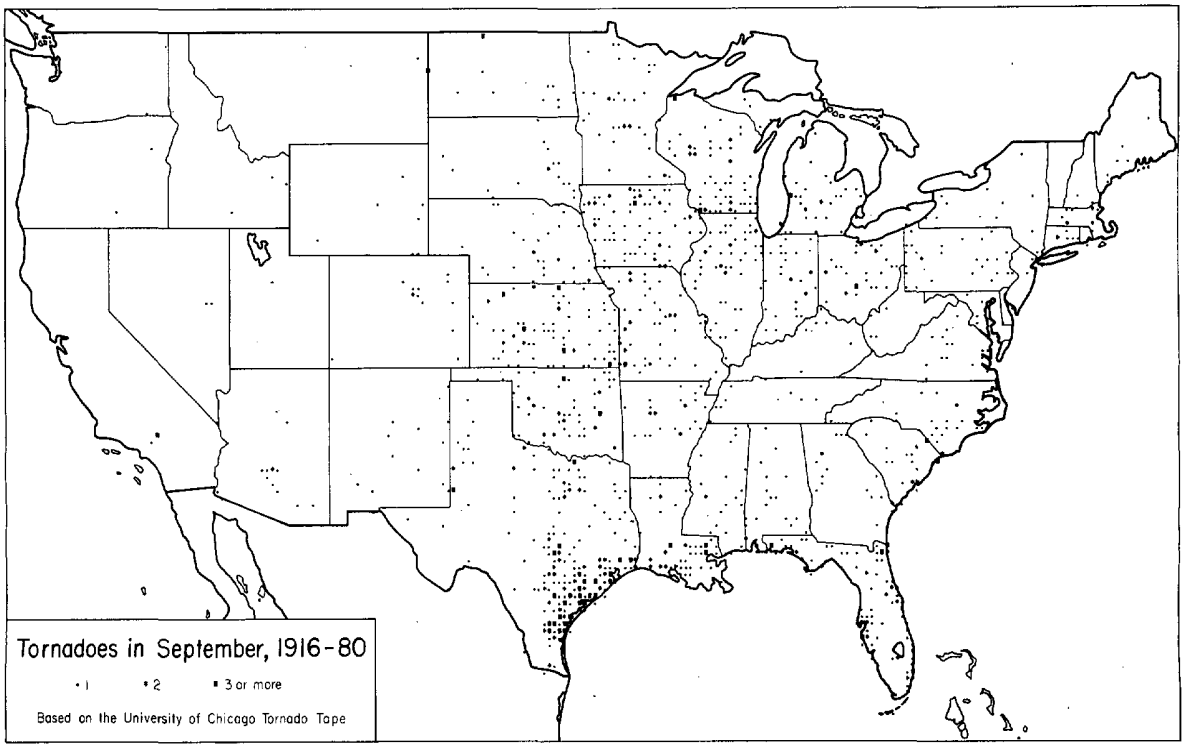
STORM DATA - (USPS 363-010) is published monthly. Subscription, pricing, and ordering information is available from: Publications Section, The National Climatic Center, Environmental Data and Information Service, NOAA, Federal Building, Asheville, NC 28801.

OUTSTANDING STORMS OF THE MONTH



● REPORT RECEIVED ○ NO REPORT RECEIVED

●1AL	●5CO	●10ID	●15KY	●20MI	●25NE	●30NYcoastal	●33OH	●37RI	●41TXsouthern	●45WA	●50HI
●2AZ	●6CT	●11IL	●16LA	●21MN	●26NV	●30NYcentral	●34OK	●38SC	●41TXwestern	●46WV	●51PR
●3AR	●7DE	●12IN	●17ME	●22MS	●27NH	●30NYwestern	●35OR	●39SD	●42UT	●47WI	●52VI
●4CAnorthern	●8FL	●13IA	●18MD	●23MO	●28NJ	●31NC	●36PAeastern	●40TN	●43VT	●48WY	●53GU
●4CAsouthern	●9GA	●14KS	●19MA	●24MT	●29NM	●32ND	●36PAwestern	●41TXnorthern	●44VA	●49AK	



CLIMATOLOGICAL TORNADO MAPS

The computer-generated climatological map of tornadoes in September, 1916 - 1980 includes touchdown locations of all tornadoes listed in the University of Chicago tornado tape which is being updated monthly by adding the tornadoes in the STORM DATA. Tornadoes near the Gulf coast are mostly associated with landfalling hurricanes and tropical storms. A concentration of tornadoes is seen inside a broad band extending from Oklahoma, Iowa to the southern Great Lakes.

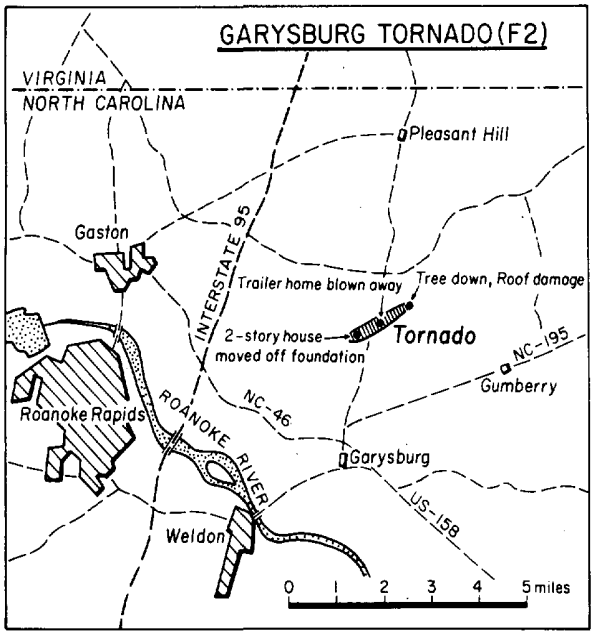
A monthly climatological map will be produced and included in the future STORM DATA in the section of "OUTSTANDING STORMS OF THE MONTH" to allow readers to compare the tornado distribution of each month with that of the climatological tornadoes in the same month reported since 1916 when the systematic collection of tornado data started.

1. GARYSBURG TORNADO (F2) in North Carolina on September 15, 1981

This tornado touched down 5 miles to the east of Roanoke Rapids, N.C., leaving behind a damage path of approximately 1.5 miles extending west-southwest to east-northeast. --- Damage map and photos by Ted Sumner, Coordinator, Northampton County Emergency Management at Jackson, N.C. --- Data supplied by John Valentine, NWS at Raleigh-Durham Airport, Morrisville, North Caralina.

This two-story house was moved by the wind, from left to right, off its foundation. A chimney which had been in the rectangular hole on the side of the house fell to the ground, turning into a pile of bricks. The tornado touched down just to the southwest of this house.

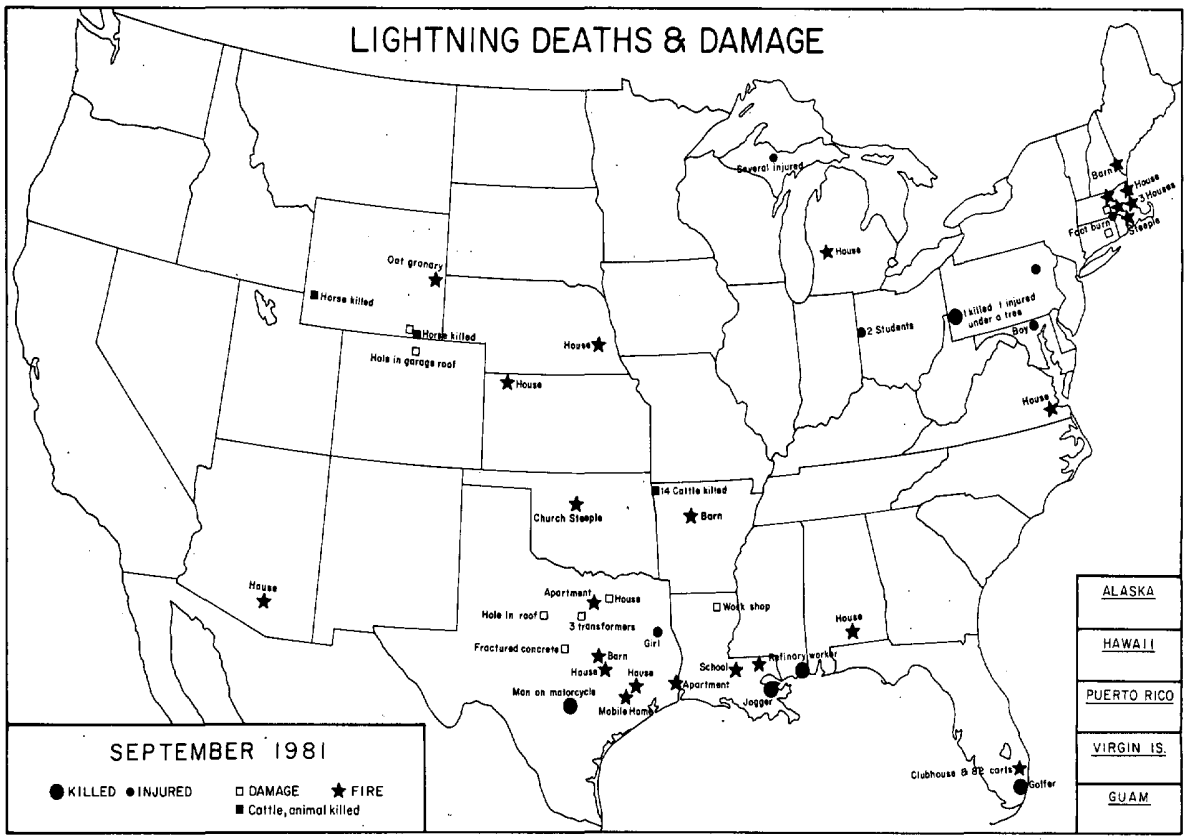
GARYSBURG TORNADO --- Continued



Path of the Garysburg tornado

TV, bed, and other items left behind a trailer home which was blown away. The location of this damage is in the map (left).

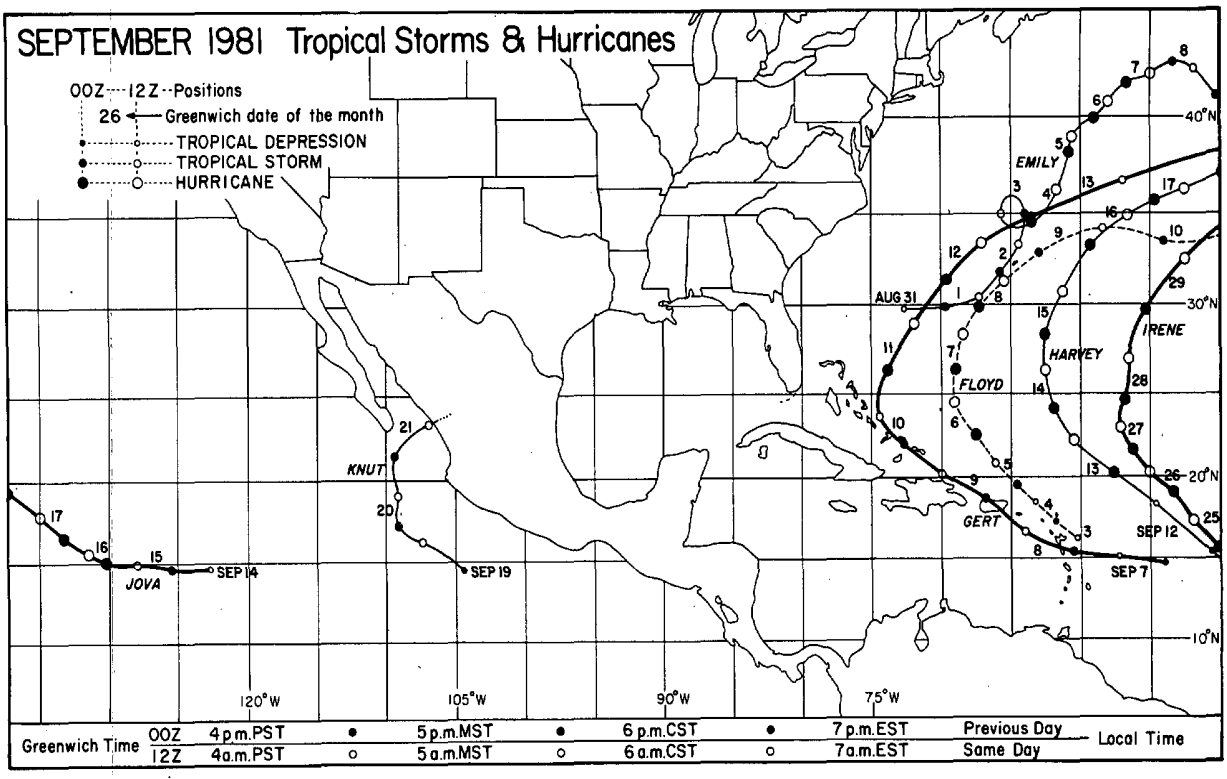
LIGHTNING DEATHS AND DAMAGE IN SEPTEMBER



This summary map shows that several persons were killed by lightning while on motorcycle, standing under a tree, jogging, and golfing. Several houses and barns caught fire in the New England and in the Gulf states.

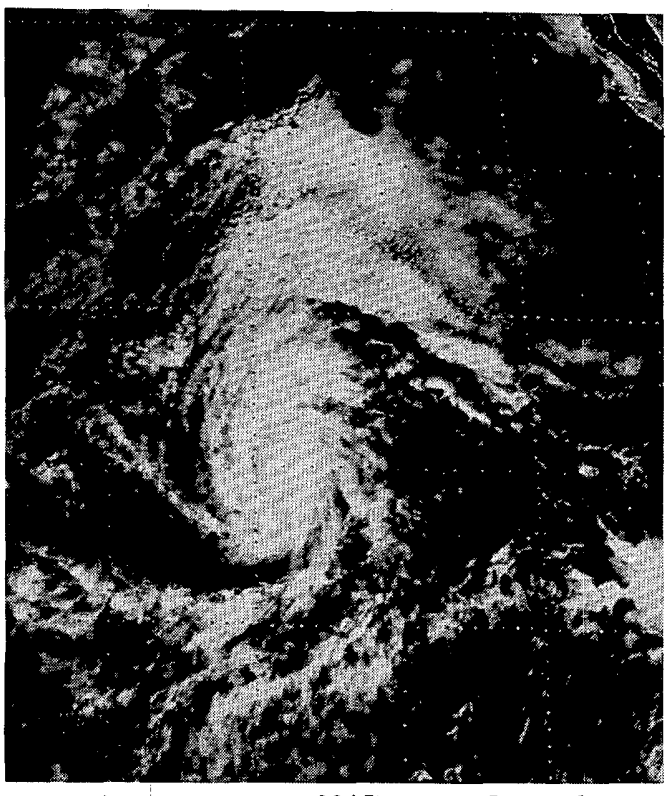
Statistics show that more people were killed by lightning than by tornadoes. We should know, however, that most lightning deaths and injuries are preventable through precautions.

TROPICAL STORMS AND HURRICANES

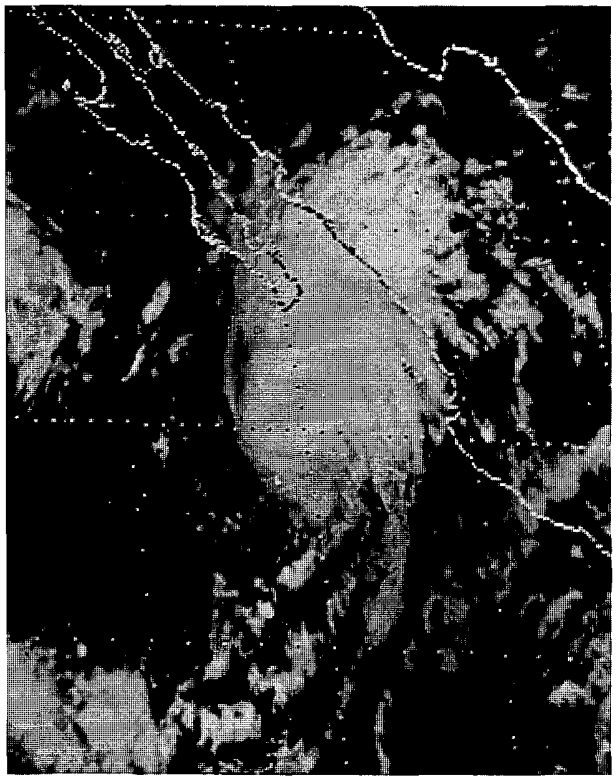


Wind speeds and storm classifications are from Best Track Data listed in STORM DATA.

PACIFIC HURRICANES — Jova and Knut

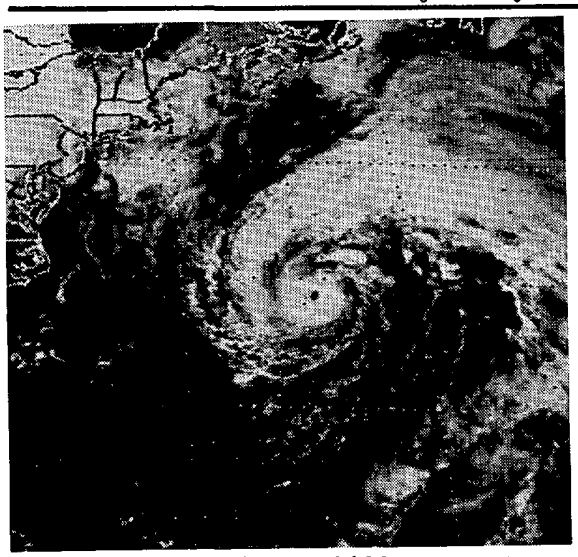


Hurricane Jova at 0945PST on September 15 when the maximum wind speed was 75 mph.

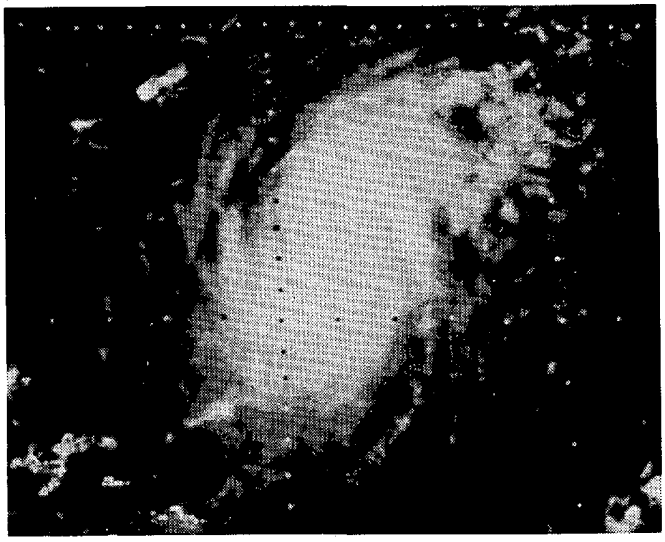


Hurricane Knut at 0715PST on Sept. 20. Maximum wind speed 75 mph.

ATLANTIC HURRICANES Emily, Floyd, Gert, Harvey, and Irene



Hurricane Emily at 1400EST on Sept. 3 when the max. wind was 72 mph.

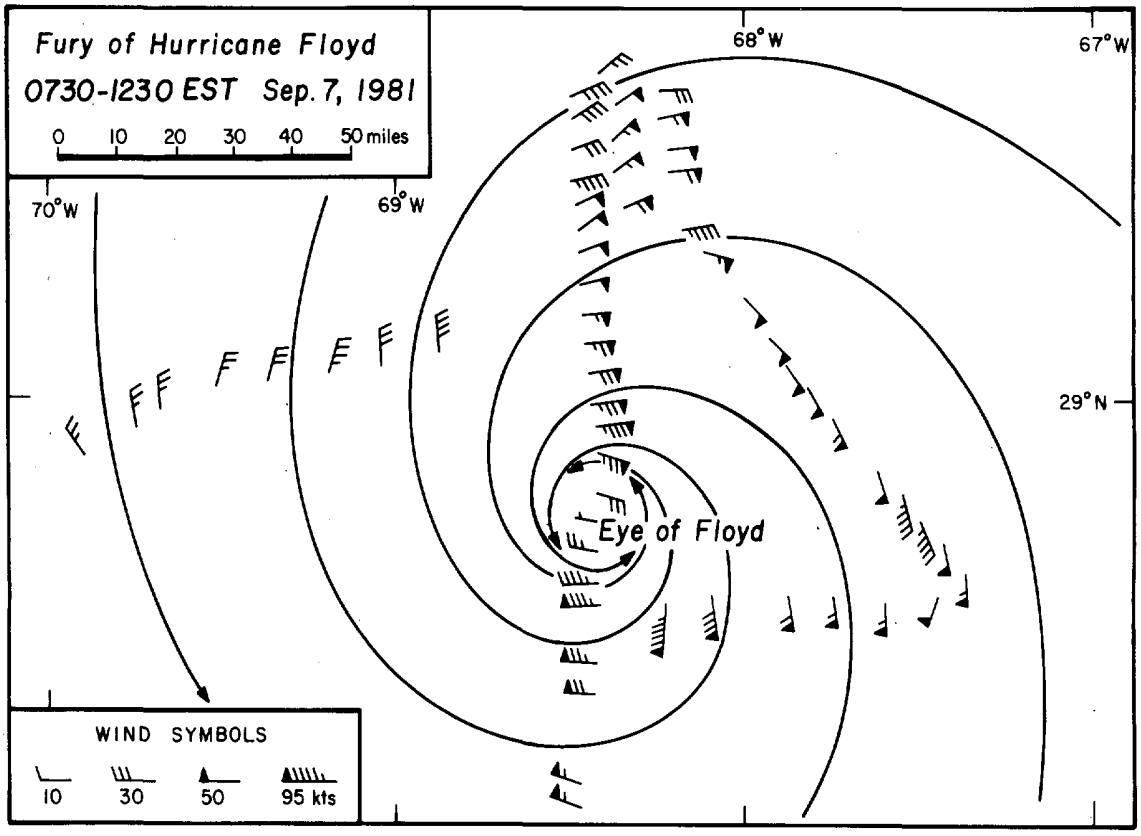


Hurricane Floyd at 1400EST on September 6 when the max. wind was 110 mph.

2. HURRICANE FLOYD An example of automated hurricane maps by NHC-NHRL

National Hurricane Research Laboratory (NHRL) fly NOAA aircraft into hurricanes for measuring meteorological parameters: -- wind, temperature, moisture, pressure, etc. One minute data are stored on board the aircraft and then transmitted via satellite to the National Hurricane Center (NHC) every one half hour.

Data received at NHC in real time are plotted automatically into hurricane maps which are used in monitoring and predicting hurricanes and tropical storms.

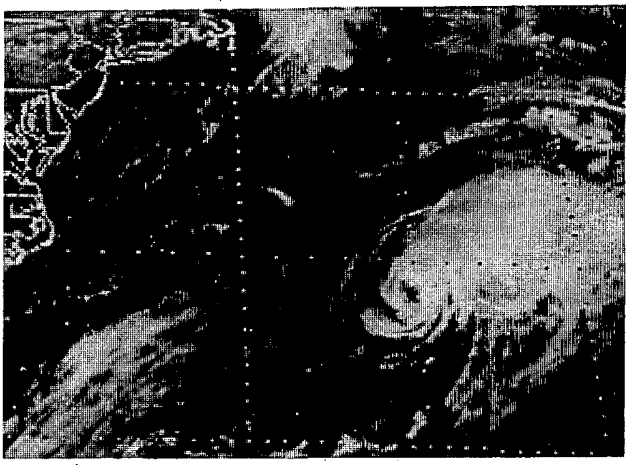


Aircraft-measured winds in hurricane Floyd received at NHC in real time. Data supplied by Robert Sheets, National Hurricane Center, Coral Gables, Florida.

3. EYE OF HURRICANE GERT

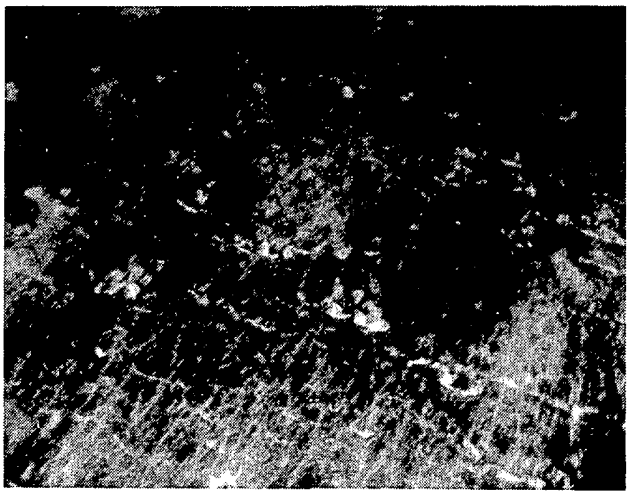
Gert was first detected on satellite pictures off the African coast on Sept.1. An Air Force reconnaissance plane estimated 39 mph surface wind on Sept.7, resulting in upgrading Gert into tropical storm.

Gert became a hurricane at 1300EST on Sept.10. NOAA aircraft performed a comprehensive monitoring during two days thereafter when Gert was in hurricane intensity. Four aerial photos shown below were taken on September 11.



Hurricane Gert at 1430EST on Sept.12. Estimated winds 80 mph. NESS photo.

70 miles from the eye of Gert. The aircraft is flying between low and middle clouds near a cloud band.



Waves and spray on the sea surface caused by winds blowing at 80 to 85 mph from upper right to lower left of the photo.

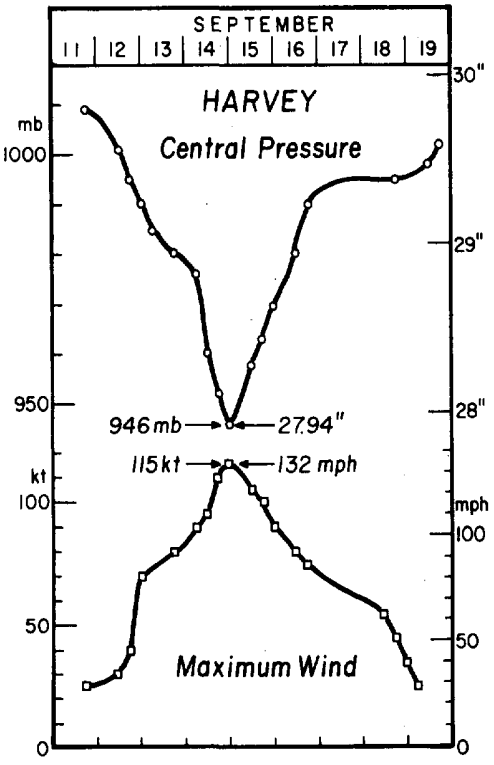
Low scud clouds inside the eye seen from the cockpit of the NOAA aircraft. Clouds in the foreground are in sunlight passing through thin high clouds.

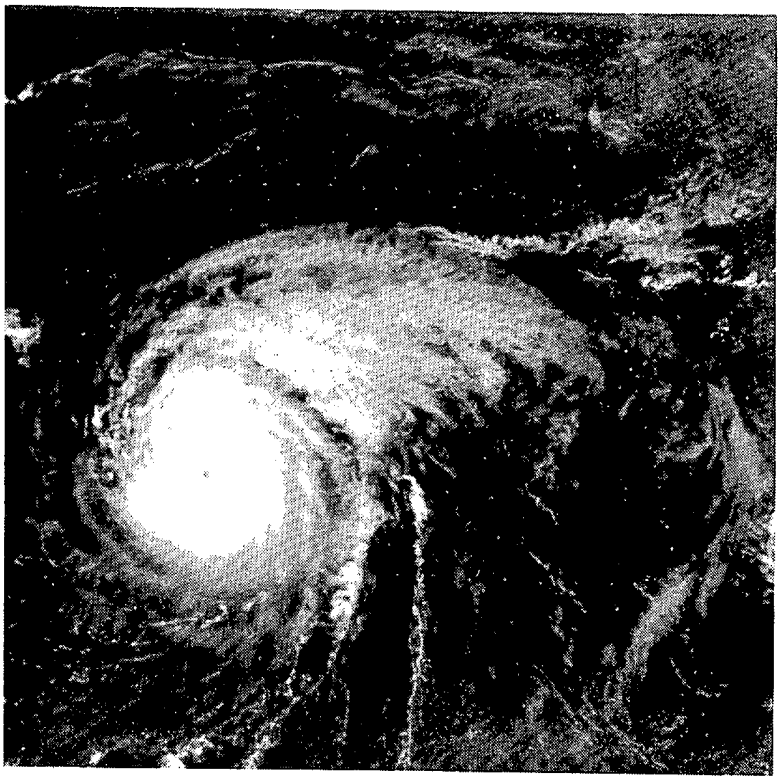
The eye surrounded by the wall cloud. The circulation center of scud clouds is located on the middle left edge of the picture.

--- Aerial photos by Stan Goldenberg, National Hurricane Research Laboratory at Coral Gables, Florida. Data supplied by NHRL and NHC.

4. HURRICANE HARVEY

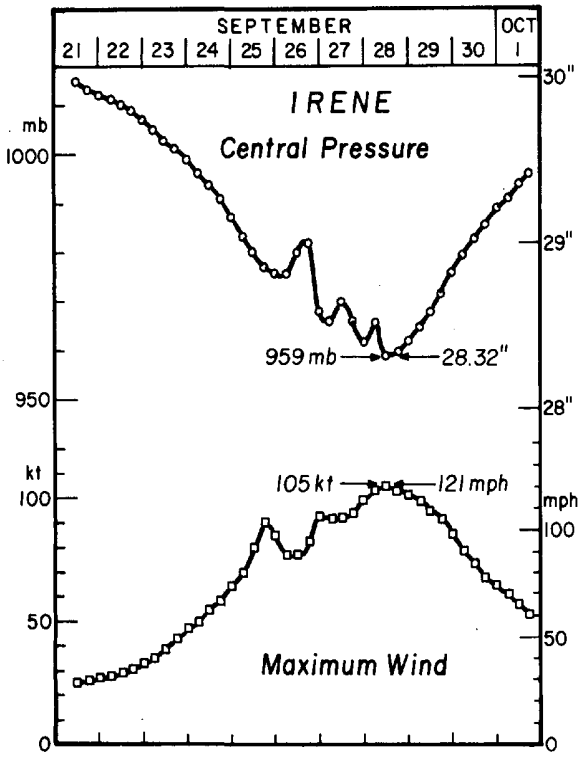
Hurricane Harvey was the strongest Atlantic hurricane of the 1981 season, attaining the maximum winds of 132 mph and a minimum pressure of 946 millibar (mb) on Sept. 15. Satellite photo shows the storm at 1430EST on September 14 when the wind speed was 130 mph. Satellite photo by NESS.

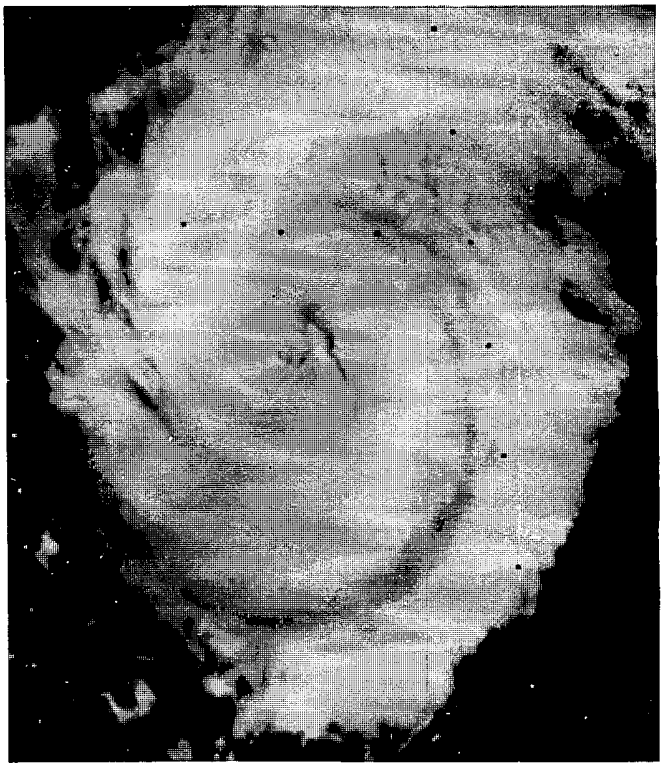




5. HURRICANE IRENE

Satellite picture of Hurricane Irene at 1332EST on September 27 shows a tongue-like top of a convective cloud to the southeast of the hurricane center. Max. wind - 105 mph. Photo supplied by Linwood Whitney and Vern Dvorak of NESS.





STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS: KILLED	NO. OF PERSONS: INJURED	ESTIMATED† DAMAGE: PROPERTY	ESTIMATED† DAMAGE: CROPS	CHARACTER OF STORM

1 ALABAMA

Andalusia area, Covington County	15	1350CST			0	0	5	0	Lightning/Wind
A home was destroyed by fire after being struck by lightning. High winds that accompanied the thunderstorm caused scattered damage to trees and utility lines in the area.									

2 ARIZONA

Stanfield (Pinal Co.)	5	1525MST	2	40	0	0	5	0	Tornado (F1)
During a severe thunderstorm, a tornado touched down about 10 miles south of here and moved east 2 miles before dissipating. Several homes were damaged and power lines downed. No injuries.									
Gila Bend (Maricopa Co.)	5	1527MST	1	40	0	0	5	0	Tornado (F1)
During a severe thunderstorm, a tornado touched down just west of town and traveled east for about 1 mile. Two mobile homes were destroyed and several more damaged. There was damage to power lines, signs, sheds and trees. The deputy sheriff's car was buried under a toppled 60 ft. tree. No injuries were reported.									
Peoria-Glendale (Maricopa Co.)	5	1920MST	1	30	0	0	5	0	Tornado (F1)
A tornado touched down, during a severe thunderstorm, for about 1 mile in the far northern sections of Peoria and Glendale. It knocked down a section of a 69,000 volt power line, damaged several houses and mobile homes and uprooted large trees. No injuries.									
Topock-Yucca (Mohave Co.)	6	Early Morning			0	0	6	0	Thunderstorm Flash Flooding
Very heavy rains of up to 4 inches caused a 160 ft. portion of a 2-track steel girder bridge on the main line of the Santa Fe Railway over the Sacramento Wash near Topock to wash away. A section of Interstate 40, southwest of Yucca, collapsed as a result of being under-mined by flash flooding. Two persons were injured when their vehicle was caught on the collapsed portion.									
Lake Havasu City (Mohave Co.)	6	Early Morning			0	0	4	0	Thunderstorm Flash Flooding, Hail
Very heavy rains of up to 2 inches and hail up to 1-3/4 inches diameter caused flash flooding in the area, but no heavy damage or injuries.									
Tucson (Pima Co.)	22	Afternoon			0	0	5	0	Thunderstorm Lightning
A lightning caused fire almost totally destroyed a home in the Tucson Mountains area. Damage was put at $70,000.									

3 ARKANSAS

Dumas (Desha County)	01	1830-2000CST			0	0	?	0	Heavy Rain/ Flooding
Heavy rain began falling around 1500CST with 3 inches of rainfall occurring in about 2 hours. Total rainfall was almost 6 inches. Sixty-five to seventy percent of the streets in town were flooded. Several businesses and homes were flooded.									
Little Rock (Pulaski County)	02	1730-2000CST			0	0	?	0	Heavy Rain/ Flooding
Rainfall amount at WSFO was 1-1/4 inches in forty minutes. Heavier amounts probably fell over western Little Rock. Water was over 3 feet deep in some areas. An eleven-year old boy was almost drowned in the floodwaters, but was rescued and escaped injury.									
Just North of Scottsville (Pope County)	13	1315CST			0	0	4	0	Lightning
Lightning caused a fire which destroyed a large barn and 750 bales of hay. Damage was estimated at 35 thousand dollars.									
Jacksonville (Pulaski County)	15	1640CST			0	0	0	0	Hail
Thunderstorms produced golf-ball sized hail. No damage was reported.									
Gentry (Benton County)	26	Mid-Evening			0	0	4	0	Lightning
Lightning struck and killed 14 head of cattle. Damage was estimated at 14 thousand dollars.									

4 CALIFORNIA, Northern — NONE REPORTED

4 CALIFORNIA, Southern

Imperial County	5	Late aft.			0	0	0	0	Heavy Rain, Gusty Winds and Hail
Heavy Rain, gusty winds and hail reported in the Salton City area.									
Los Angeles County	6	1555PST			0	0	0	0	Heavy Rain and Hail
Palmdale Highway Patrol reported heavy rain and hail in mountain pass along highway 15.									
Riverside County	7	1620PST			0	0	0	0	Heavy Rain and Hail
Pine Cove Fire Station, 3 miles from Idyllwild reported 3 inches of rain and 2 inches of hail fell in 45 minutes. California Highway Patrol reported Hwy 74 closed at Green Acres.									

5 COLORADO

Fort Collins	5	evening			0	0	3	0	Lightning
Lightning struck a town house garage in Fort Collins, burning a hole in the roof and causing $2,000 damage.									
Longmont	19	afternoon			0	0	2	0	High wind
Winds estimated at 100 mph knocked out a window in a vacant store, blew down a railroad crossing signal, and tore limbs off trees in the northern part of Longmont.									
Weld County	23	1358 MST	short	narrow	0	0	0	0	Tornado (F0)
A pilot reported a brief tornado touchdown between Nunn and Carr.									

6 CONNECTICUT

Statewide	8-9	2300-0300 EST			0	0	5	0	High Wind
The first day of school was cancelled in many areas due to an exceptionally large amount of trees blown down across electrical wires and onto roads and houses. The Bridgeport National Weather Service recorded a wind gust of 59 mph.									
Central Portions	14	1800-1900 EST			0	0	4	0	High Wind Lightning
Again thunderstorms blew down many trees onto houses and automobiles. Several lightning hits were scored on power lines.									
Montville	23	0130 EST			0	0	4	0	Lightning
A large barn was struck and totally destroyed. Wires and fuses were melted as a strike occurred at one residence and at another strike, plaster was sent flying, tiles blown off and wires and plugs melted.									

7 DELAWARE — NONE REPORTED

8 FLORIDA

Escambia County	1	1300CST			0	0	0	0	Waterspout
A waterspout was observed over Escambia Bay just north of the Interstate Highway Bridge.									
Dade County	6	Morning			1	0	0	0	Lightning
The 47-year-old athletic director of Central High School was struck and killed by lightning on the Miami Springs Golf Course. The 290-pound director died immediately, while three other golfers in the group were not injured.									
Monroe County	7	1029EST			0	0	0	0	Waterspout
A waterspout was observed about 10 miles west-southwest of the Key West International Airport moving slowly toward the west.									
Pinellas County	7	1230EST			0	0	0	0	Funnel cloud
A funnel cloud aloft observed over Largo dissipated after five munutes.									
Dade County	7	1250EST			0	0	0	0	Waterspout
A waterspout was observed over Biscayne Bay off South Beach moving toward the north.									
Polk County	9	1600EST			0	0	4	0	Wind, severe thunderstorm
A severe thunderstorm moved through the Lakeland area accompanied by strong winds, numerous lightning strikes and locally heavy rain. Two trees were blown down and several power lines were downed by wind and lightning strikes. Lightning damaged a number of transformers and caused at least 3 fires within 30 minutes. Winds gusted to near 50 mph, and the damage reportedly was caused by straight-line winds. No injuries were reported.									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED[1] DAMAGE PROPERTY	ESTIMATED[1] DAMAGE CROPS	CHARACTER OF STORM
FLORIDA									
Dade County	9	1635EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported in northern Dade County near County Line Road and Highway 441 moving toward the east.									
Palm Beach County	9	1656EST			0	0	3	0	Wind
Wind gusts to 62 mph were reported in West Palm Beach during a thunderstorm that dumped two inches of rain on the area and caused power outages. No significant damage was reported.									
Broward County	10	1725EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported by the County Sheriff's office in northeastern Broward County near the Margate/Pompano Beach area.									
Dade County	10	1830EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported by the Florida Highway Patrol in north Dade County near N.W. 27 Avenue and 183 Street moving toward the east.									
Broward County	10	1855EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported over North Perry Airport near Pembroke Road and University Drive.									
Broward County	10	1900EST			0	0	5	0	Lightning
Lightning struck the clubhouse at the Country Club of Coral Springs during a heavy thunderstorm causing about 80 battery chargers to explode and set the building afire. Damage to the building, including 82 golf carts destroyed, was estimated at $300,000. The clubhouse was unoccupied at the time.									
Dade County	11	1355EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported northwest of Miami International Airport.									
Broward County	11	1805EST			0	0	0	0	Waterspout
A waterspout was reported about 3 miles east of Ft. Lauderdale.									
Monroe County	11	1810EST			0	0	0	0	Waterspout
A waterspout was observed 12 miles northwest of Key West moving very little.									
Dade County	12	0732EST			0	0	0	0	Funnel clouds
Several funnel clouds aloft were reported by the Miami Beach Patrol 2 to 3 miles off Government Cut.									
Monroe County	12	1330EST			0	0	0	0	Waterspout
A waterspout moving slowly southward was observed 9 miles southwest of Key West International Airport in the vicinity of Sand Key Light.									
Monroe County	13	0956EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was observed 8 miles south of Key West International Airport moving slowly toward the west.									
Broward County	13	1055EST			0	0	0	0	Waterspout
A large waterspout was reported by the Coast Guard about 4 miles east of Port Everglades. The waterspout was moving slowly southwestward.									
Polk County	16	1345EST	1	20	0	0	4	0	Tornado (F0)
A small tornado touched down about .2 miles west of Lake Wales damaging 7 small airplanes and one glider. Miscellaneous damage in the airport area included several trees down, a large billboard twisted and lying in Highway 27, and minor damage to one or two buildings. Damage was estimated up to $15,000. No injuries were reported.									
Brevard County	16	1600EST			0	0	0	0	Waterspout
A waterspout was reported off Melbourne Beach.									
Orange County	17	1300EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported over Orlando.									
Brevard County	17	1545EST			0	0	0	0	Waterspouts
Several waterspouts were observed off Melbourne Beach between 1545 and 1600 EST.									
Palm Beach County	17	1602EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported 2 miles north of Sikorsky Aircraft.									
Palm Beach County	17	1617EST	0.1	20	0	0	0	0	Tornado (F0)
A tornado touched down in a wooded area in northern Palm Beach County. There were no damages or injuries.									
Broward County	18	1445EST			0	0	0	0	Funnel cloud
A funnel cloud aloft was reported over Plantation moving northeastward.									
Monroe County	18	1825EST			0	0	0	0	Waterspout
A waterspout was observed 8 miles southwest of Key West moving toward the southwest.									
FLORIDA									
Monroe County	19	0820EST			0	0	0	0	Waterspout
A waterspout was reported 10 miles south of Big Pine Key.									
Monroe County	20	0701EST			0	0	0	0	Waterspout
A waterspout was reported southwest of Sand Key moving toward the east.									
Monroe County	20	1324EST			0	0	0	0	Waterspout
A waterspout was observed 4 miles northwest of Key West International Airport moving toward the west.									
Monroe County	21	0817EST			0	0	0	0	Waterspout
A waterspout was reported 8 miles south of Boca Chica.									
Dade County	21	0940EST			0	0	0	0	Waterspout
A waterspout was reported just east of Key Biscayne.									
Monroe County	21	1053EST			0	0	0	0	Waterspout
A waterspout was observed about 2 miles south of Key West International Airport drifting toward the northwest.									
Pasco County	21	1600EST			0	0	0	0	Hail
Golfball-sized hail was reported over central Pasco County during a thunderstorm.									
Monroe County	21	1747EST			0	0	0	0	Funnel cloud
A funnel cloud was observed 5 miles northwest of Key West International Airport moving toward the west.									
Dade County	22	0725EST			0	0	0	0	Waterspout
A waterspout was reported off Miami Beach.									
Palm Beach County	22	0835EST			0	0	0	0	Waterspout
A waterspout moving southward was reported just offshore from Boca Raton.									
Dade County	26	1645EST	0.2	15	0	0	0	0	Waterspout-Tornado (F0)
A waterspout was reported moving onshore by the Florida Marine Patrol near 79th Street on Miami Beach. The waterspout dissipated shortly after moving onshore. No damage was reported.									
9 **GEORGIA** — NONE REPORTED									
10 **IDAHO** — NONE REPORTED									
11 **ILLINOIS**									
Rock Island County	24-27				0	0	4	3	Flooding
Local heavy rainfall amounts during this four day period caused flash and urban flooding in parts of Rock Island County. Some crop and building damage occurred.									
12 **INDIANA**									
New Pickard Clinton County	19	1330EST	--	--	0	0	3	0	Thunderstorm, winds
Several outbuildings were destroyed. A TV antenna tower was blown down.									
Pleasant & Chester Townships Kosciusko County	19	1800-2100EST	--	--	0	0	5	?	Thunderstorm, winds
Several barns were damaged. Numerous trees were reported down. One car was crushed by a tree.									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS: KILLED	NO. OF PERSONS: INJURED	ESTIMATED† DAMAGE: PROPERTY	ESTIMATED† DAMAGE: CROPS	CHARACTER OF STORM
INDIANA									
Northeast Indiana (Allen, Whitley Counties)	26	Late afternoon	0	0	0	0	5	0	Thunderstorms, small hail, gusty winds
Heavy thunderstorms moved through northeast Indiana. Most of these thunderstorms produced small hail and some wind damage. Severe thunderstorm damage due to high winds was reported in northeast Whitley County and in northern Allen County. Several limbs were down, small trees uprooted, and small sheds overturned. Roof damage and tree limbs were reported down just northwest of Fort Wayne on U. S. 33. At Cook and Lima Road in Allen County an old barn was destroyed.									
13 IOWA									
Cherokee County,	26	Approx. 0230 CST			0	1	5	0	Severe Thunderstorm, Wind
Strong winds caused considerable damage to a one block area in Quimby. A resident, sleeping in a camper on his lot, was injured when the wind upset the camper. A shed was destroyed, a garage damaged and many trees snapped. Several residences had windows broken from flying objects. The town sign "Quimby" was blown a quarter mile east of town. In Aurelia a sign was blown down and several large limbs were broken off trees in the City Park.									
14 KANSAS									
Rawlins County	3	0845CST			0	0	5	0	Lightning
Lightning struck a farm house 8 miles east and 2 south of Atwood. The resulting fire left the house and contents a total loss.									
Garden City, Finney County	3	1700-1730CST	2	1000	0	0	6	0	Wind, Rain
A severe thunderstorm moved south southeast through north and central sections of Garden City. It left homes, businesses, and trees damaged. Most structural damage was caused by high winds and was confined mostly to the roofs of buildings. As much as 4 inches of rain fell, flooding streets and basements.									
Ellis County	6	1450CST	Short	Narrow	0	0	0	0	Tornado (F1)
A small tornado touched down briefly 3 miles north of Hays.									
Ellis County	6	Evening			0	0	5	0	Rain
Thunderstorms dropped 2 to 5 inches of rain in and around Hays. Streets and a number of basements were flooded. Some 20 homes and a number of vehicles sustained damage from the high water.									
Sedgwick and Cowley Counties	11	1630-1830CST			0	0*	5	5	Wind, Hail
A line of thunderstorms accompanied by strong winds crossed Sedgwick and Cowley Counties. Trees, utility poles, and crops sustained damage. A wind gust of 53 MPH was measured at the Wichita Airport at 1700CST and 3/4 inch hail fell the east side of Wichita at 1742CST. *Ten people were injured in more than 20 auto accidents caused by near zero visibility in blowing dust when the storms crossed Sedgwick County.									
Southwest Osborne County	24	1800-1930CST	20	20 mi.	0	0	0	5	Rain
Thunderstorms dropped 2 to 6 inches of rain in southwest Osborne County. Erosion from the runoff washed out 18,000 recently seeded acres.									
SPECIAL HAIL SUMMARY									
Kansas-Oklahoma Hail Loss Service reports indicate hail was especially damaging to crops on the following dates in the listed counties.									
3 Grant, Haskell, Kearney, Meade									
10 Sheridan									
11 Sheridan									
15 KENTUCKY — NONE REPORTED									

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS: KILLED	NO. OF PERSONS: INJURED	ESTIMATED† DAMAGE: PROPERTY	ESTIMATED† DAMAGE: CROPS	CHARACTER OF STORM
16 LOUISIANA									
Caddo and Bossier Parishes	01	1400 CST			0	0	2	0	Heavy Rain
Three to four feet of water on some roads in Shreveport occurred when Gilmer Bayou flooded the area caused by heavy rains. A mobile home park was flooded with water in two of the homes.									
Hammond, Tangipahoa Parish	03	1400 CST			0	0	2	0	Lightning
Lightning struck a feeder box causing electrical power outage for about 3,000 customers.									
Kenner, Jefferson Parish	03	1420 CST	short	3	0	0	1	0	Tornado (F0)
A tornado touched down briefly uprooting a large tree that fell on a fence.									
Jefferson, Orleans, & St. Bernard Pars.	03	1500 CST			0	0	3	0	TSTM winds/Lgtng
Winds tore down power lines and broke tree limbs that snapped transmission lines, lightning struck transformer boxes that caused power outage for more than 11 hours in Metairie, Kenner, Algiers, and in St. Bernard Parish. Lightning also struck a Hammond home in Tangipahoa Parish causing a minor fire.									
Zachary, East Baton Rouge Parish	12	1800 CST			0	0	3	?	TSTM winds/Lgtng Heavy rains
Urban street flooding and power lines were downed as a severe thunderstorm swept through East Baton Rouge Parish. Zachary Elementary School had a small fire caused by lightning.									
St. Bernard Parish	13	1600 CST			1	0	0	0	Lightning
A Chalmete man was killed when lightning struck him while he was jogging along the Mississippi River Levee.									
Monroe, Ouachita Parish	14	1400 CST			0	0	2	0	Lightning
A small wood frame work shop was struck by lightning resulting in minor damage.									
Bogalusa, Washington Parish	14	1500 CST			0	0	3	0	TSTM winds
Thunderstorm winds blew down a large tree which fell on a home damaging its roof.									
17 MAINE									
York County	22	1600-1700EST			0	0	4	0	Lightning, Winds
A line of thunderstorms swept through the County with lightning touching off a fire which destroyed a barn and part of a house in North Shapleigh. High winds downed trees and powerlines. Hardest hit was the Kennebunk-Kennebunkport area where several hundred residents were powerless for 4 hours.									
18 MARYLAND and D.C.									
Allegany County	1-2				0	0	5	3	Rain
Heavy rain over a period of two days culminated in several incidences of flooded homes and businesses with damage or loss to property and food stuffs. Observer at Cumberland reported a rain total of 4.5 inches. Some streets were flooded in Cumberland... and an earth slide collapsed a basement wall of a home in Cresaptown. Damage in the county expected to total over $50,000.									
Crisfield Area	8	1800EST	1	60	0	0	4	0	Tornado (F1)
Apparently formed over water and moved inland in a generally west-to-east direction through the Jacksonville section, on the outskirts of Crisfield. Several residences were damaged, including a mobile home that was knocked off its foundation. In addition, a poultry house had a 20-foot swath cut through it, with loss of 300 4-week-old chickens. Total damage estimated at near $40,000.									
Perry Hall	22	nr 1800EST			0	1	0	0	Lightning
11-year-old boy apparently struck while leaving soccer field, unknown to others. His mother found him lying unconscious on the field and she, along with three men, administered CPR. He was gradually improving after being in critical condition for several days.									
Carroll County	27	1700EST			0	0	4	0	Wind
Heavy thunderstorm activity accompanied a cold frontal passage, with winds estimated to around 60 mph. Two county maintenance barns near the Hashawha Environmental Center were damaged, and an unoccupied house had its porch taken off. Many downed trees blocked roads in the Hampstead-Manchester area. Damage total expected to be between $5,000 and $10,000.									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
19 MASSACHUSETTS									
Sturbridge	8	2300 EST			0	0	5	0	High Wind
	High wind described as a roar knocked down about one hundred large trees, many of which damaged house roofs. No lightning was reported.								
Worcester	12	1530 EST			0	2	0	0	Lightning
	Two boys sustained foot burns when lighting struck a nearby tree in the cemetary which they were running across.								
Norton	12	1730 EST			0	0	4	0	Lightning
	A barn was struck and burned.								
Statewide	14	1700-1800 EST			0	0	5	0	Lightning and High Wind
	In Millis many trees fell onto houses. A church steeple and three houses were struck resulting in small fires. In nahant a house was hit and its second floor burned, and in Northborough a large garage was destroyed. In Oxford, lightning blasted a hole in a house roof and the corner of a bedroom wall was blown out. Also a well and television set were hit. In Scituate three houses sustained minor fires due to lightning, and in West Boylston the police station radio antenna was destroyed. In Westwood many large trees were blown down onto houses.								
Clinton	22	1700 EST			0	0	2	0	Lightning
	Lightning traveled through electrical wires and set a kitchen stove on fire.								
20 MICHIGAN									
East of a line thru Hillsdale & Bay City	03- 04	all night			0	0	6	C	Flash Floods
	Heavy thundershowers moved slowly through the area. Rainfall amounts generally 2-4 inches, with many locally larger amounts. Heaviest over Lenawee County with up to 12 inches just south of Jasper. Another area of 6 inches or more over northwestern Sanilac and northeastern Tuscola Counties. Severe flash flooding, with many roads and bridges washed out, some buildings and many automobiles damaged in Lenawee and southwestern Washtenaw Counties. Similar flooding with less damage in upper portion of Cass River basin. Local urban flooding in Ann Arbor and in suburbs of Detroit and Flint. Serious flooding on the mainstream of the River Raisin, and significant flooding on the Cass River followed. Damages along the Raisin, mostly near Blissfield and Dundee, totalled $2.7 million.								
Sawyer AFB, Marquette County	11	1350 EST				Several			Lightning
Just NW of Gwinn, Marquette County	11	1337 EST							Funnel Cloud
	Reported by Gwinn Police.								
Perronville, Menominee County	11	1449 EST							Hail
	Hailstones 1 3/4". Reported by Public and Michigan State Police.								
18 miles S. Escanaba, Delta County	11	1529 EST							Hail
	Hailstones 1 3/4". Reported by Michigan State Police.								
Presque Isle, Presque Isle County	11	1735 EST							Hail
	Hailstones 1 3/4".								
West Arm of Grand Traverse Bay	13	1048 EST							Funnel Clouds
15 mi. E Monroe, Lake Erie Co.	16	0920 EST							Funnel Cloud
West End of Lake Erie	16	Noon EST							Funnel Clouds
Tuscola County	26- 27	Overnight			2	5	C		Flash Floods
	Two persons injured when car dropped into washed out section of water covered road 6 W Caro. Many road washouts and minor damage to structures. Unharvested portion of bean, beet, and potato crop ruined.								
Entire State	27	All day			2		6		Wind
	Two men swept off breakwater at St. Joseph by high waves, and drowned. Widespread tree and minor structural damage, and power outages. Thirteen ships went to anchor in the lee of Whitefish Point, four more off DeTour Passage. Mackinaw Bridge closed by overturned trailer. Three small boats torn from moorings near Petoskey, one at Grand Haven. Drifting sand closed road at Ludington.								
West Olive, Ottawa Co. to Hastings, Barry Co.	30	1920-2030 EST	53	8 mi.			6	C	Thunderstorm Gust
	Gust to 61 mph at Kent County Airport at 8.14. Gusts estimated 80 mph or more in center of track. Many buildings unroofed, trees and power lines down. Heaviest damage in southwest suburbs of Grand Rapids. Lightning listed below was from same thunderstorm. Heavy rain continued through the night and spread over southern Michigan, causing serious flooding which will be listed in October Storm Data.								
Kent City, Kent Co.	30	1930 EST					5		Lightning
House burned.									

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21 MINNESOTA ——— NONE REPORTED									
22 MISSISSIPPI									
3 SSW Red Banks (Marshall Co.)	13	1645CST	1	100	0	0	3	0	Tornado (F1)
	A small tornado touched down in this rural area about 7 miles WNW of Holly Springs. Damage was done to two houses and one metal storage shed, in addition to numerous trees. Two eyewitnesses reported seeing a funnel cloud with the storm. The thunderstorm which produced the tornado was also accompanied by high winds estimated at 50 mph, and hail between one-half and one inch in diameter. Damage due to the tornado was estimated at $4,000 not counting the trees.								
Pascagoula (Jackson Co.)	14	0620CST			1	0	0	0	Lightning
	A 27-year old man was killed by lightning at a Chevron Oil Company refinery work project as a work crew was gathering up equipment and preparing to leave the job site because of thunderstorms in the area.								
23 MISSOURI									
Macon County	14	1633CST			0	0	0	0	Large Hail
	Golf Ball size hail at La Plata								
24 MONTANA ——— NONE REPORTED									
25 NEBRASKA									
Kimball County	2	1420CST			0	0	0	0	Funnel Cloud
	A funnel cloud was reported 10 miles southwest of Bushnell.								
Lancaster County	24	1700CST			0	0	0	2	Hail
	Three quarter inch hail fell at Dorchester with only minor crop damage.								
Lancaster County	24	1800CST			0	0	4	2	Flash Flood
	Up to 6 inches of rain fell in southeast Lincoln between 6 PM and 9:30 PM. Many basements were flooded and damaged while some streets were under 4 feet of water.								
Lancaster County	24	1830CST			0	0	4	0	Lightning
	Fire started by lightning damaged a home in Lincoln.								
Loup County	25	2215CST			0	0	3	4	Hail
	One and a half inch hail fell in and around Taylor with some damage to crops and windows.								
Keya Paha County	25	2230CST			0	0	5	5	Damaging Winds and Hail
	One and a half inch hail fell 14 miles northwest of Springview damaging crops. Winds estimated to 50 m.p.h. at Springview down tree limbs. Power lines also down at Mills.								
Garfield County	25	2240CST			0	0	3	4	Hail
	One and a half inch hail fell at Burwell causing crop and some property damage.								
Boyd County	25	2330CST			0	0	5	5	Hail
	One and a half inch hail fell at Naper with damage to buildings, cars and crops.								
Antelope County	26	0040CST			0	0	5	4	Damaging Winds
	Thunderstorm winds destroyed a double wide mobile home 3 miles west of Clearwater. Power lines down in Clearwater. A transformer was damaged by lightning.								
Madison County	26	0045CST			0	0	4	4	Damaging Winds
	Thunderstorm winds gusting 50 to 60 m.p.h. caused damage at Battle Creek. Winds also gusted to 68 m.p.h. at the Norfolk airport.								
Wayne County	26	0100CST			0	0	4	3	Damaging Winds
	Thunderstorm winds down trees and power lines along with damaging crops in western Wayne County.								
Dakota County	26	0200CST			0	1	5	3	Damaging Winds
	High thunderstorm winds damaged 8 mobile homes at South Sioux City totally destroying one. One woman received minor injuries. Trees and power lines were down.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

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26 NEVADA									
Boulder City and nearby Lake Mead	4	1400 PST			0	0	5	4	Thunderstorms
Local flash flooding and damaging winds to marinas									
27 NEW HAMPSHIRE									
Statewide	8-9	2200-2300EST			0	0	4	0	Heavy Rain, Winds
Heavy showers and thunderstorms moved across the State with many rainfall reports between one and one and one-half inches. Most of it fell in a 3 to 4 hour period. Winds gusted to 33 miles per hour at Concord. Several trees fell in Hudson, damaging a garage.									
28 NEW JERSEY ——— NONE REPORTED									
29 NEW MEXICO									
Eddy County near Roswell	15	1315MST	0	0	0	0	0	0	Hail
Hail one inch in diameter was reported by the public to the Roswell Weather Service Office.									
30 NEW YORK, Coastal ——— NONE REPORTED									
30 NEW YORK, Central ——— NONE REPORTED									
30 NEW YORK, Western									
Rush and Henrietta, Monroe County	8	1300 EST	2	100	0	0	3	0	Tornado (F1)
A small tornado touched down in Northeast Rush and moved northeast to Southeast Henrietta. The tornado occurred in open country. A home nearby was slightly damaged.									
Fulton, Oswego County	8	1400 EST	?	?	0	0	3	0	Tornado (F1)
A small tornado briefly touched down in Fulton and destroyed a barn.									
Monroe, Genesee and Orleans Counties	-	-	-	-	-	-	-	-	Rain
September, 1981 was an unusually rainy month. Rain was observed in 23 out of 30 days. Rainfall amounts of 2 to 3 inches above normal were recorded. Farmers complained of unharvested beans sprouting in their pods. Corn, cabbages, potatoes, tomatoes, cauliflowers, cucumbers and other crops rotted. Harvesting machines could not be used because they could not move in deep mud.									
31 NORTH CAROLINA									
2N GARYSBURG NORTHAMPTON CO.	15	1700EST	1.25	100	0	0	5	0	Tornado (F2)
A tornado touched down 1/2 mile east of US 301 2 miles north of Garysburg, N.C. and travelled northeast for a mile and a half before lifting. A two-story frame farmhouse was lifted off the ground and moved 12 feet. The house sustained only minor damage. As the tornado moved northeast the backporch of another house was destroyed and an unoccupied mobile home was also destroyed. Further along the path a garage was destroyed with its contents untouched. Before the tornado lifted it blew off a portion of another house's roof and destroyed the front porch. The tornado also sheared off and uprooted several trees. One of the trees fell on an automobile. Eyewitness reported a corn combine being lifted up in the air and carried for quite a distance, while the combine was turning "like a top".								
32 NORTH DAKOTA									
Washburn (McLean County)	25	1915CST			0	0	4	0	Thunderstorm Winds
Strong thunderstorm winds damaged several airport hangars and three planes; flipped a camper into a grain bin; and tore part of a roof off a shed.									
Turtle Lake (McLean County)	25	1920CST			0	0	4	3	Thunderstorm Winds
Strong thunderstorm winds lifted the roof off a barn; destroyed a metal utility shed and several trees; and damaged crops.									
33 OHIO									
Lucas County	3	1200-2000 EST			0	0	6	0	Heavy Rain
Thunderstorms and general rainfall of up to 6.5 inches fell. The rainfall caused considerable urban drainage and small stream flooding, especially in Toledo. Water was up to 7 feet deep in some portions of the city. The flooding caused evacuation of over 100 people and damaged about 7500 homes.									
Celina (Mercer County)	14	0630EST			0	2	4	0	Lightning
Lightning during a thunderstorm struck and injured two high school students who were studying under a tree waiting for a school bus.									
Cleveland (Cuyahoga County)	14	0910EST			0	0	4	0	High Winds
A thunderstorm crossed the county with gusty winds. Wind gusts of over 50 knots were reported at Cleveland Hopkins Airport. Some tree and structural damage was scattered throughout the city.									
34 OKLAHOMA									
Balko, Beaver County	3	1530CST			0	0	?	?	Wind
Wind near 100 miles an hour caused considerable damage. No estimates on dollar amounts of damage.									
Cherokee, Alfalfa County	11	1930CST	?	?	0	0	4	?	Tornado (F1)
A small tornado damaged a house and destroyed some outbuildings on a farm near Cherokee. No estimate on exact damages.									
Cherokee, Alfalfa County	11	2330CST			0	0	?	?	Flooding
Near 5 inches of rain caused some flooding in Cherokee, with at least a dozen people evacuated by the National Guard. Most of the people were able to return to their homes the next day.									
Kingfisher, Kingfisher County	12	0000CST			0	0	5	0	Lightning
The steeple on a landmark Church on the main street of Kingfisher burned after being struck by lightning.									
Antlers, Pushmataha County	13	1610CST	?	?	0	0	?	?	Tornado (F0)
A tornado touched down briefly uprooting a tree and doing some damage to a convenience store. No injuries reported and no estimate on damages.									
35 OREGON ——— NONE REPORTED									
36 PENNSYLVANIA, Eastern									
Lozerne County	14	1745 EST			0	1	0	0	Lightning
A man was injured by lightning while in the basement of his house.									
Felton, York County	23	1700 EST			0	0	4	0	Wind
Wind gusts accompanying a thunderstorm tore the roof off a mobile home and severely damaged the side walls. Although nobody was injured directly by the wind, one man suffered cuts on his feet from glass broken by the wind.									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED† DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
36 PENNSYLVANIA, Western									
Crawford County	01	1645EST	0	0	0	0	4	0	Tornado (F1)
	A small tornado tore off the front porch and partof the roof of a double-wide mobile home.								
Cambria County	02	evening	0	0	0	0	5	?	Heavy rain
	In 3 hours 5 1/2 inches of rain fell just west of Johnstown(Westmont). Over 150 homes were flooded and 300 people evacuated. Chunks of pavement were torn off streets. Numerous intersections were knee deep in water.								
Allegheny County	14	?	0	0	1	1	0	0	Lightning
	A man was standing under a tree during a thunderstorm when lightning hit the tree, then struck him and a friend. The man died, his friend was treated for head injuries.								
37 RHODE ISLAND ——— NONE REPORTED									
38 SOUTH CAROLINA									
Good Hope Community near Conway (Horry County)	12	PM			0	0	4	0	Thunderstorm
	A severe thunderstorm destroyed a large barn and caused other minor damage.								
39 SOUTH DAKOTA									
Mellette, Spink Co.	6	1355CST							Wind
	55-60 MPH winds estimated.								
Pierre, Stanley Co.	25	1835CST	Short		0	0	0	0	Tornado (F0)
	Tornado touched down briefly fourteen miles west of Pierre. No injuries or damage reported.								
Tyndall, Bon Homme Co.	26	0045CST			0	0	0	0	Winds
	Winds were estimated at 60 MPH six miles west of Tyndall.								
Vermillion, Clay Co.	26	0210CST	Short		0	0	4	0	Tornado (F2)
	Tornado touched down several times east of Vermillion. Two barns were damaged.								
40 TENNESSEE ——— NONE REPORTED									
41 TEXAS, Northern									
Shelby County	1	Morning			0	0	4	?	Flash Flood
Nacogdoches County					0	0	4	?	Flash Flood
Angelina County					0	0	4	?	Flash Flood
Rusk County					0	0	4	?	Flash Flood
Panola County					0	0	?	?	Flash Flood
Harrison County					0	0	?	?	Flash Flood
	General rains of 2 to 4 inches from before daybreak until about noon occurred in the above counties. The heaviest rains, generally from 5 to 8 inches, fell in Shelby, southeastern Panola, northern Nacogdoches, and southeastern Rusk County. Over 11 inches were reported in northern Nacogdoches County at Appleby while 14.20 fell at Concord in southeastern Rusk County. Flash flooding was general in the 6 county areas, with considerable bridge and road damage occurring in Nacogdoches, Rusk, Shelby, and Panola Counties.								
Swift, Nacogdoches County	1	0600CST			0	1	0	0	Lightning
	A 14 year-old girl was injured by lightning inside her Swift home. The girl was touching a metal doorknob as lightning struck the home. She was taken to a local hospital where her condition was reported as being stable.								
Tarrant County	1	0900CST			0	2	4	0	Wind and Rainstorm
					0	0	4	0	Flash Flood
					0	0	5	0	Lightning
	Heavy thunderstorms resulted in 2 to 3 inches of rain within about one hour, with the heaviest rains in eastern Tarrant County. Heavy rains combined with the force of 45 mph winds to collapse the roof of a large hardware store in Hurst. Two employees were injured by the collapsed roof. Flash flooding damaged several mobile homes near Hurst and lightning caused a $300,000 fire which destroyed 24 units of a southwest Arlington apartment complex.								

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS		ESTIMATED† DAMAGE		CHARACTER OF STORM
					KILLED	INJURED	PROPERTY	CROPS	
TEXAS, Northern									
Waxahachie, Ellis County	1	0900CST-1100CST			0	0	?	?	Flash Flood
	About 2 inches of rain within one hour caused minor flash flooding in Waxahachie. A number of automobiles were damaged by street flooding.								
Dallas County	1	0900CST-1000CST			0	0	4	0	Lightning
	A lightning caused electrical power surge resulted in an explosion and heavy damage at a Grand Prairie store. Lightning also struck and damaged two residences in Grand Prairie and one additional house in Garland.								
Smith and Gregg Counties	1	1000CST-NOON			0	0	?	?	Flash Flooding
	Heavy rains resulted in minor flash flood damage to streets and automobiles in Tyler (Smith County) and Kilgore (Gregg County). Over 4 inches of rain fell during the late morning in Tyler. Over 3.5 inches of rain fell within 30 minutes at Owentown, also in Smith County.								
Adamsville, Lampasas County	1	1330CST			0	0	?	?	Windstorm
	Thunderstorm gusts of 50 to 60 mph were reported at Adamsville.								
Sherman, Grayson County	1	1334CST			0	0	0	0	Funnel Cloud
Bell County	1	1530CST			0	0	?	?	Flash Flood
					0	0	?	?	Windstorm
	Thunderstorm winds resulted in minor damage to trees and powerlines in the Killeen and Stillhouse Hollow Lake areas. Minor flash flooding along Nolan Creek damaged several roads. From 1 to 4 inches of rain occurred across the county.								
Lufkin, Angelina County	4	Afternoon			0	0	4	0	Rainstorm
	After a week of heavy rainfall, additional heavy thunderstorms on the 4th collapsed the roof of a funeral home in Lufkin. Minor flooding from the same storm stalled cars on several roads in southeastern Lufkin.								
Whitewright area, Grayson County	13	1740CST			0	4	5	?	Windstorm
	An intense thunderstorm with winds of at least 60 mph moved through the Whitewright area. Several mobile homes were demolished at a mobile home park in northwestern Whitewright. Four occupants of one of the mobile homes were injured when the trailer was flattened by the windstorm. Elsewhere, minor damage occurred in and south of Whitewright and in the Whitesboro area.								
Trenton area, southern Fannin County	13	1800CST			0	0	4	?	Windstorm
	Strong thunderstorm winds damaged outbuildings, signs, trees and powerlines in and near Trenton.								
Roxton area, southwestern Lamar County	13	2005CST			0	0	?	?	Windstorm
	Trees were uprooted by 60-70 mph thunderstorm winds in the Roxton area. One tree fell on and damaged several parked automobiles.								
Granbury, Hood County	14	0645CST			0	0	4	0	Lightning
	Lightning struck and destroyed three $7,000 transformers in Granbury.								
NW of Center, Shelby County	14	Morning			0	0	?	?	Windstorm
	Thunderstorm winds damaged powerlines several miles northwest of Center, sometime before 8 A.M.								
Abilene, Taylor County	14	1445CST			0	0	?	?	Hail and Rainstorm
	One inch diameter hail produced spotty damage as a severe thunderstorm moved across western Abilene. Heavy rainfall resulted in urban flooding and minor automobile damage.								
Rising Star, Eastland County	14	1525CST			0	0	?	?	Hail and Rainstorm
	Fifty MPH winds and one inch hail buffeted the Rising Star area, resulting in unknown damages.								
Clyde, Callahan County	14	Afternoon			0	0	?	?	Lightning
	Lightning struck the roof of the Clyde High School football clubhouse, knocking a large hole in it.								
Brady area, McCulloch County	14	1732CST-1800CST			0	0	?	?	Windstorm and Flash Flooding
	Thunderstorm winds to 60 MPH caused minor damage in the Lake Brady area. Heavy rains produced minor flooding and light damage in the city of Brady.								
Goldwaite, Mills County	14	Evening			0	0	?	?	Lightning
	Lightning fractured the concrete slab foundation in a Goldwaite home. The lightning narrowly missed the two residents, who were inside the house during the strike.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM

41 TEXAS, Southern

Lavaca Co.	1	Morning			0	0	?	?	Heavy Rain
	A slow moving cluster of thunderstorms dropped heavy rains over northern Lavaca Co. causing flooding of low areas and small creeks by 7:30 am CST. Heaviest rains fell from Shiner to Hallettsville with Hallettsville receiving 2.35 inches by 7 am and nearly 4 inches by 9 am. The Lavaca River was already in record flood and creeks were still running high from the torrential rains over this same area the previous two days, thus allowing this morning's rainstorms to create sudden flooding and reflooding of roadways and creeks. Any property damages by this storm were eclipsed by the previous flood Aug. 31.								
Fayette Co.	1	Morning			0	0	?	?	Heavy Rain
	Thunderstorms dropped a sudden 2 to 3 inches of rain over southern Fayette Co. bringing already high creeks into resurgence by 8 am CST. This same area was super wet and just recovering from some 8 to 15 inches of rain 24 to 36 hours earlier. No new damages were reported.								
Fayette Co.	1	Evening			0	0	?	?	Heavy Rain
	Again intense downpours hit this county causing flooding of low areas and sending small creeks on sudden rises over banks. After near record rains less than 48 hours earlier and other thunderstorms the morning of Sep. 1, creeks were running high and ground was extremely wet. Storms along a southward moving cold front dropped rains this evening causing flash flooding to return by 7 pm CST. Damages were unknown but substantially less than caused by the Aug 31 flooding. Road closures on this evening included FM Roads 130, 155, 159, and 609.								
DeWitt Co.	1	Evening			0	0	?	?	Heavy Rain
Lavaca Co.	1	Evening			0	0	?	?	Heavy Rain
	The Guadalupe, Lavaca, and Navidad Rivers were already in record or near-record flood through these counties due to torrential rains of Aug. 30-31. Morning storms on Sep. 1 also caused renewed rises on creeks in Lavaca Co. Then thunderstorms on a southward moving cold front dropped brief downpours over these two water-logged counties. Sudden flood- of low areas returned as well as renewed surges over banks of many creeks and enhanced flooding already in progress on the rivers and lower stretches of major creeks. Additional damages from this rain were ill-defined.								
Karnes Co.	1	Night			0	0	°5	C	Heavy Rain
Atascosa Co.	1	Night			0	0	?	?	Heavy Rain
	A cluster of thunderstorms along a slow moving cold front drifted southward and dropped intense rains over these two counties. Ground was saturated and creeks still high from tropical depression rainstorms up to 16 inches in Karnes Co. Aug. 30-31. Storms on this evening became nearly stationary from southeast Atascosa Co. across northern Karnes Co. and began causing flash flooding on creeks in those areas by 9:30 to 10 pm CST. The upper segment of Ecleto Creek surged well out of banks in Karnes Co., over washing the bridge on Hwy 80, and pushing several cars off the roadway. FM Road 81 between Panna Maria and Helena was also closed by high water. Other small creeks and low areas in the two counties flooded. Damages were considerably less than the flood 48 hours earlier.								
Harris Co.	2	1045CST							Funnel Cloud
	The funnel, which apparently did not touch ground, passed near the Hockley community in association with moderate thundershowers.								
Orange Co.	2	1230CST			0	0	4	0	Lightning
	Lightning struck an apartment building in the city of Orange, knocked a hole in the roof, and ignited a fire. Numerous electical appliances in the apartment units were damaged.								
Chambers Co. (Mont Belvieu)	2	1503CST	Short	Narrow	0	0	4	0	Tornado (F1)
	A tornado, generated by a heavy thundershower, skipped northeastward for a very short distance on the ground through Mont Belvieu. At 3:03 pm CST the small twister hit two houses in the Cherry Point subdivision peeling off roofing and breaking windows. The mini-funnel, similar to those that frequently form in this area but seldom touch ground, lifted and headed over marshlands of adjacent Liberty Co. but apparently did not touch ground again.								
Atascosa Co.	2	1945CST			0	0	?	?	Wind
Frio Co.	2	2000CST			0	0	?	?	Wind
Bexar Co.	2	2100CST			0	0	?	?	Wind
	A severe thunderstorm cell developed over the Frio-Atascosa county line area and moved northward into extreme south Bexar Co. before weakening. Along its path strong wind gusts reportedly blew down trees and caused superficial damages to some buildings through the rural areas.								
Uvalde Co.	2	2000CST			0	0	?	?	Wind
Medina Co.	2	2030CST			0	0	?	?	Wind
Bandera Co.	2	2110CST			0	0	?	?	Wind
	A severe thunderstorm developed in eastern Uvalde Co. east of the city of Uvalde then moved northeastward through Medina Co. and into southern Bandera Co. Passing over rural areas, the storm produced localized wind gusts which downed trees and utility lines and caused some minor damage to outbuildings.								

TEXAS, Southern

LaSalle Co.	2	2215CST			0	0	4	?	Wind
	A thunderstorm began intensifying near the town of Encinal about 10:15 pm CST and produced strong wind gusts as it moved northeastward through ranch and brushlands of central LaSalle Co. The storm passed southeast of Cotulla. Extent of damages was minor, mainly to outbuildings and utility poles.								
Burnet Co.	3	Early morning			0	0	5	4	Heavy Rain
Williamson Co.	3	Early morning			0	0	6	6	Heavy Rain
	Major flash flooding hit eastern Burnet and western Williamson Co. soon after 2 am CST. Very high flood crests moved rapidly downstream into central Williamson Co. on several creeks and on the San Gabriel River later in the morning. An upper air trough, advancing eastward over the area, had set off numerous thunderstorms in the warm, humid air of central and south Texas. One particular storm cell which intensified over the Burnet-Williamson county line area dropped unusually intense rainfall, however. Rain fell over this area mainly from 11 pm to 3 am CST with the greatest burst of rain hitting between 1 and 2 am. Measured storm rainfall totals included Bertram 10.40 inches; Oatmeal 6.0; Briggs 4.86; Burnet 4.20; and generally 6 to 8 inches north of Liberty Hill. Areas of central and east Williamson Co. received less than 2 inches of rain. Ground in the area was very wet and streams running above normal before this storm due to rains of previous days. The sudden runoff of this intense rain sent severe flash floods down Bear, Clear and Lackey Creeks which in turn fed a large rise on the North Fork of the San Gabriel River. Simultaneously a severe rise developed on the South Fork of the San Gabriel which was higher than the recent major flood of June 1981. Many small creeks and unnamed branches in central western Williamson and extreme eastern Burnet Counties overflowed banks. Burnet Co: Farm roads were overwashed by swift deep waters soon after 2 am in the area around Bertram. No injuries or serious damages were reported as headwaters of creeks in the area surged well out of banks and sent flood waters eastward into Williamson County. Williamson Co.: Damages to private property and to roads were estimated between 2 and 4 million dollars in the county with some $750,000 estimated loss to agricultural products, mainly livestock. Worst flood damages in the county were in Liberty Hill along the South Fork of the San Gabriel River, in several subdivisions along the North Fork and along Bear Creek, and in the Rock House community. Altogether some 2 dozen mobile homes were damaged, about 10 were destroyed or washed downstream, one frame house was dislodged from its foundation and washed down the North Fork, and numerous automobiles were damaged or washed away. Nearly 100 persons evacuated just ahead of the advancing flash floods in darkness, while some 10 to 15 persons safely sought refuge on rooftops of frame buildings during the night. At the Rock House community water levels from the North Fork reached ceiling height depth. On the South Fork in Liberty Hill and along Hwy 183 on the North Fork mobile home parks were badly damaged. Several narrow escapes were reported in those areas and some residents were rescued from the water by helicopter after sunrise. Flood waters on the North Fork filled Lake Georgetown to more than 15 feet over normal level in a few hours. When the flood crest on the South Fork arrived in Georgetown, it sent a surge flowing upstream on the North Fork for some distance and flooded city parks and roads. Agricultural losses included many miles of fencing, 50 head of cattle, and some 200 head of goats.								
Travis Co.	3	Morning			0	0	?	?	Heavy Rain
Hays Co.	3	Morning			0	0	?	?	Heavy Rain
	Heavy thunderstorm rains moved slowly eastward over these two counties between 4 and 6 am CST dropping some 2 inches of rain. Swift water covered many Austin streets at morning rush hour. Some sudden, slight overbank rises were noted on creeks in the two counties. No serious property damage was reported, however.								
Lavaca Co.	3	Morning			0	0	?	?	Heavy Rain
DeWitt Co.	3	Morning			0	0	?	?	Heavy Rain
	A short line of very intense rainstorms stretched from Cuero to Hallettsville and caused flash flooding on creeks by 5:30 am CST. The countryside was extremely wet from record rains of Aug.30-31 and recurring rains on Sep. 1. No serious damages were reported although water briefly covered low water-crossings on highways.								
Jackson Co.	3	Morning			0	1	4	?	Heavy Rain
	The Navidad and Lavaca Rivers were already high in the county due to upstream rains several days earlier. Early morning thunderstorms on Sep. 3 filled low areas and creeks. Backwater flooding from the rivers inhibited normal drainage near headwaters of small creeks. On FM Road 530 north of Edna a truck stalled in high waters. One driver was injured when swept into a fence by the swift current as he evacuated the stalled truck.								
Nueces Co.	3	0745CST							Funnel Clouds
	Several funnel clouds were generated by developing coastal showers in southeast Nueces Co. None touched ground.								

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS KILLED	NO. OF PERSONS INJURED	ESTIMATED† DAMAGE PROPERTY	ESTIMATED† DAMAGE CROPS	CHARACTER OF STORM
TEXAS, Southern									
Montgomery Co.	3	1445CST			0	0	5	0	Lightning
A two-story house was destroyed by fire which resulted when lightning struck an adjacent tall tree and bolted onto the house. The incident occurred in the Lakeland subdivision near Conroe.									
Orange Co.	3	1530CST			0	0	5	0	Lightning
Thunderstorms produced unusually frequent lightning strikes over the city of Orange. Widespread damage to utility transformers and lines was reported. The Stark Museum suffered some lightning damage while area residents reported cases of damaged electrical appliances. There were no known injuries. More than 2 inches of rain fell with the electrical storm in about an hour and caused serious street flooding.									
Travis Co.	3	1620CST			0	0	4	0	Wind
A severe thunderstorm developed over south Travis Co. and produced damaging wind gusts around the Creedmore area. One mobile home was completely destroyed by the downburst winds. The home, in a rural area on Old Lockhart Highway, was carried several hundred yards through fields and shattered. Owners were not home at the time. Roof damage also occurred to nearby frame buildings.									
Jefferson Co.	4	0830CST							Funnel Clouds
Area residents and Port Arthur police spotted an unusually large funnel cloud as it passed over the Port Arthur area near a developing thunderstorm. Beginning near FM Road 365 and West Port Arthur Road, the funnel drifted toward the city but did not touch ground. Another large funnel formed separately near Groves a short while later.									
Aransas Co.	7	0830CST							Funnel Cloud
A funnel passed a few miles north of Rockport along the bayshore. It did not touch ground.									
Bexar Co.	8	0600CST			1	0	4	0	Lightning
A 23-year old man was killed by lightning while riding a motorcycle on Interstate Highway 35 through Live Oak. A witness said the lightning appeared to hit the road surface and then spread outward to hit the cyclist. The driver of car immediatly behind the motorcycle was not affected by the bolt. Around the north side of the city of San Antonio the same storm damaged utility equipment and caused widespread power outages. Brief heavy rains with the storm flooded urban streets, stalled many vehicles,and damaged some during morning rush hour.									
Milam Co.	14	1300CST			0	0	3	3	Lightning
Lightning struck a barn just west of Cameron causing a fire which destroyed the barn and 100 bales of hay.									
Brazos Co.	14	Afternoon			0	0	?	?	Heavy Rain
Thunderstorms dropped heavy rains over the north half of Brazos Co. with rainfall totals reaching 5½ inches at Kurten and 3½ at Bryan. Small creeks and urban areas of Bryan and College Station experienced brief flooding. Rains hampered cotton harvest and in some fields damaged crop quality.									
Austin Co.	14	1400CST			0	0	4	0	Lightning
A mobile home located between Sealy and San Felipe caught fire and was destroyed when struck by lightning.									
Milam Co.	14	2040CST			0	0	4	0	Lightning
Lightning struck a house in Milano touching off a fire which caused extensive damage.									
41 TEXAS, Western									
Dumas, Moore County	03	1745CST			0	0	0	0	Hail
Hail larger than marble size 8 to 11 miles east of Dumas. No damage reported.									
Stanton, Martin County	04	1300CST			0	0	0	0	Tornado (F0)
Two funnel clouds 4 miles west and 1 mile north of Stanton sighted by DPS. One touched down. No damage reports received.									
Seminole, Gaines County	04	1352CST			0	0	0	0	Tornado (F0)
Tornado in open country 9 miles north of Seminole. No damage.									
Amarillo, Potter, Randall Counties	04-06	Began the 4th			0	0	5	0	Flood
Frequent rains, occasionally heavy, accumulated in a relatively small area of Amarillo causing considerable floods and forcing the Governor of Texas to declare this area a disaster area. No casualities but there was considerable damage in the thousands (possibly the millions) of dollars due to the penetration of water into many buildings and homes.									
TEXAS, Western									
Summerfield, Castro County	13	1440CST			0	0	0	0	Tornado (F0)
Tornado near Summerfield reported by Sheriff. No damage reported.									
Lockney, Floyd County	13	1725CST			0	0	0	0	Hail
Lockney received 1-inch hail. No damage reported.									
Wheeler, Wheeler County	13	2030CST			0	0	0	0	Hail
One and one-half inch hail at Wheeler. No damage reported.									
Pampa, Gray County	13	2300CST			0	0	0	0	Funnel
Funnel cloud just west of Pampa.									
San Angelo, Tom Green County	14	1520CST			0	0	4	0	Wind
Wind to 76 mph in San Angelo damaged several aircraft and a small trailer. Minor damage reported.									
Lubbock, Crosby, Dickens Counties	24	Afternoon			0	0	5	0	Wind, Hail
A cluster of thunderstorms, dropping small to large hail and wind estimated 90 to 100 mph, devastated the cotton crop (and other crops) in a 6 mile wide area from Lubbock County across Crosby County to below the Caprock in Dickens County. Many thousands of acres of crops were damaged, but no estimate of losses given. The damage was listed as light to very heavy with total losses in thousands of acres.									
Dumont, King County	24	1703CST			0	0	2	0	Tornado (F0)
Tornado near Dumont caused minor damage.									
Lubbock, Lubbock County	24	1735CST			0	0	2	0	Hail
Golf ball-sized hail south Lubbock with light damage.									
Guthrie, King County	25	2210CST			0	0	0	0	Hail
Hail near 1 inch in Guthrie. No damage reported.									
42 UTAH									
Levan Juab County	7	Evening			0	0	4	3	Heavy Rain
A flash flood occurred in the vicinity of Levan at Chicken and Pidgen Creeks. The flooding caused considerable damage to the stream channel and an adjacent concrete ditch. In addition to these 10 acres of windrowed hay and 3 acres of standing hay were also damaged.									
43 VERMONT — NONE REPORTED									
44 VIRGINIA									
Roanoke County	3-4				0	0	4	3	Rain
A series of slow-moving thunderstorms concentrated heavy rain over the southern portion of the county during the evening of the 3rd into the morning of the 4th. Over 3 inches of rain was recorded at Woodrum Field Weather Service Office, Roanoke...while as much as 6 inches was reported at Cave Spring, on the southwest edge of Roanoke. Many residences had flooded basements, while some mudslides occurred on Garst Mill Road and Old Starkey Road. Damage expected to range between $5,000 and $10,000.									
Virginia Beach	6	All Day			0	0	0	0	Dangerous Riptides
Treacherous riptides were attributed to Tropical Storm "Emily", although the center of the storm was well out to sea. More than 30 persons had to be rescued, prompting the closing of the beach to swimmers.									
Nelson County	6-7				0	0	0	0	Rain
Heavy downpours, during the night of the 6th to the early morning of the 7th, brought a reported 5 inches of rain in one section of the county. Dry ground soaked up most of the precipitation, with only some minor creek flooding occurring.									
Southeastern	15	1830-2200EST			0	0	4	0	Lightning, Wind
Two homes struck by lightning...one at Buckroe had minor damage to roof and attic beams...the other, at Smithfield, was heavily damaged when the resulting fire burned the roof and second floor. Some 14,500 homes were without electricity for a time. Total damage: near $50,000.									

STORM DATA AND UNUSUAL WEATHER PHENOMENA

PLACE	DATE	TIME - LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	NO. OF PERSONS: KILLED	NO. OF PERSONS: INJURED	ESTIMATED† DAMAGE: PROPERTY	ESTIMATED† DAMAGE: CROPS	CHARACTER OF STORM

VIRGINIA

Newport News Area	16	1100-1300EST			0	6	4	0	Wind, Rain

Woman injured when lightning struck a store window that she was standing near. In nearby Grafton, a woman and 4 children escaped serious injury when a large tree fell on..and demolished..the small auto they were in. Over 3.5 inches of rain measured at the Newport News, mainly between 12 noon and 1 P.M. Estimated damage near $10,000.

45 WASHINGTON

Pierce County	24	1045PST			0	0	0	0	Tornado (FO)

A tornado touched down one mile south of Gray Field south of Tacoma. The tornado lifted back into the clouds immediately after touching ground.

46 WEST VIRGINIA — NONE REPORTED

47 WISCONSIN — NONE REPORTED

48 WYOMING

Pine Bluffs, Laramie County	02	1215MST	4	?	0	0	0	0	Tornado (FO)

Tornado reported by the public 2 miles south and 7 west of Pine Bluffs. Radar indicated a line of heavy thunderstorms from Egbert, Wyoming, to 10 miles north of Kimball, Nebraska. Line of thunderstorms was nearly stationary. Cells moved east at 12 mph. Tornado moved southeast at 10 mph in open country. No reported damage.

Carpenter, Laramie County	04	1830MST	?	?	0	0	0	?	Hail

Goose egg size hail and heavy rain 2 miles east of Carpenter.

Manville, Niobrara County	04	afternoon	0	0	0	0	?	0	Electrical

Lightning strike caused an oat granary to burn north of Manville.

Hams Fork, Lincoln County	04	?	0	0	0	0	?	0	Electrical

One horse killed by lightning on Hams Fork north of Kemmerer.

Laramie, Albany County	14	1435MST to 1700	0	0	0	0	?	0	Electrical

Repeated lightning strikes caused damage to Pacific Power and Light Company equipment causing extensive power outages. Minor flooding also caused by heavy rains from slow moving storms. Seven-tenths of an inch of rain recorded east of Laramie.

Cheyenne, Laramie County	24	1400MST to 1500	0	0	0	0	?	0	Electrical, wind

Widely scattered thunderstorms in southeast. Up to 50 mph wind gusts, marble size hail and heavy rain reported 8 miles west of Cheyenne. Lightning killed one horse at Vedawoo Park, 28 miles west of Cheyenne.

49 ALASKA — NONE REPORTED

50 HAWAII — NONE REPORTED

51 PUERTO RICO

Guayanilla	25	1500-1800 AST			0	0	5	0	flash flood

Towards the end of the month there were a series of days with heavy thunderstorms over the western cordilleras with daily rainfall totals of 3 to 4 inches. On September 25 a slow moving thunderstorm dropped 5 to 6 inches of rain over the upper Guayanilla River basin during a period of about 3 to 4 hours. This amount, falling on saturated ground, brought a rapid rise in the Guayanilla River, which left its banks for about an hour down on the coastal plain where the river runs thru the town. About 2 feet of water entered a number of shops and small houses near the river's edge.

52 VIRGIN ISLANDS — NONE REPORTED

53 PACIFIC — NONE REPORTED

STORM SUMMARY

SEPTEMBER 1981

STATE	TORNADOES					HAILSTORMS				WINDSTORMS				LIGHTNING				@HEAVY SNOWSTORMS AND BLIZZARDS				# ICE STORMS				ϕ ALL OTHER			
	NUMBER	DAYS	DEATHS	INJURIES	† DAMAGE	DEATHS	INJURIES	†DAMAGE PROPERTY	†DAMAGE CROPS	DEATHS	INJURIES	†DAMAGE PROPERTY	†DAMAGE CROPS	DEATHS	INJURIES	†DAMAGE PROPERTY	†DAMAGE CROPS	DEATHS	INJURIES	†DAMAGE PROPERTY	†DAMAGE CROPS	DEATHS	INJURIES	†DAMAGE PROPERTY	†DAMAGE CROPS	DEATHS	INJURIES	†DAMAGE PROPERTY	†DAMAGE CROPS
Alabama												3				5													
Arizona	3	1			5											5											2	6	
Arkansas																4												?	
California																													
Colorado	1	1										2				3													
Connecticut												5				5													
Delaware																													
Florida	3	3			4							4		1		5													
Georgia																													
Idaho																													
Illinois																												4	3
Indiana												5																	
Iowa										1		5																	
Kansas	1	1							?			6	5			5												5	5
Kentucky																2													
Louisiana	1	1			1							3		1		3												2*	?
Maine																4													
Maryland & DC	1	1			4							4			1													5	3
Massachusetts												5			2	5													
Michigan										2		6	C		?	5											2	6	C
Minnesota																													
Mississippi	1	1			3									1															
Missouri																?	?												
Montana																													
Nebraska								5	6		1	6	4			4												4	2
Nevada												5	4															5	4
New Hampshire												4																	
New Jersey																													
New Mexico																													
New York	2	1			3																								5
North Carolina	1	1			5							5	3																
North Dakota												4			2	4												6	
Ohio	2	2			5							?	?			5												?	?
Oklahoma								?	?			?	?			?	?												
Oregon																													
Pennsylvania	1	1			4						1	4		1	2													5	?
Rhode Island																													
South Carolina												4																	
South Dakota	2	2			4																								
Tennessee																													
Texas	5	4			4			3	5		6	5	4	1	1	5	3										1	7	6
Utah																												4	3
Vermont																													
Virginia											5	4			1	4												4	3
Washington	1	1																											
West Virginia																													
Wisconsin																													
Wyoming	1	1							?							?													
Alaska																													
Hawaii																													
Pacific																													
Puerto Rico																												5	
Virgin Islands																													

TROPICAL STORM EMILY

31 August - 11 September

National Hurricane Center, NOAA
Miami, Florida

A dissipating frontal zone in the Atlantic off the southeast United States coast gradually developed into a low pressure system during the last few days of August. As the disturbance drifted eastward, satellite pictures indicated that cloudiness and shower activity was slowly becoming organized. It attained the status of a subtropical depression by 31 August then rapidly strengthened and developed the characteristics of a tropical storm on the first day of September.

Emily was a large system with a broad area of light winds and little convection around the center. An extensive belt of gale force winds extended as far as 400 miles to the north and more than 100 miles to the south of the center. The center passed near the island of Bermuda at 0600 GMT 2 September where the lowest pressure was 993 millibars and maximum sustained winds were only 20 to 25 knots at Kindley Naval Air Station. There were no reports of damage on the island.

Blocked temporarily by a large high pressure system passing north of the storm, Emily moved through a complete loop on the 3rd and 4th of September. The interaction of these two systems produced large swells over the western Atlantic and caused high tides with considerable beach erosion along the northeast and middle Atlantic United States coasts.

The first reconnaissance flight into Emily was on 4 September. The Air Force plane reported 65 to 70 knot winds and lowest sea level pressure near 970 millibars. Satellite intensity estimates suggest that Emily probably attained hurricane strength during the night of 3 September.

Emily began moving northeastward around 10 knots on 4 September as a weak upper level trough approached from the northwest. After passage of the trough the hurricane was again blocked by high pressure on 5 September. During this day reconnaissance aircraft and satellite data indicated that Emily reached maximum strength with hightest sustained winds 80 knots and lowest sea level pressure 966 millibars.

From 6 to 11 September, Emily moved on a slow northeast to east course, steered by weak upper level westerly winds associated with a major blocking pattern that had developed over the far north Atlantic Ocean during September. A gradual decrease in strength continued and Emily was downgraded to a tropical storm on 8 September. By 12 September the storm had degenerated to a broad low pressure area and was no longer an identifiable system.

PRELIMINARY BEST TRACK

TROPICAL STORM EMILY

31 August - 11 September 1981

National Hurricane Center, NOAA
Miami, Florida

DATE	TIME (GMT)	POSITION LATITUDE	POSITION LONGITUDE	PRESSURE (MB)	WIND (KT)	STAGE
8/31	1200	29.8	72.7	1008	30	Subtropical depression
	1800	29.9	71.2	1006	32	
9/01	0000	29.9	69.7	1004	35	Subtropical storm
	0600	30.1	68.4	1000	38	
	1200	30.4	67.3	996	40	Tropical storm
	1800	31.3	66.6	994	45	
9/02	0000	31.9	65.9	992	48	
	0600	32.6	65.1	990	50	
	1200	33.3	64.4	988	52	
	1800	34.1	64.1	986	54	
9/03	0000	35.0	64.0	984	56	
	0600	36.0	65.0	982	58	
	1200	35.0	65.8	980	60	
	1800	34.2	65.0	978	62	
9/04	0000	34.6	63.6	976	65	Hurricane
	0600	35.3	62.7	974	68	
	1200	36.2	61.9	972	70	
	1800	37.1	61.2	971	72	
9/05	0000	38.2	60.9	970	73	
	0600	38.6	60.8	968	74	
	1200	39.0	60.8	967	76	
	1800	39.4	59.9	966	78	
9/06	0000	39.9	59.0	967	80	
	0600	40.3	58.4	968	79	
	1200	40.8	58.0	970	78	
	1800	41.2	57.4	971	76	
9/07	0000	41.6	56.8	972	74	
	0600	41.9	55.9	974	70	
	1200	42.0	55.0	976	68	
	1800	42.3	54.1	978	65	
9/08	0000	42.7	53.4	982	62	Tropical storm
	0600	42.9	52.5	984	58	
	1200	42.2	51.9	986	56	
	1800	41.7	51.2	988	55	
9/09	0000	41.0	50.2	990	54	
	0600	40.9	49.1	991	52	
	1200	40.9	47.9	992	50	
	1800	41.0	46.9	993	48	
9/10	0000	41.2	45.9	995	45	
	0600	41.9	45.1	998	42	
	1200	42.5	44.8	1000	39	Tropical storm
	1800	42.7	44.0	1001	38	
9/11	0000	42.2	43.3	1002	37	
	0600	42.1	42.7	1004	36	
	1200	42.2	42.0	1005	35	
	1800	42.3	41.5	1007	33	Extratropical low
9/12	0000	42.7	41.0	1008	30	

*Maximum wind speeds and minimum sea level pressure interpolated from best fit curve to air craft observed or satellite derived values.

TROPICAL STORM FLOYD

03 - 12 September 1981

National Hurricane Center, NOAA
Miami, Florida

Floyd was the first of a series of four September hurricanes which followed similar tracks, curving northward out of the tropics through the western Atlantic and finally turning northeastward toward the Azores.

A tropical disturbance formed on an easterly wave about 250 miles east of Barbados on 31 August. The disturbance remained disorganized until 3 September when a weak circulation formed just to the east of the Leeward Islands. The newly-formed tropical depression moved up the island chain during the following twenty-four hours, causing heavy rains and gusty winds. The greatest rainfall amount noted from the regular reporting stations was 5.7 inches at Antigua, four inches of which fell during the six hours ending at 0000 GMT, 4 September.

Once the circulation cleared the islands, it gradually strengthened. The first reconnaissance flight into the system found that it had reached tropical storm intensity with winds of 35 knots and a central pressure of 1004 millibars at 1830 GMT, 4 September, about 130 miles east northeast of San Juan, Puerto Rico.

At the time Floyd became a tropical storm, it was centered 1100 miles due south of the center of Hurricane Emily. The large low pressure system associated with Emily dominated the western Atlantic and eroded the western periphery of the Atlantic high pressure ridge. As a result, Floyd recurved well to the east of the United States east coast. This general pattern was to be repeated three times as Hurricanes Gert, Harvey and Irene, each in turn, recurved under the influence of the trough left in the wake of the preceding storm.

Once Floyd became a tropical storm, it intensified at a fairly steady rate, reaching hurricane strength at 1800 GMT, 5 September, and attaining maximum strength thirty-six hours later. However, late on 7 September, satellite pictures indicated that strong wind shear over the hurricane swept away the convective overcast from the low level circulation center. This coincided with a period of rapid filling, as the central pressure rose about twenty millibars between 1800 GMT, 7 September and 0600 GMT, 8 September, including a rise of about fourteen millibars during the first six hours of the period. Reconnaissance measurements show a corresponding decrease in maximum winds, but this is less certain because of the difficulty in locating the zone of highest winds, especially at night. How quickly the wind field reacts to such a dramatic change in cloud character and rise in pressure is not certain.

The period of weakening, coinciding with a slight turn to the right, reduced the threat to Bermuda. During the afternoon of 8 September, the center passed a short distance to the southeast of the island, placing Bermuda in the weaker semicircle of the storm's circulation. Meanwhile, Floyd's maximum winds diminished below hurricane strength, decreasing about 40 knots from the 100 knot winds measured twenty-four hours earlier. The effects of Floyd in Bermuda apparently were minor.

After passing Bemuda, Floyd turned toward the east and its subsequent track was controlled by the large cyclonic circulation around the periphery of Hurricane Emily. Floyd accelerated eastward, outpacing the larger storm to the north, and gradually turned toward the northeast. Floyd lost identity northeast of the western Azores on 12 September.

Floyd attained its maximum strength at 1200 GMT, 7 September with winds of 100 knots and a central pressure of 975 millibars. No damages nor casualties were attributed to Floyd.

Although the simultaneous occurence of three named storms in the Atlantic is unusual, the coexistence of Emily, Floyd and Gert makes 1981 the second consecutive year that this has happened. In 1980, Earl, Frances and Georges were hurricanes simultaneously in the Atlantic - an even rarer event.

PRELIMINARY BEST TRACK

TROPICAL STORM FLOYD

03 - 12 September 1981

DAY	HOUR (GMT)	LATITUDE	LONGITUDE	MINIMUM PRESSURE (mbs)	MAXIMUM WIND (knots)	CATEGORY
03	12	16.2	60.3	1010	20	Trop. Dep.
	18	16.7	61.1	1010	20	
04	00	17.3	61.9	1009	20	
	06	18.0	62.6	1008	23	
	12	18.6	63.3	1006	28	
	18	19.0	64.0	1004	35	Trop. Storm
05	00	19.5	64.7	1002	43	
	06	20.1	65.5	1000	52	
	12	20.9	66.2	999	60	
	18	21.7	67.1	997	70	Hurricane
06	00	22.6	67.7	994	78	
	06	23.6	68.6	991	85	
	12	24.5	69.1	988	90	
	18	25.5	69.1	985	95	
07	00	26.4	69.1	981	98	
	06	27.5	68.9	978	100	
	12	28.4	68.5	975	100	
	18	29.3	67.8	975	100	
08	00	29.9	67.2	989	97	
	06	30.6	66.5	995	93	
	12	31.4	65.6	998	85	
	18	32.0	64.7	1003	60	Trop. Storm
09	00	32.9	63.0	1005	52	
	06	33.7	60.7	1007	46	
	12	34.2	58.5	1007	44	
	18	33.8	56.3	1007	41	
10	00	33.5	54.0	1007	40	
	06	33.6	51.3	1007	40	
	12	34.0	48.7	1008	40	
	18	34.0	46.4	1008	40	
11	00	33.8	44.1	1008	40	
	06	34.5	41.7	1008	40	
	12	35.5	39.7	1008	40	
	18	36.6	38.3	1008	40	
12	00	37.6	36.9	1009	39	
	06	39.0	35.2	1009	38	
	12	40.6	33.4	1009	35	

TROPICAL STORM GERT

07 - 15 September 1981

National Hurricane Center, NOAA
Miami, Florida

Gert was first detected on satellite pictures as an area of cloudiness moving off the African coast on 1 September. On 4 September, this cloudiness had become concentrated into a separate and distinct system moving westward about 15 kt. It also began to develop some low cloud banding structure, suggesting a low-level circulation. Based on satellite pictures, depression status is estimated to have been reached at 0000 GMT 7 September while the depression was centered about 40 n mi east of the Leeward Islands.

An Air Force reconnaissance plane investigated the depression late on 7 September, just before it passed through the Leeward Islands. The plane reported a 700-mb wind on 50 kt and an estimated surface wind of 35 kt, at a position about 100 n mi east of Guadeloupe, and this resulted in upgrading the depression to a tropical storm at 0000 GMT 8 September. The poorly-defined center moved across the Leewards between Dominica and Guadeloupe during the period 0000-0600 GMT on 8 September. However, no gale-force winds were reported by any of the island observing stations.

By 8 September, Gert had begun a turn toward the northwest, and the storm center, now better defined, moved across Puerto Rico between 1800 GMT 8 September and 0000 GMT 9 September. It is noted that the tracking and forecasting of this slowly developing storm was not sufficiently precise to provide timely notice that the storm center was passing directly across Puerto Rico. This is often the case with minimal tropical storms, where estimates of center locations are sometimes in error by as much as 60 n mi. It is also the case that the center of a weak tropical storm is rarely the most significant weather feature.

The intensity of the storm temporarily peaked at 50 kt (1002 mb central pressure) at 1200 GMT 8 September and a 24-h weakening trend began, just prior to the center crossing eastern Puerto Rico. A gust of 35 kt was reported at Isla Verde Airport near San Juan, along with a minimum pressure of 1004.4 mb. St. Thomas, in the U. S. Virgin Islands, reported a gust to 45 kt but, as was the case in the Leewards, there were no sustained winds of gale force. The highest reported rainfall was 5.85 inches in 24 h at St. Thomas. Elsewhere in Puerto Rico, the Virgin Islands and the Lesser Antilles, rainfall amounts were in the 1-4 inch range.

Gert continued northwestward, its center passing within 30 n mi of the northeast coast of the Dominican Republic early on 9 September. Satellite pictures show that much of the storm's circulation was over the island of Hispaniola. This situation probably contributed to the period of weakening that was occuring.

At 0000 GMT 9 September, the Bahamian Government issued gale warnings for the Turks and Caicos Islands, and by 1900 GMT, storm warnings were issued for the southeast and central Bahamas. Surface reports indicated that a well-defined circulation moved over the Turks and Caicos Islands late on 9 September and over Mayaguana Island in the extreme eastern Bahamas by 0000 GMT 10 September.

Cat island in the central Bahamas reported northwest surface winds of 30-35 kt as the storm center passed 40 n mi to the east at 1800 GMT 10 September. The highest rainfall report received from the Bahamas was 3.20 inches which fell during a 6 hr period ending at 1200 GMT 10 September at San Salvadore (MYSM). It is likely that isolated accumulations of 5 inches or more occurred on nearby islands.

A due northward turn was in progress by 1200 GMT 10 September, as well as a 42 h period of intensification which began at 1800 GMT on the 9th. Maximum intensity was reached at 1200 GMT on the 11th, as maximum surface winds reached 90 kt and the minimum sea level pressure fell to 988 mb. Gert became a hurricane at 1800 GMT 10 September. NOAA research aircraft performed a comprehensive data monitoring at the 850-mb level during the two days that Gert was of hurricane intensity.

Gert passed a little over 100 n mi northwest of Bermuda at 1800 GMT 12 September. Maximum winds in Gert were 70 kt as this time, but Bermuda's winds remained light, even though the surface pressure fell to 1000 mb.

Proceeding on a heading of 070°, the forward motion then accelerated to 30 kt. Gert was tracked by satellite to the vicinity of the Azores on 15 September, where its cloud remnants became difficult to identify. No death or significant damage report has been received.

PRELIMINARY BEST TRACK

TROPICAL STORM GERT

7 - 15 September 1981

DATE	TIME (GMT)	POSITION LATITUDE	POSITION LONGITUDE	PRESSURE (MB)	WIND (KT)	STAGE
9/07	0000	14.8	54.0	1013	25	Tropical depression
	0600	14.9	55.7	1012	30	
	1200	15.1	57.4	1012	30	
	1800	15.3	59.0	1010	30	
9/08	0000	15.6	60.6	1008	40	Tropical storm
	0600	16.1	62.3	1005	45	
	1200	16.8	64.0	1002	50	
	1800	17.8	65.4	1004	50	
9/09	0000	18.9	66.9	1006	45	
	0600	19.6	68.3	1009	40	
	1200	20.3	70.0	1011	35	
	1800	21.3	71.7	1012	35	
9/10	0000	22.1	72.8	1010	40	
	0600	22.7	73.7	1008	50	
	1200	23.7	74.5	1001	60	
	1800	24.8	74.4	996	70	Hurricane
9/11	0000	26.3	73.9	993	80	
	0600	27.7	73.0	990	85	
	1200	29.0	72.0	988	90	
	1800	30.2	70.9	988	90	
9/12	0000	31.5	69.6	989	90	
	0600	32.5	68.5	990	90	
	1200	33.4	67.1	992	85	
	1800	34.1	65.6	997	70	
9/13	0000	34.9	63.5	1002	60	Tropical storm
	0600	35.8	60.7	1006	55	
	1200	36.8	57.0	1008	50	
	1800	37.7	53.2	1010	45	
9/14	0000	38.3	49.4	1010	40	
	0600	38.8	45.6	1011	40	
	1200	39.2	41.9	1012	35	
	1800	39.6	38.6	1012	30	Tropical depression
9/15	0000	39.9	35.3	1012	30	
	0600	40.1	33.0	1012	25	
	1200	40.3	30.7	1012	25	
	1800	40.5	28.2	1012		Dissipated

TROPICAL STORM IRENE

21 September - 3 October 1981

National Hurricane Center, NOAA
Miami, Florida

Hurricane Irene was the fourth in a series of Cape Verde type storms to form in the month of September. The other three were Floyd, Gert, and Harvey. All four of these storms recurved without reaching the east coast of the United States. Irene was the fifth hurricane to form during the month, (Emily formed in early September) equalling the record of the number of hurricanes to form in a single month. The other years having five hurricanes form in one month were 1955 and 1893.

The system which was to become Hurricane Irene moved off the west coast of Africa on 19 September as a high amplitude perturbation on the intertropical convergence zone cloudiness. It moved westward as a large, diffuse, cloud mass until 21 September when it became better organized and started to separate from the ITCZ cloud band. At this stage it was upgraded to a tropical depression. This system continued moving westward as a large, sprawling, cloud mass which was slowly becoming better organized. It reached tropical storm status on 23 September. However, the deep convective clouds did not become concentrated around the center of circulation until 24 September.

Irene then started a slow turn toward the west northwest, reaching hurricane strength on 25 September. At this time, the future course of the storm was uncertain. There was a surface high pressure area centered to the northeast of the storm and another to the northwest over the eastern U. S. with a weakness in the pressure field to the north of the storm center. Also, a mid latitude upper level trough was moving eastward well to the north of Irene. Guidance from NHC computes was divergent, ranging from a continued west northwest course to rapid recurvature. The continued west northwest to northwest projections were primarily based on persistence and climatology while the recurvature forecasts were apparently based on the synoptic situation.

The storm followed neither long term course, but moved steadily northwestward for 48 hours, slowed and then turned more northerly for the next 24 hours. The slow northward motion was a result of the high pressure over the east coast of the U. S. on 25 September moving eastward north of the storm center on the 26th and 27th. However, this high pressure system was not strong enough to force the hurricane on a more westerly course. Irene then came under the influence of an upper level trough, accelerated toward the northeast through 30 September, slowed down on October 1 as it became involved with a strong, mid latitude, low pressure system, then moved generally eastward becoming extratropical, and finally moved inland over France with winds of 25 to 30 knots on 3 October.

The location and strength of Irene from its inception through the morning of 25 September and after 29 September were based solely upon satellite data. From 25 September through 29 September, the storms location and strength were well documented by both satellite and aerial reconnaissance. Figure 1 shows the "best track" while fugures 2 and 3 show the "best fit" minimum sea level pressures and maximum wind speeds respectively. The data from which these curves were determined are also displayed. These data show that Irene generally gained strength from its inception until mid day on 28 September when it turned toward the northeast and started to weaken. There were periods with fluctuations of maximum wind speeds and minimum pressures of about 10 knots and 5 mb respectively from 25 September through 28 September. The strongest winds were near 105 knots and the minimum pressure was 959 mb, both recorded on 28 September.

PRELIMIARY BEST TRACK

TROPICAL STORM IRENE

21 SEPTEMBER TO 3 OCTOBER 1981

DATE	TIME (GMT)	POSITION LATITUDE	POSITION LONGITUDE	PRESSURE (MB)*	WIND (KT)*	STAGE
9/21	1200	13.5	32.5	1015	25	TROP. DEPRESSION
"	1800	13.3	33.6	1013	26	" "
9/22	0000	13.1	34.9	1012	27	" "
"	0600	12.8	36.0	1011	28	" "
"	1200	12.6	37.2	1010	29	" "
"	1800	12.5	38.4	1009	31	" "
9/23	0000	12.4	39.6	1007	33	" "
"	0600	12.5	40.8	1005	35	TROP. STORM
"	1200	12.7	42.2	1003	39	" "
"	1800	13.0	43.8	1001	43	" "
9/24	0000	13.3	45.3	999	47	" "
"	0600	13.8	46.7	996	50	" "
"	1200	14.3	47.8	994	55	" "
"	1800	15.0	48.9	991	59	" "
9/25	0000	15.6	50.1	987	65	HURRICANE
"	0600	16.6	51.2	983	70	" "
"	1200	17.4	52.0	980	80	" "
"	1800	18.2	52.8	977	90	" "
9/26	0000	19.1	53.5	976	85	" "
"	0600	19.7	54.3	976	77	" "
"	1200	20.3	55.1	980	77	" "
"	1800	21.0	55.7	982	83	" "
9/27	0000	21.8	56.4	968	93	" "
"	0600	22.4	56.8	966	92	" "
"	1200	23.0	57.2	970	92	" "
"	1800	23.8	57.2	966	94	" "
9/28	0000	24.7	56.9	962	100	" "
"	0600	25.8	56.8	966	103	" "
"	1200	27.0	56.7	959	105	" "
"	1800	28.4	56.2	960	103	" "
9/29	0000	29.8	55.3	962	101	" "
"	0600	31.3	54.0	965	99	" "
"	1200	32.6	52.6	968	95	" "
"	1800	34.1	50.4	972	91	" "
9/30	0000	35.9	47.5	976	86	" "
"	0600	37.5	45.1	980	79	" "
"	1200	38.9	42.4	983	74	" "
"	1800	40.0	39.5	986	68	" "
10/1	0000	41.3	36.1	989	65	" "
"	0600	42.5	33.7	991	61	TROP. STORM
"	1200	43.7	32.0	994	57	" "
"	1800	44.8	30.3	996	53	" "
10/2	0000	45.1	28.5	999	50	" "
"	0600	45.4	25.0	---	--	EXTRATROPICAL
"	1200	45.2	21.0	---	--	" "
"	1800	44.5	17.0	---	--	" "
10/3	0000	43.6	11.5	---	--	" "
"	0600	45.0	4.0	---	--	" "

* MAXIMUM WIND SPEEDS AND MINIMUM SEA LEVEL PRESSURES INTERPOLATED FROM BEST FIT CURVE TO AIRCRAFT OBSERVED OR SATELLITE DERIVED VALUES.

USCOMM-NOAA-ASHEVILLE, N.C. 1981-1900

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